# draft-ietf-lpwan-ipv6-static-context-hc-16

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>

# Presentation agenda

- What has happened since IETF101? [ 3 mn]
- What is coming up next? [ 1 mn]
- Ticket status [ 1 mn]
- Single padding [10 mn]
- Appendix D, Ticket #15 [ 5 mn]
- Comments received since WGLC2 [25 mn]

# What has happened since IETF101?

# What has happened since IETF101?

- Formally closed tickets solved in -10
- Published -11 on Apr 13th
  - Improved Fig 3, Appendix D, when no Dtag, no R
- Published -12 on May 15th
  - SCHC F/R, LSB(y) -> LSB
- Published -13 on May 22nd
  - variable length field text (Ticket #18)

# What has happened since IETF101?

- -14, -15 and -16 published on June 29th
  - L2 Word, single padding, RuleID identical in frag and ACK, UDP checksum elision text, fixed Ack-Always sender FSM, C-bit bump
- Second WGLC initiated on June 29th, closing now
- Pascal's shepherd review comments July 3rd
  - Presented at interim July 7th
- More comments received recently
  - Lars, Edgar, Soichi (hackathon), Charlie, Juan-Carlos

# What is coming up next?

# What is coming up next?

- WGLC2 closure today
- Process comments received
  - Pascal, Lars, Edgar, Soichi, Charlie, Juan-Carlos
  - See dedicated section in this presentation
- Publish -17 soon
- Sepherd to request publication to IESG

# Ticket status

# Tickets

- All Tickets by the LPWAN WG
  - https://trac.ietf.org/trac/lpwan/report/6
- Selective link to Tickets pertaining to *this* draft
  - ipv6-schc-all-tickets
- As of today, 29 tickets pertain to this draft
  - that is, #2-#26 and #28-#31
  - all CLOSED, ticket #6 might be re-opened (see last comments received)
- Resolution for each Ticket
  - tracked in Appendix to this presentation, see at bottom
  - recap mail to be sent out soon
- New tickets opened as a response to recent comments?

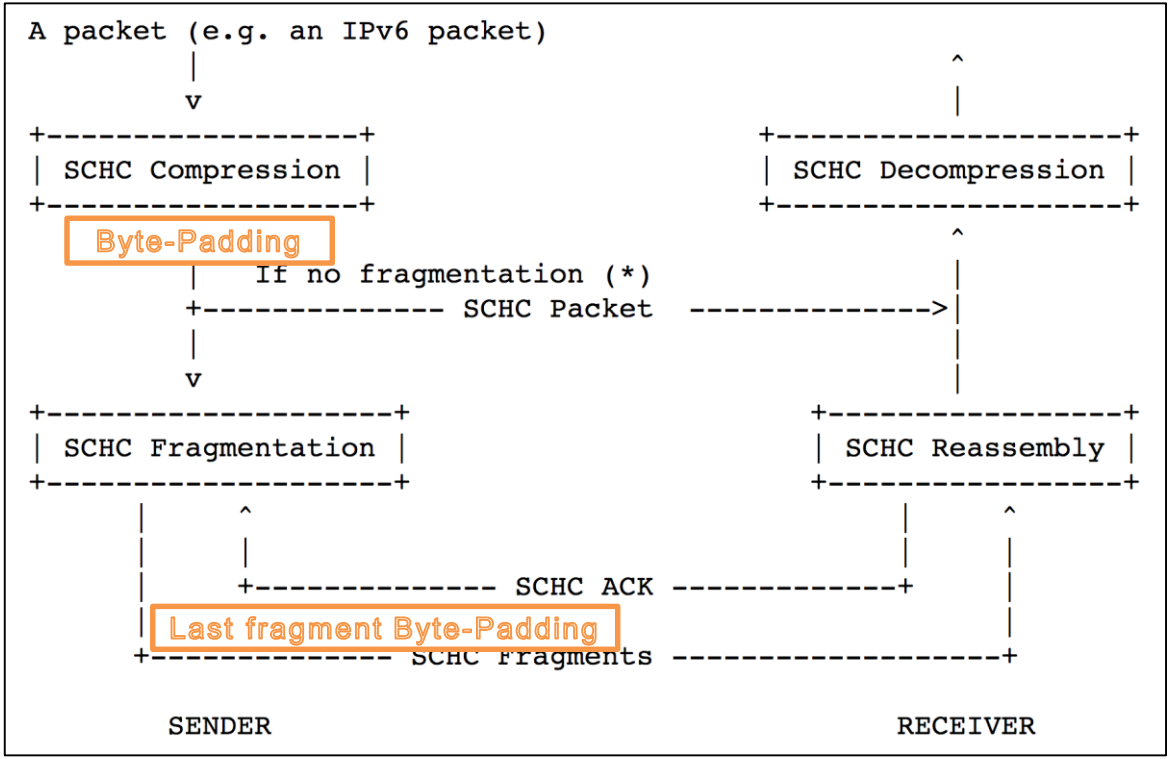
# Single padding

# Single padding, timeline

- Idea floated at interim May 16th
- Virtual corridor meeting May 22nd
- Full-fledged proposal presented at interim May 30th
- Mail sent out to WG ML on May 30th , again June 5th
- Received 6 positive response, 0 objection
- Decision to integrate proposal at Jun 13th interim
- First appearance in -14, June 29th

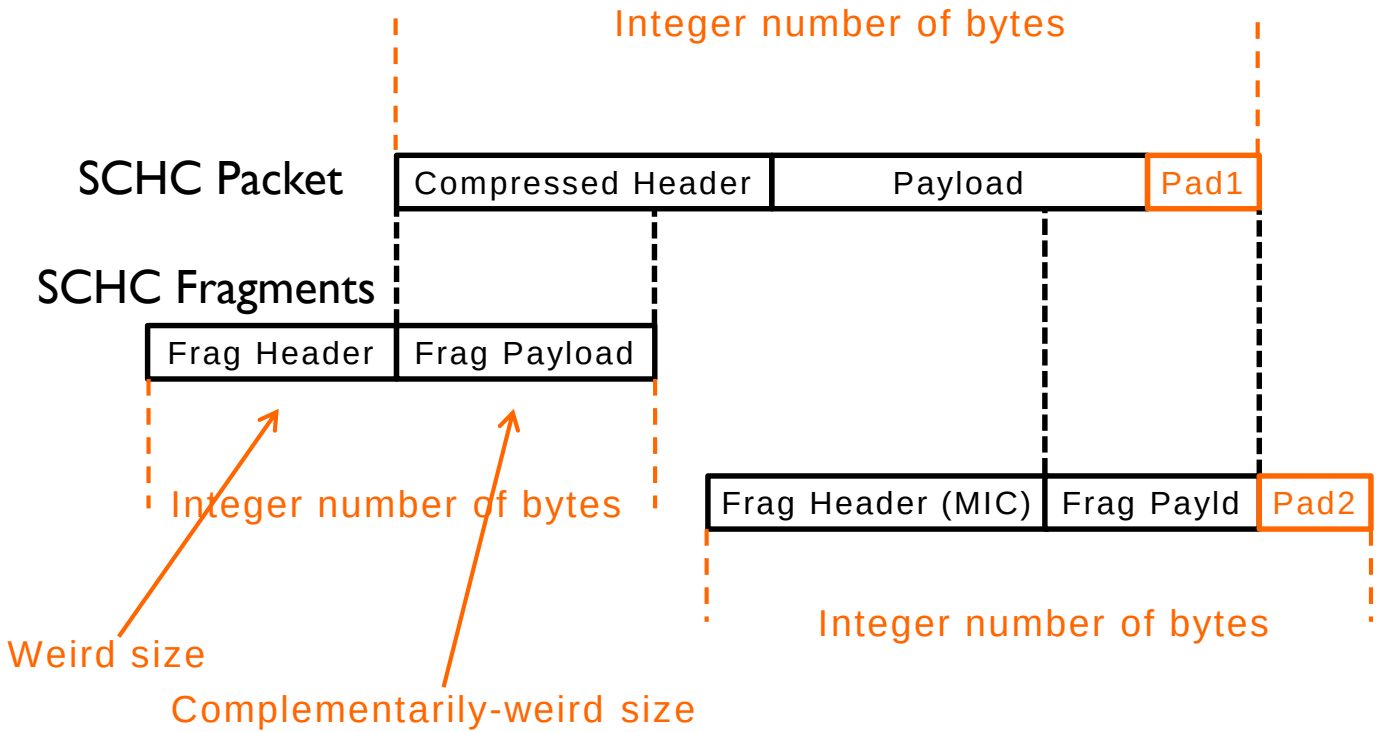
# Padding, until -13

- If padding enabled, two paddings in series



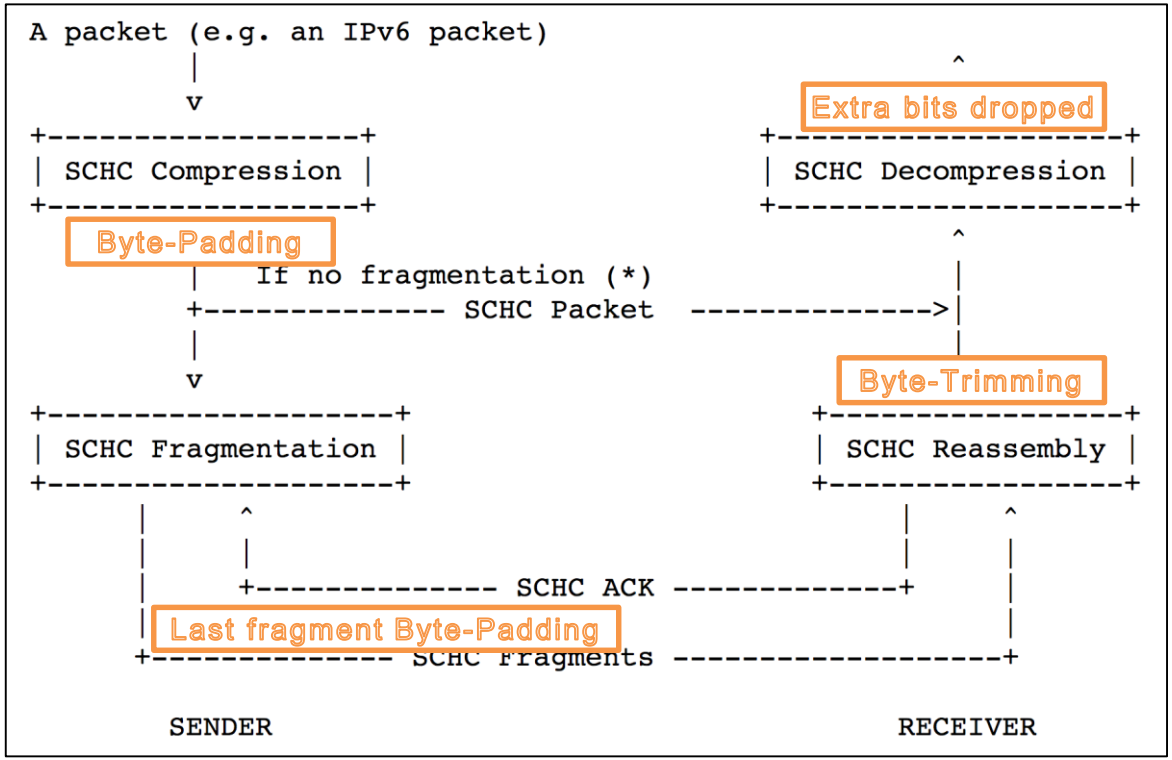
# Padding, until -13

- If padding enabled, two paddings in series



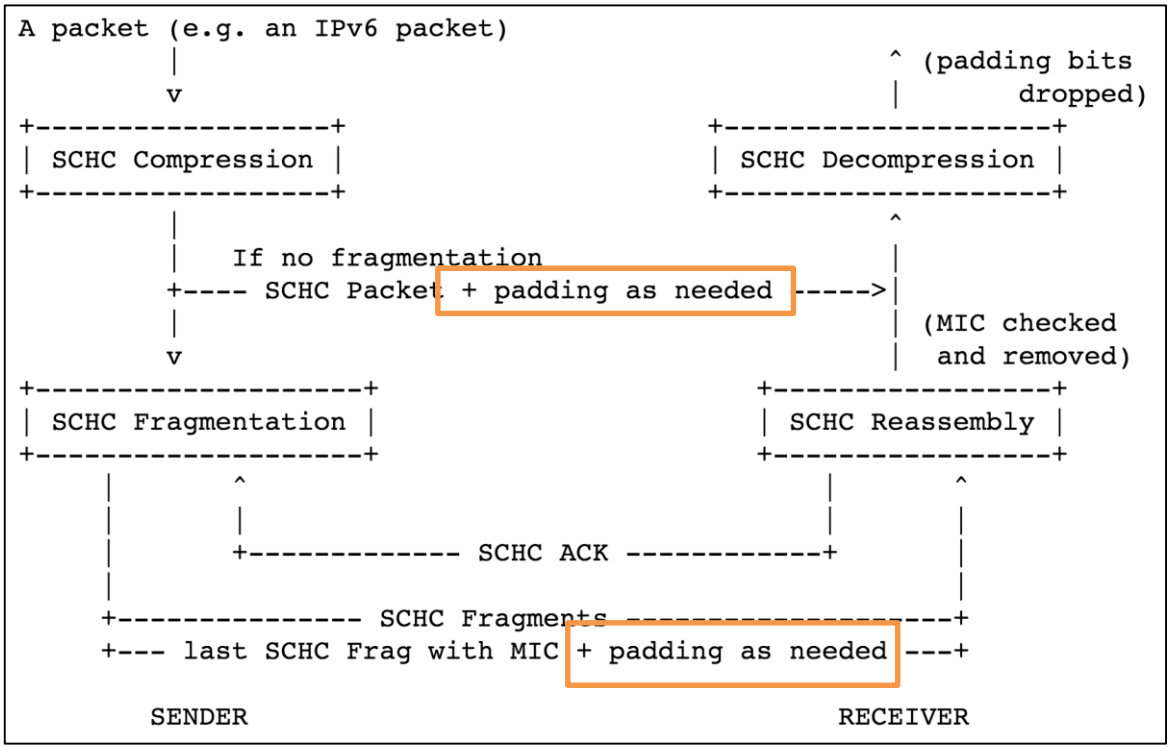
# Padding, until -13

- If padding enabled, two paddings in series



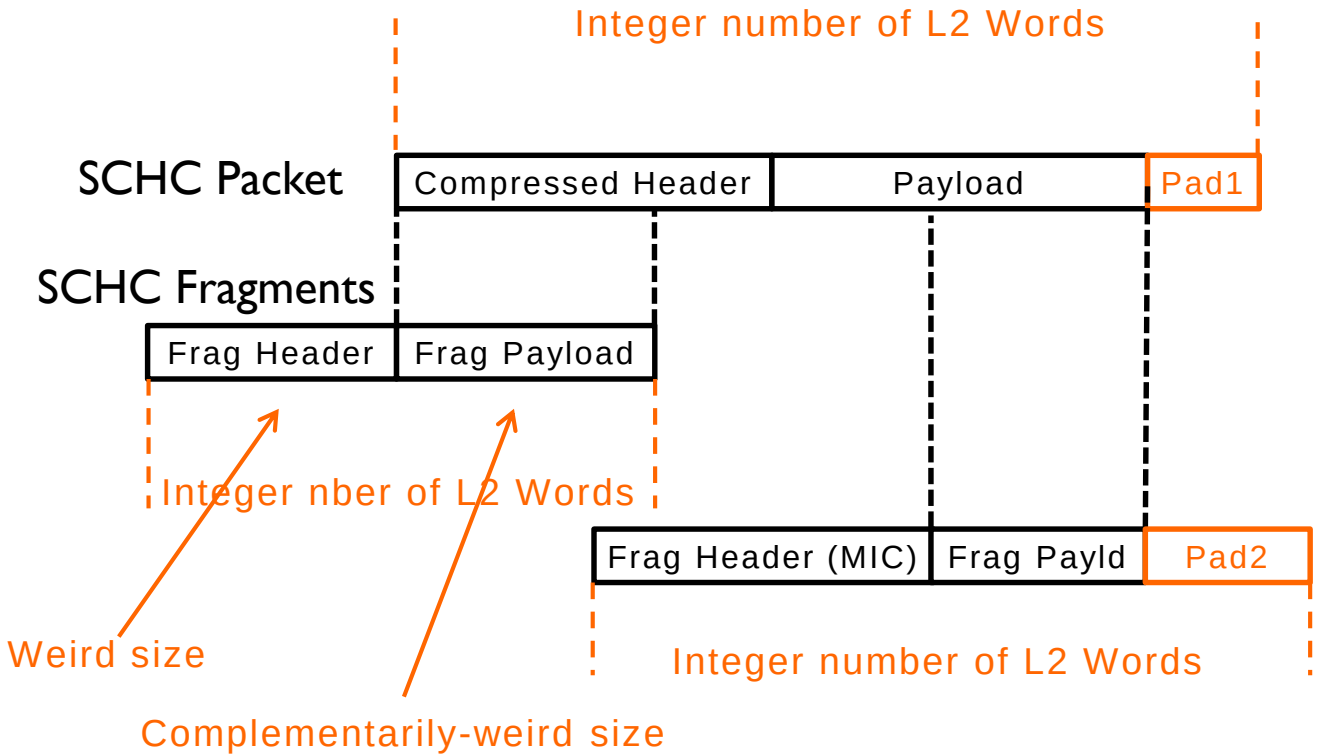
# Padding, from -14 onward

- Padding done at most once
- L2 Word can be 1 byte, 1 bit, …



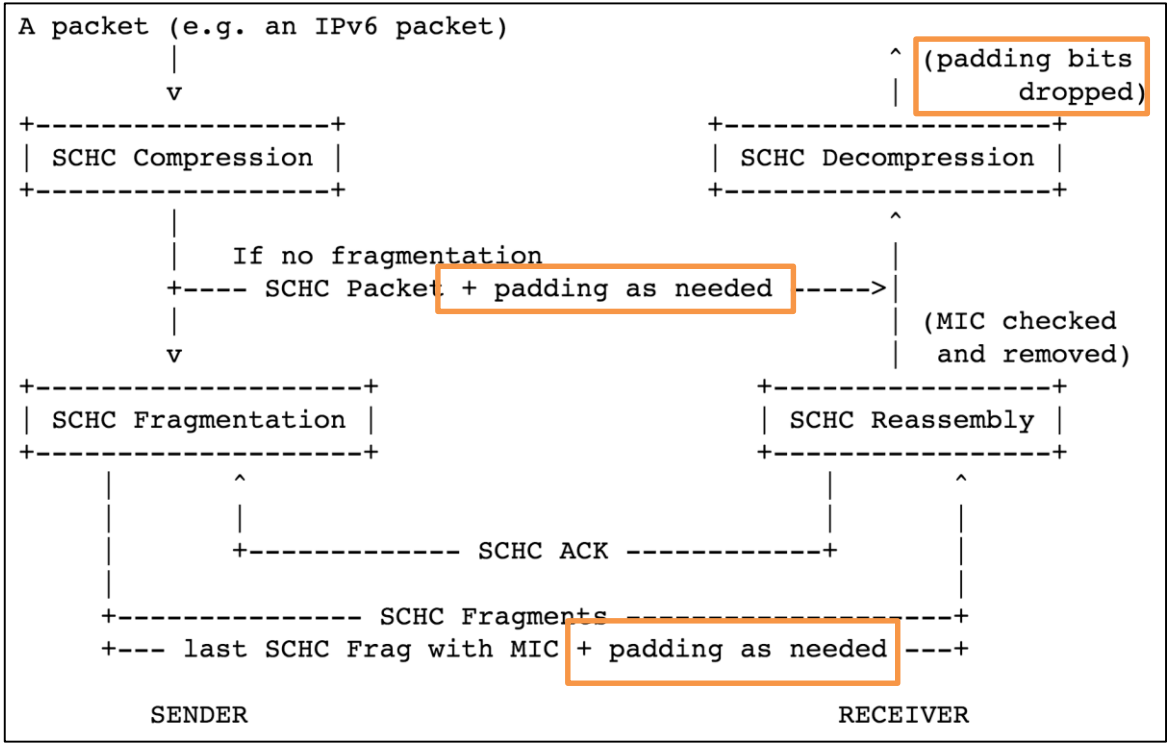
# Padding, from -14 onward

- Padding done at most once
- L2 Word can be 1 byte, 1 bit, …



# Padding, from -14 onward

- Padding done at most once
- L2 Word can be 1 byte, 1 bit, …



# Appendix D: parameter/choices left to each technology-specific document

# Appendix D

- Text is still rough
- Is an Appendix the right place for this info?
  - Is this normative content?

# Appendix D, current listing

- Use-case, deployment
- Mapping of architectural elements
- L2 integrity checking
- RuleID numbering, format
- L2 Word
- Fragmentation by SCHC?
  - Reliability modes, concurrent transmission, parameters, timers

# Comments received since WGLC2

# Lars

- traffic class field contains ECN bits. The "ignore" MO will bleach them out
  - Good point, will be taken into account
  - Is a device sensitive to ECN? So far, no Layer 4 in LPWAN space uses ECN, so can safely ignore it.
  - In the future, could transmit it in full or could use send-LSB CDA

# Edgar

- Write “L2 MTU” instead of “L2 data unit”
  - We will update text

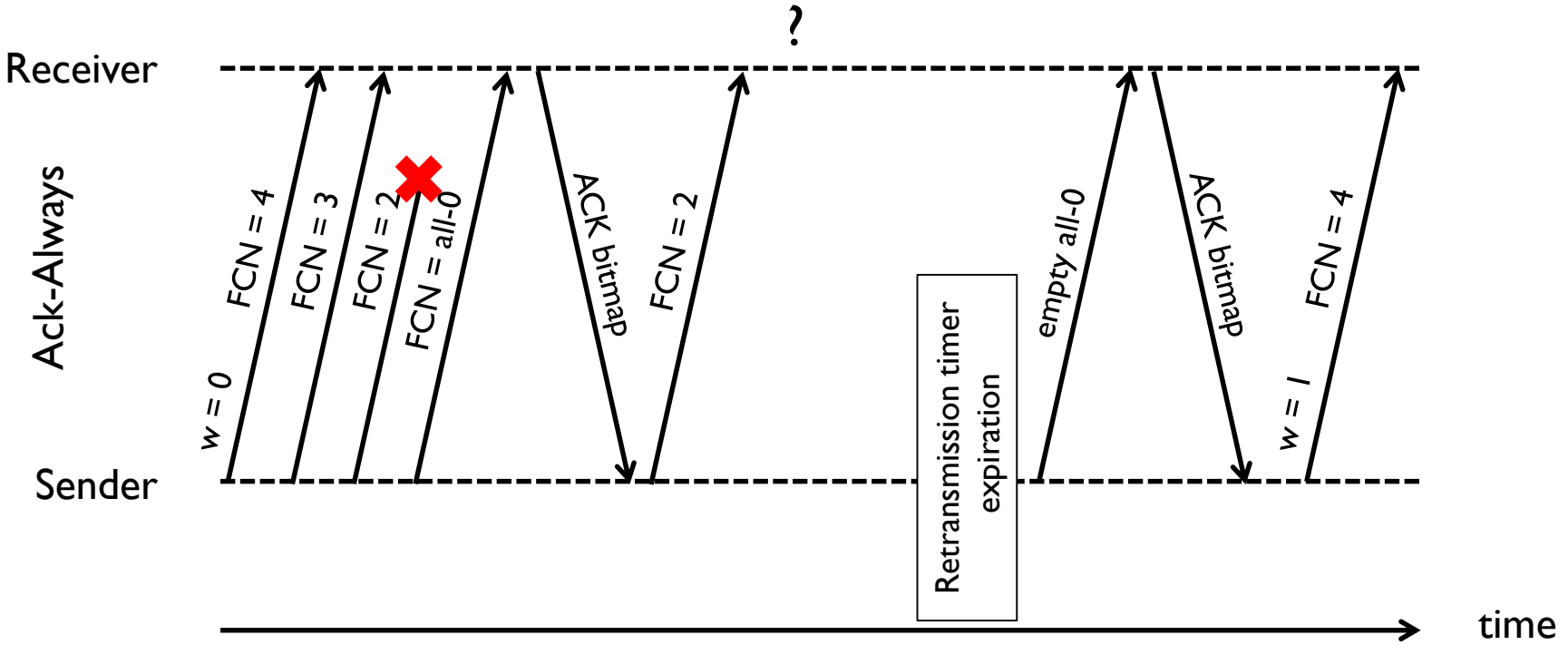
# Soichi

- Hackathon : working on implementation, with standard CRC library. They are byte-oriented.
  - In theory, CRC can be computed on any bit array
  - Specify byte fill-up for MIC computation ?
  - Leave to technology-specific draft to specify MIC computation ?

# Pascal

- partially filled all-0 windows is complex, creates un-necessary complication and confusion in description

# What if windows can be partially filled?



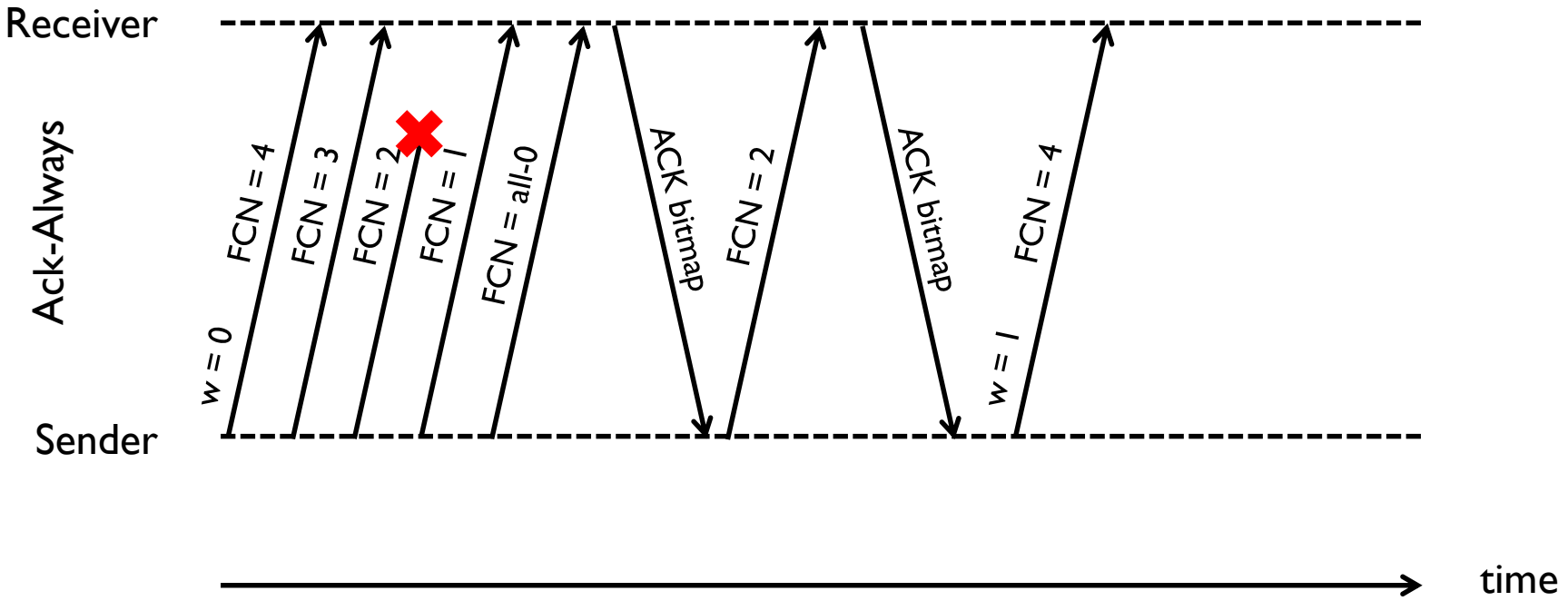
# Partially filled windows?

- 3 options
  - Leave situation unchanged, retransmission timer will trigger sending the « empty All-0 » frag
  - Mandate that windows MUST be full (but the last)
  - Mandate that (empty) All-0 frag be sent at the end of each retransmission burst

# Partially filled windows?

- Proposing to adopt option 2
  - mandate all-0 windows are full, all FCN values used.

# If windows must be partially full



# Partially filled windows?

- Proposing to adopt option 2
  - mandate all-0 windows are full, all FCN values used.
- Opinions?
  - Got 5 supports on ML, no objection

# Pascal

- #2: "expected window" is both w=0 and w=1 after receiver sends SCHC ACK
  - Issue disappears if we mandate that windows be full

# Pascal

- #3: text on fragmentation still hard to parse. Many “if”, “otherwise”, “on the other hand”

# Pascal

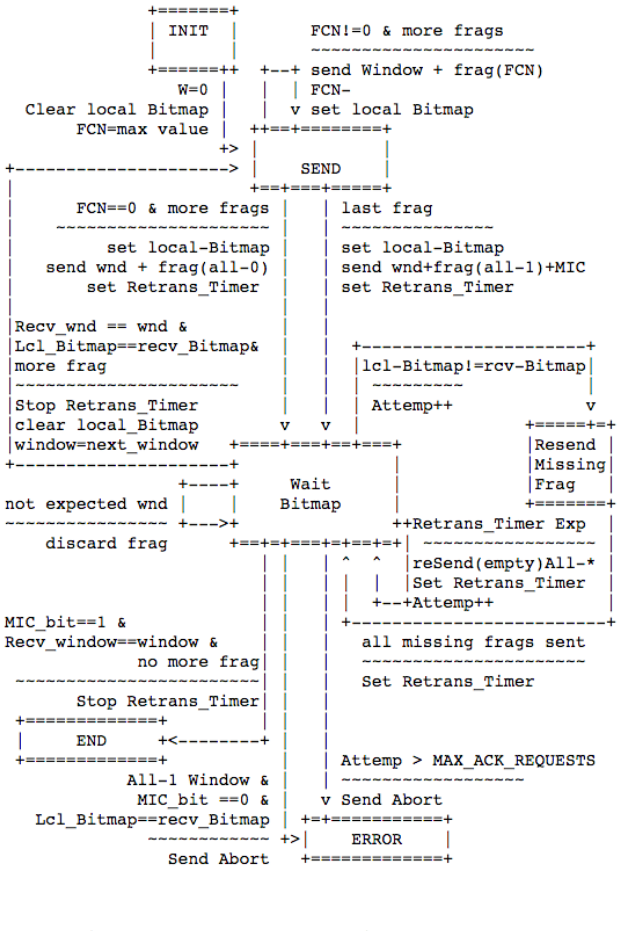
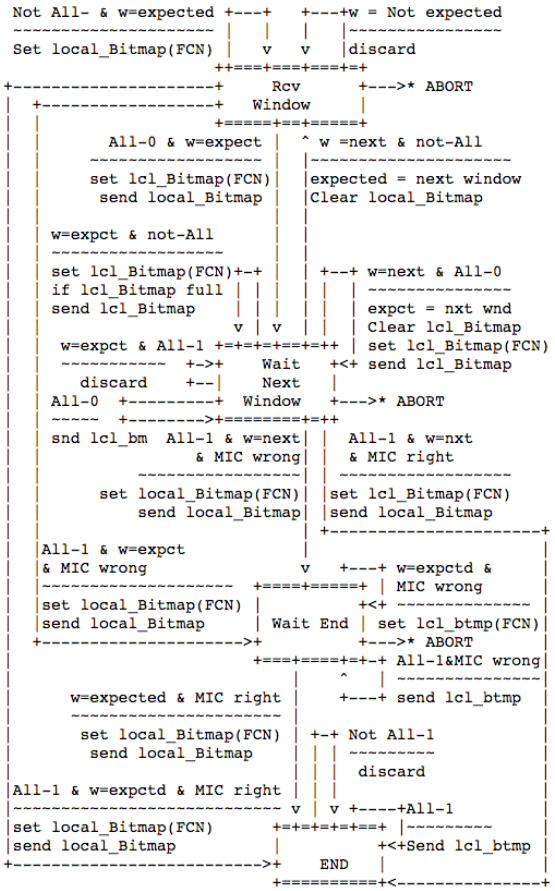



Figure 41: Sender State Machine for the ACK-Always Mode



# Pascal

- #3: text on fragmentation still hard to parse. Many “if”, “otherwise”, “on the other hand”
  - Make the FSM drawing normative, text an help to decipher the drawing?

# Charlie

- #1: Since the Sender-Abort doesn't have a MIC, does this mean that the Abort could be spoofed and all fragmented transmissions disabled?
  - L2 has its own anti-spoofing mechanism. The All-1 frag MIC is not meant to protect the message, but to verify the whole reassembly process.

# Charlie

- #2: If L2 Word can be one bit, what about this sentence "The size of the All-0 fragment header is generally not a multiple of the L2 Word size."
  - If L2 Word is one bit, the All-0 fragment header is indeed a multiple of the L2 Word. "generally" catches that exception as well. Better wording?

# Charlie

- #3: MIC is only used with fragmentation, yet required for UDP elision at compression. What if UDP datagram is compressed but not fragmented?
  - If not fragmented, could send UDP checksum in full. Or rely on L2 CRC if strong enough. Or send one fragment in order to have MIC.

# Charlie

- #4: fragmentation/reassembly mechanism in the specification is to be treated as optional.
  - We'll look at it and try to restructure text. Will rewrite Appendix D in a hierarchical manner, esp. wrt. Fragmentation

# Charlie

- #5: Target Value type to be stored in context to check for run-time discrepancies?

# Charlie

- #6: implication of allowing out-or-order application of CDAs, such as compute-*?

# Juan Carlos

- #1: Make MIC optional? If L2 integrity is good enough, why waste bytes for a MIC? Especially for non-UDP traffic?
  - MIC is still needed to make sure that all the fragments of last window have been received. MIC can be made as short as an L2 Word.
  - Could make all ACK retransmission requests be All-0, even in last window: rename it "SCHC ACK Request"

# Juan Carlos

- #2: Ack-on-Error. Currently, on loss of All-0 Frag or loss of ACK : unexpected window, therefore Abort.
  Proposal to treat Frag with unexpected w value as a roll-back signal.

# Juan Carlos

- #3: allow N>1 in No-Ack mode
  - For Alignment ? Looks like Reserved bits
  - To convey some information to the receiver: however, since FCN starts from MAX_WIND_FCN, no information is conveyed

# Thank you for your attention

# Details on Ticket resolution

# Ticket resolution (1/5)

| ticket # | nickname | resolution first appeared in | section(s), in that version |
|---|---|---|---|
| **2** | Rule ID default size | -10 | 5, 6.2, 7.2 |
| **3** | Zip bomb | -10 | 10.1 |
| **4** | DNS lookup | -10 | 6.1 |
| **5** | Decouple Compr. and Fragm. | -10<br>-12 | 3, 4<br>3, 7.1, 7.2 |
| **6** | Fully-used fragmentation windows | -10<br>Re-open for -17? | 7.2, 7.5.2 |
| **7** | Hop Limit default values | N/A | N/A |

# Ticket resolution (2/5)

| ticket # | nickname | resolution first appeared in | section(s), in that version |
|---|---|---|---|
| **8** | Different RuleIDs with same Dtag? | N/A | N/A |
| **9** | Reordering between RGW and NGW | -10 | Intro, 7.1 |
| **10** | Interleaving of packets | N/A | N/A |
| **11** | ACK format, padding | -10 | 7.4.3, 8 |
| **12** | Padding place | -10<br>-14 | 8<br>3, 8 |
| **13** | Terminology, sublayers | -11<br>-13 | 4<br>4 |

# Ticket resolution (3/5)

| ticket # | nickname | resolution first appeared in | section(s), in that version |
|---|---|---|---|
| **14** | Beg./ending rule, legacy devices | -10 | 5 |
| **15** | Parameters to be specified in technology-specific documents | -11 | Appendix D |
| **16** | Compression terminology | See #13 | See #13 |
| **17** | New compression terms | -10 | 3, 5, 6.1 |
| **18** | MSB/LSB arguments | -12 | 6.5 |
| **19** | Fragmentation terminology | -14 | 3, 7.2 |

# Ticket resolution (4/5)

| ticket # | nickname | resolution first appeared in | section(s), in that version |
|---|---|---|---|
| **20** | « byte boundary » term | -14 | 7.4, 8 |
| **21** | C-bit, All-1 SCHC ACK « bump » | -14 | 7.5, App. D |
| **22** | Make fragmentation optional | -11 | Abstract, 1 |
| **23** | NB-IoT, multiRAT, fragmentation | -14 | 7.1 |
| **24** | What if Dtag not present? | -13 | 7.2 |
| **25** | Rule synch. between both ends | N/A | N/A |
| **26** | Frag and ACK RuleID match? | -14 | 7.4.3 |

# Ticket resolution (5/5)

| ticket # | nickname | resolution first appeared in | section(s), in that version |
|---|---|---|---|
| **27** | N/A to this draft | | |
| **28** | Ill-formed sentence in 7.5.2 | -14 | 7.5.2 |
| **29** | Rephrase Bitmap encoding section | -14 | 7.4.3.1 |
| **30** | Fix Ack-Always FSM drawing (1) | -14 | App. C |
| **31** | Fix Ack-Always FSM drawing (2) | -14 | App. C |