SCHC fragmentation

Authors:
Ana Minaburo <ana@ackl.io>
Laurent Toutain <laurent.toutain@imt-atlantique.fr>
Carles Gomez <carlesgo@entel.upc.edu>

100th IETF, Singapore, November 13th, 2017
Status

• Since IETF 99
  – revisions -06 and -07 published

• Plan for -08
  – Complete the work in -07
  – Review, solve corner cases
    • Side-meeting Tuesday (Butterworth room, 9:30-12:00)
  – Possibly intended for WGLC
Technical updates in -06 (I)

- **ACK Always**
  - Clarified when to check the MIC after retries in the last window
  - After all-1 frag received, check MIC after each retransmitted frag received
  - If reassembly OK, frag receiver sends the ACK

```
<table>
<thead>
<tr>
<th>Sender</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>W=0, CFN=6</td>
<td></td>
</tr>
<tr>
<td>W=0, CFN=5</td>
<td></td>
</tr>
<tr>
<td>W=0, CFN=4</td>
<td></td>
</tr>
<tr>
<td>W=0, CFN=3</td>
<td></td>
</tr>
<tr>
<td>W=0, CFN=2</td>
<td></td>
</tr>
</tbody>
</table>
| W=0, CFN=7  | MIC checked | 11000001
|----ACK, W=0 |          |
| W=0, CFN=4  | MIC checked: wrong |
| W=0, CFN=3  | MIC checked: wrong |
| W=0, CFN=2  | MIC checked: right |
|----ACK, W=0 | no bitmap   |
```
Technical updates in -06 (II)

• ACK Always
  – MAX_FRAG_RETRIES and MAX_ACK_REQUESTS simplified into a single parameter
  – MAX_ACK_REQUESTS
  – Recommended ACK Always timer to be reasonably short

• ACK on error
  – Added MAX_FRAG_RETRIES
  – Discussed also in the Security Considerations section
Editorial updates in -06

• Abstract
  – Minor improvement (fragmentation part)

• Merged sections 5.2 and 5.3
  – 5.2. Reliability options: definition
  – 5.3. Reliability options: discussion

• Added examples (Appendix B)
  – Window mode – ACK “always”
    • Last window behavior
For -08: Problem

- Downlink fragmentation and ACK Always
  - In some technologies, an uplink message is required prior to the transmission of X downlink messages
  - E.g. X=1

If ACK lost, neither the next fragments (if any) nor the “ACK request” can be sent.
For -08: solution

- Solution: timer-based ACK retransmission
  - Fragment receiver: ACK Retry timer
    - Except for an ACK reporting no losses in response to all-1 fragment
    - Stopped upon receipt of a frag of the next window or a missing frag from the current window
  - Fragment sender
    - Last fragment, initialization of ACK Always Timer to long value
    - If timer expires and no ACK received, sender assumes
      - All-1 fragment (and the whole last window) successfully received
      - Last ACK, reporting no losses, lost (most likely)
Corner cases

• MIC check fails but FCNs apparently correct
  – Possible at all?
  – If yes, reaction of the receiver in ACK modes?

• Issue in ACK on error
  – If all fragments sent and lost
    • False positive
  – To discuss: adding (the option to have) a final ACK?
    • At the end of the packet
    • Unconditionally
Thanks!

Comments?

Authors:
Ana Minaburo <ana@ackl.io>
Laurent Toutain <laurent.toutain@imt-atlantique.fr>
Carles Gomez <carlesgo@entel.upc.edu>