LPWAN SCHC Fragmentation

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Status (I/II)

• Since IETF 98 (Chicago)
  – Revisions -03, -04, -05
  – Reviews
    • Diego Dujovne: -03
    • Dominique Barthel: -05
  – Input (WG interims, on the list, offline)
    • Pascal Thubert, Alexander Pelov, Juan Carlos Zúñiga, Carsten Bormann, Gengyu Wei, Arunprabhu Kandasamy
Status (II/II)

• Current status
  – Last revision published is -05
  – Updates ready for -06 after DB’s review
    • Available on github.com/lp-wan/ip-compression
  – Overall: stable
Main updates since -02 (I/II)

- Packet mode removed
- Multiple window sizes supported
- Highest CFN in the window lower than $2^N - 2$
  - E.g. it can be 23 (with N=5), allows a 24-bit bitmap
- W and DTag added
  - Both in fragments and ACKs
- Timers added
  - Ack on error
  - Ack “always”
Main updates since -02 (II/II)

• Parameters
  – MAX_ACKS_PER_WINDOW
  – MAX_ACK_REQUESTS
  – MAX_FRAG_RETRIES

• Abort

• Downlink fragment transmission
Main updates for -06 (I/II)

• FCN instead of CFN
  – Fragment Compressed Number

• Highest FCN in the window
  – MAX_WIND_FCN

• Sender in Window mode – ACK on error
  – Assumption: ACK wait time smaller than time to transmit a complete window
  – Careful consideration of L2 technology characteristics
Main updates for -06 (II/II)

- **Outstanding question:**
  - MAX_FRAG_RETRIES
    - Currently, only in ACK “always”
    - ACK on error:
      - Currently, the receiver sends an ACK and expects frag retries
      - Might also be a way to deplete the battery of an end-device?
    - a) Define MAX_FRAG_RETRIES also in ACK on error?
    - b) Define it, allowing up to “infinite” retries, and defer to SCHC over foo documents?
    - c) Handle this at an implementation level?
Thanks!

Comments?

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### Back-up slide: frag header formats

#### No ACK

![No ACK diagram](image)

#### Window mode

![Window mode diagram](image)

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**A fragment (not the last one)**

<table>
<thead>
<tr>
<th>Rule ID</th>
<th>DTag</th>
<th>CFN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rule ID</th>
<th>DTag</th>
<th>11..1</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

**Last fragment**

<table>
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<th>DTag</th>
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</tr>
</thead>
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</table>
Back-up slide: overhead analysis

- Uplink fragmented IPv6 packet transmission
- 12-byte MTU (UL), 8-byte MTU (DL)