Compressed IPFIX for Smart Meters in Constrained Environments

draft-braun-core-compressed-ipfix-01

Lothar Braun, Corinna Schmitt, Benoit Claise, Georg Carle

77th IETF Meeting, Anaheim, 2010
Agenda

- Motivation for Compressed IPFIX

- Brief presentation of the modifications to IPFIX

- Goals:
  - Get attention to the protocol/activities
  - Get feedback from the IPFIX experts
  - Point to the full presentation in the CoRE-WG
    - Meeting at Thursday 9:00-11:30
    - Time slot for presenting Compressed IPFIX in more depth
Idea: IPFIX in Constrained Environments

- Use IPFIX for exporting sensor data from constrained devices in 6LoWPAN networks
  - Sensors perform periodic measurements
  - Sensors aggregate several measurements into a single packet
  - Export the aggregated measurements
  - Power-off wireless transceiver in the mean time

- Constraints:
  - Hardware:
    - Little Memory: ~ 8 kb RAM
    - Little Energy: Battery-Powered
  - Network:
    - IEEE 802.15.4 wireless lan
    - Packet size constraint:
      - 128 Bytes frames
      - ~102 Bytes for application payload

- Propose modifications to IPFIX ➔ Compressed IPFIX
Compressed IPFIX – Message Header

- Goal: reduce message size by „compressing“ headers

<table>
<thead>
<tr>
<th>4 Bytes</th>
<th>Version</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Bytes</td>
<td>Export Time</td>
<td></td>
</tr>
<tr>
<td>4 Bytes</td>
<td>Sequence Number</td>
<td></td>
</tr>
<tr>
<td>4 Bytes</td>
<td>Observation Domain</td>
<td></td>
</tr>
</tbody>
</table>

16 Bytes

2 Bytes

0 – 8 Bytes

2 - 10 Bytes

Compressed IPFIX for smart meters in constrained networks
Compressed IPFIX – Set and Template Record Header

**Modified Set Header**

- 4 Bytes
  - Set ID
  - Length

- 2 Bytes
  - Set ID
  - Length
  - Set ID 1 – 127: Template/Reserved
  - Set ID 128 – 255: Data Sets

**Modified Template Record Header**

- 4 Bytes
  - Template ID
  - Field Count

- 2 Bytes
  - Template ID
  - Field Count
Conclusion

- Changes to IPFIX as per RFC 5101
  - Reduced header sizes (Message header, Set header and Template Record header)
  - Changes to Template Management over UDP
    - Sensors sleep most of the time
      - Templates are not retransmitted after $N$ seconds
      - But: Templates are resend after $N$ Data Sets

- Compressed IPFIX can be translated into IPFIX (a Mediation process exists)

- Two existing implementations
  - Enhanced our IPFIX implementation in VERMONT to include Compressed IPFIX Exporting and Collecting Processes
  - Protocol implementation on TinyOS for IRIS Motes

- We are looking for people who are interested in Compressed IPFIX
  - Protocol will also be presented in depth in CoRE