TCP over Constrained-Node Networks

draft-gomez-lwig-tcp-constrained-node-networks-03

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Motivation

• Several application layer protocols being used for the Internet of Things (IoT)
  – Constrained Application Protocol (CoAP)
    • Originally over UDP
    • CoAP over TCP in progress
      – To overcome middlebox problems
  – HTTP/2 and HTTP/1.1
  – XMPP
  – MQTT

• TCP is being / will be used in many IoT scenarios
  – Offer simple measures for suitable TCP implementation/operation over CNNs
Status

- draft-gomez-core-tcp-constrained-node-networks-00
  - Presented in IETF 96 (LWIG and TCPM WGs)
- draft-gomez-lwig-tcp-...-01
  - Presented in IETF 97
- draft-gomez-lwig-tcp-...-02
  - Presented in IETF 98
- draft-gomez-lwig-tcp-...-03
  - Feedback from IETF 98
  - Details on RIOT and OpenWSN TCP implementations
    - Thanks to Simon Brummer and Xavi Vilajosana
Acknowledgment

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Updates in -03 (I/V)

• 4.2. Maximum Segment Size (MSS)
  – RFC 1981: technologies that support an MTU > 1280 bytes
    • SHOULD support PMTU discovery
      – A minimal IPv6 implementation may choose to omit implementation of PMTU discovery
  – Unless applications require handling large data units (IPv6 datagram size > 1280 bytes)
    • Desirable to limit the MTU to 1280 bytes
4.8. Delayed Acknowledgments

- Constrained device sending data to a peer
- If Delayed ACKs are enabled at the peer
  - ACKs may be delayed by, typically, 200 ms
  - Transactional-type traffic
    - Unnecessary delay
    - Disabling Delayed ACKs is recommended
    - Possible if the peer is administered by the same entity managing the CNN
Updates in -02 (III/V)

• 7.3. RIOT TCP implementation
  – Designed for Class 1 devices
  – Targets are 8- and 16-bit microcontrollers
  – Single-MSS window
    • Simplifies implementation
  – By default, only enough memory for a single TCP connection
  – Similar to uIP, but:
    • Memory allocated can be increased to support multiple parallel connections
      – Provides independent buffer for each connection
    • Retransmission handled by TCP
Updates in -02 (IV/V)

• 7.4. OpenWSN
  – Mostly equivalent to uIP implementation
  – Only supports minimum functionality
  – E.g. does not perform retransmissions
Updates in -03 (V/V)

- **Annex**

<table>
<thead>
<tr>
<th></th>
<th>uIP</th>
<th>lwIP orig</th>
<th>lwIP 2.0</th>
<th>RIOT</th>
<th>OpenWSN</th>
<th>TinyOS</th>
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More details welcome!
WG adoption?