TCP Usage Guidance
in the Internet of Things
draft-ietf-lwig-tcp-constrained-node-networks-01

Carles Gomez
Universitat Politècnica de Catalunya
Jon Crowcroft
University of Cambridge
Michael Scharf
Nokia

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Status

• WG document after IETF 99 (Prague)

• draft-ietf-lwig-tcp-constrained-...-01
  – Last revision
  – Feedback from IETF 99
  – Comprehensive review by Hannes Tschofenig
  – Further on-list comments
    • Rahul Jadhav, Joe Touch, Abhijan Bhattacharyya...
Updates (I/III)

• Title
  – Old: TCP over Constrained-Node Networks
  – New: TCP Usage Guidance in the Internet of Things

• Abstract
  – Old
    • Profile
  – New
    • Guidance: techniques that simplify a TCP implementation
    • Related trade-offs
    • Help embedded developers with decisions
Updates (II/VIII)

• 1. Introduction
  – Optional TCP extensions increase codesize and RAM requirements
    • Many are not required for interoperability
    • Careful tuning can make the implementation lightweight
  – A TCP implementation following guidance in this document
    • Intended to be compatible with a TCP endpoint compliant with TCP standards
      – Possibly with lower performance in some aspects
Updates (III/VIII)

• 3. Characteristics of CNNs relevant for TCP
  – Structure:
    • 3.1. Network and link properties (former section 2)
    • 3.2. Usage scenarios (former section 3)
    • 3.3. Communication and traffic patterns
  – Traffic patterns
    • Unidirectional transfers
    • Request-response transfers
    • Bulk data transfers
  – Constrained-to-constrained possible
Updates (IV/VIII)

• 4.2. Maximum Segment Size (MSS)
  – Redundancy removed (editorial update)

• 4.3. Window size
  – Devices that support a larger TCP window size may benefit from Fast Retransmit and Fast Recovery
    • Window of 5 MSS needed (i.e. 6100 bytes for 1220-byte MSS)
  – Bulk data transfers may benefit from Limited Transmit
Updates (V/VIII)

• 4.4. RTO estimation
  – Trade-off more explicitly described
    • Aggressive vs conservative
  – There exists margin for RTO algorithm tuning
    • CoCoA cited as an example
Updates (VI/VIII)

• 4.8. Delayed Acknowledgments
  – Problem
    • Single-MSS window sender transmitting to a receiver that uses Delayed ACKs (e.g. outside the CNN)
  – Workaround: “Split hack”
    • Split the data into two segments of smaller size
    • Downside: overhead of two packets

• 5. Security considerations
  – BCP for securing TCP also applies in CNNs
    • E.g. TLS
  – Sec considerations of the mechanisms discussed apply
Updates (VII/VIII)

• 7.1. Annex: uIP
  – In case of a retransmission, the application must be able to reproduce the same user data
  – “Split hack”

• 7.5. Annex: TinyOS
  – The application is responsible for buffering
    • Send buffer available
    • Multiple-MSS window

• References
  – Better distinction: normative vs informative
Updates (VIII/VIII)

- Annex

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Potential changes for -02

• Possible reorganization of Section 4 contents
  – Change the order of some subsections
    • E.g. “Delayed ACKs” subsection, more relevant than the “ECN” one
  – Other approaches
    • Single-MSS vs multiple-MSS window size
Thanks!

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