

CoAP in space

draft-gomez-core-coap-space-00

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Introduction

- Deep space communication:
 - Between devices on/orbiting different celestial bodies
 - Long delays, intermittent comm. opportunities...
- IP stack was considered unsuitable for deep space
 - Led to DTN architecture (RFC 4838) and BP (RFC 5050, RFC 9171)
- draft-many-deepspace-ip-assessment:
 - Revisits the assessment on the IP stack for deep space
- Constrained Application Protocol (CoAP)
 - Suitable for deep space
- This document:
 - Informational, guidance on how CoAP can be used for deep space

Overview

- CoAP over UDP
 - Reliability is optional, short header size, groupcomm support, no initial handshakes
- CoAP parameter settings and related times
 - NSTART ?, ACK_TIMEOUT, MAX_RETRANSMIT
 - MAX_LATENCY, EXCHANGE_LIFETIME, NON_LIFETIME
- Congestion control: needed in deep space?
- Observe
- Block-wise transfers
 - RFC 9177: no stop & wait, NON-based, efficient loss recovery
 - Parameter settings
- Security: OSCORE can avoid initial handshakes by use of pre-shared materials

CoAP over Bundle Protocol (BP)

draft-gomez-core-coap-bp-00

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Introduction

- Interest in CoAP over BP
 - Main BP specification: RFC 9171
- This document:
 - How CoAP can be carried over BP
 - Intended Status: Standards Track
 - Two WGs may be involved: CoRE WG, DTN WG
 - Includes
 - Similar/Same considerations as draft-gomez-core-coap-space regarding:
 - » Parameter settings
 - » Observe
 - » Block-wise transfers
 - Also, specific content

Overview of specific content

- CoAP over BP
 - Architecture
 - Abstract layering
- Messaging model
 - Same as in CoAP over UDP (RFC 7252)
 - Pure ACK MAY be replaced by a BP status report
- Message ID size: increase from 16 bits to 24 bits?
 - Appendix B
- Block-wise transfers vs BP fragmentation/reassembly
- New CoAP over BP URI scheme: “coap+bp”
- Appendix A – Reference values for interplanetary communication
 - RTT, EXCHANGE_LIFETIME, MAX_LATENCY...

Appendix A. Ref. parameter values for interplanetary communication

- Idealized scenarios: latency comprises propagation delay only

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| RTT, ACK_TIMEOUT (or EXCHANGE_LIFETIME, for MAX_RETRANSMIT=0) |
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| Sun|Mercury|Venus|Earth| Mars|Jupiter|Saturn|Uranus|Neptune|
-----
| Sun| - | 466| 727|1,014|1,661| 5,444|10,007|20,214| 30,288|
-----
| Mercury| - | - |1,181|1,448|1,968| 5,751|10,340|20,548| 30,554|
-----
| Venus| - | - | - |1,735|2,382| 6,158|10,741|20,948| 30,955|
-----
| Earth| - | - | - | - |2,642| 6,424|11,008|21,215| 31,222|
-----
| Mars| - | - | - | - | - | 6,805|11,408|21,615| 31,622|
-----
| Jupiter| - | - | - | - | - | - |14,944|25,151| 35,425|
-----
| Saturn| - | - | - | - | - | - | - |29,220| 39,961|
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| Uranus| - | - | - | - | - | - | - | - | 50,168|
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| Neptune| - | - | - | - | - | - | - | - | - |
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