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CoAP Multicast
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Abstract

Multicast is a preferred approach to send a single message to multiple recipients but it is typically lossy. CoAP is the choice of messaging for IoT. If using multicast to transmit CoAP messages there is a risk they get lost and a further risk that sequences of messages get disrupted and leave the system in an unknown or unpleasant state.

In the device world we might want to guarantee that a whole sequence of commands arrives at the device. For example a sequence to Open, Report, Do some action, and Close. It is better that all of these messages arrive or all of them do not arrive rather than have some of them arrive and to not know which ones failed.

CoAP messages tend to be small due to constrained resources on the recipient devices. Existing frame sizes though are relatively large so it is possible to pack these frames with several smaller CoAP messages and send them as a group.

CoAP Multicast proposes the simplest way to do this. It is a device independent method and adds no need for encryption channels.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on April 13th, 2018.

1. Introduction

In the device world we might want to guarantee that a whole sequence of commands arrives at the device.

For example a sequence to Open, Report, Do some action, and Close. It is better that all of these messages arrive or all of them do not arrive.

Existing relatively large frame sizes allow smaller CoAP messages to be packed together in the same multicast. CoAP Multicast proposes the simplest way to pack the frames using a device independent method.

There is no mention or burden added here of encryption or security.

You can further decide of course to close the lossy reliability loop with a clever mechanism to ACK or complete/confirm a transaction but that is neither a function of multicast or a task for CoAP multicast which simply aims to provide an efficiency boost and a reliability boost in its own right by allowing groups of CoAP messages to be sent together.

2. Assumptions

The multicast transport layer returns data frames with known lengths.

The multicast transport layer is not restricted to a maximum data frame length OR the maximum data frame length is sufficient for the messages that we wish to send.

3. Summary

Keeping it as simple as possible.

Each multicast frame contains one or more CoAP messages. Multicast communication is unreliable so allowing multiple CoAP messages in a single multicast frame allows for simple atomic delivery of a set of CoAP messages.

The CoAP multicast frame contains a CBOR array of byte strings.

Each byte string is a CoAP message.

>> Each CoAP message MUST be marked as non-Confirmable.

>> Each CoAP message SHOULD be idempotent (i.e. probably PUT only).

The receiver should simply replay each message in turn. No responses should be generated because the messages MUST be marked as non-confirmable, but if any responses are generated then they should be discarded.

4. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

In this document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying significance described in RFC 2119.

In this document, the characters ">>" preceding an indented line(s) indicates a statement using the key words listed above. This convention aids reviewers in quickly identifying or finding the portions of this RFC covered by these keywords.

5. Security Considerations

None

6. IANA Considerations

None

7. Conclusions

None

8. References

8.1. Normative References

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8.2. Informative References

[RFC7390] Rahman, A., Ed., and E. Dijk, Ed., "Group Communication for the Constrained Application Protocol (CoAP)", RFC 390, DOI 10.17487/RFC7390, October 2014,
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9. Acknowledgments

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