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Multipart Media Type Encoding for CoAP
draft-fossati-core-multipart-ct-00

Abstract

This memo defines a new media type encoding that can be used to combine several different media types into a single CoAP message-body.

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 October 10, 2012.

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1. Introduction

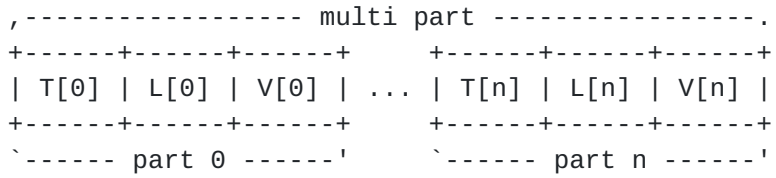
This memo defines a new media type encoding that can be used to combine several different media types into a single CoAP message-body.

1.1. Requirements Language

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 [RFC2119].

2. Multipart Media Type Encoding

Multipart encoding uses multiple adjacent frames each of which represents a single media. Every frame can further be broken in three logical pieces: the type of the framed media (T), its length in bytes (L), and the media payload itself (V) as depicted in the following figure.



The semantics associated to the TLV atoms is as follows:

T: is one of the numeric media type identifiers defined in the CoAP Media Type registry (Section 11.3 of [I-D.ietf-core-coap]), and is encoded as a 16-bit uint (Appendix A of [I-D.ietf-core-coap]).

L: is the lentgh in bytes of the following V frame, and has two possible encodings: short or extended (see Section 3). It determines the offset of the next part, or the end of the multipart representation when applied to the last frame.

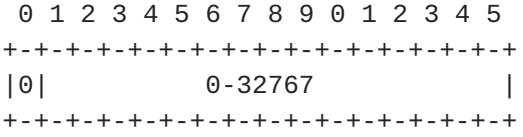
V: is the media, encoded as implied by the preceeding T field.

3. Length Encoding

Two different encodings are defined for the L value: short for parts where length(V) measured in bytes is in range [0, 32767]; extended for parts with length(V) in range (32767, 2^127-1].

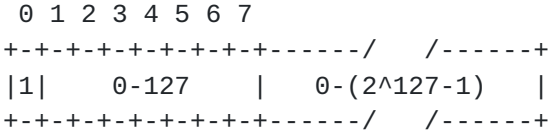
3.1. Short

The short format uses a fixed 16-bit uint with the most significant bit set to '0'. The remaining 15 bits encode a length(V) value up to 32767 bytes.



3.2. Extended

The extended format uses a fixed 8-bit uint with the most significant bit set to '1'. The remaining 7 bits encode the number of bytes needed to uint-encode the length(V) bytes.



3.3. Constraints

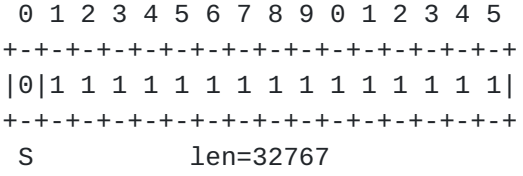
The most compact encoding MUST be used, i.e.:

1. always use short when length(V) < 32768;

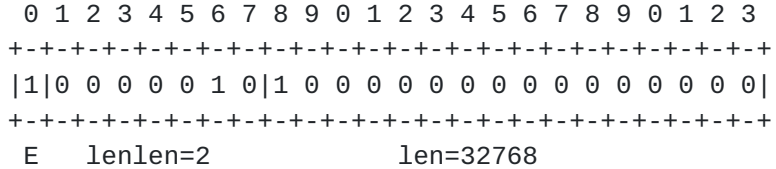
2. never zero-pad when using extended.

3.4. Examples

A length of 32767 bytes would use short encoding:



A length of 32768 bytes would use extended encoding with lenght of lenght 2:



4. IANA Considerations

The following entry is added to the CoAP Media Type registry:

Number	Name	Reference
n	Multipart	RFC XXXX

When used as the payload in a CoAP message, one Content-Type option MUST be present and set to n.

5. Security Considerations

The extended encoding may trigger insanely huge buffer allocations on the receiving party. Receivers of multipart media SHOULD put a cap on the maximum allowed size of the whole Multipart. A CoAP server MAY respond with a 4.13 (Request Entity Too Large) status code to such requests, and refuse to proceed further (e.g. processing more blocks).

A CoAP client can't tell if a 4.15 status code applies to the whole Multipart or just to one of its parts. An attacker may leverage on this ambiguity to craft application specific attacks (e.g. cause downgraded behavior). Applications built on top of Multipart need to handle such eventuality in a safe way.

6. Normative References

[I-D.ietf-core-coap]
Frank, B., Bormann, C., Hartke, K., and Z. Shelby, "Constrained Application Protocol (CoAP)", draft-ietf-core-coap-08 (work in progress), October 2011.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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