Multipart Content-Format for CoAP
draft-fossati-core-multipart-ct-05

Abstract

   This memo defines application/multipart-core, an application-
   independent media-type that can be used to combine representations of
   several different media types into a single CoAP message-body with
   minimal framing overhead, each along with a CoAP Content-Format
   identifier.

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

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   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on December 10, 2018.

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1. Introduction

This memo defines application/multipart-core, an application-
independent media-type that can be used to combine representations of
several different media types into a single CoAP [RFC7252] message-
body with minimal framing overhead, each along with a CoAP Content-
Format identifier.

This simple and efficient binary framing mechanism can be employed to
create application specific request and response bodies which build
on multiple already existing media types.

Applications using the application/multipart-core Content-Format
define the internal structure of the application/multipart-core
representation.

For example, one way to structure the sub-types specific to an
application/multipart-core container is to always include them at the
same fixed position. This specification allows to indicate that an
optional part is not present by substituting a null value for the
representation of the part.

Optionally, an application might use the general format defined here,
but also register a new media type and an associated Content-Format
identifier -- typically one in the range 10000-64999 -- instead of
using application/multipart-core.

2. Multipart Content-Format Encoding

A representation of media-type application/multipart-core contains a
collection of zero or more representations, each along with their
respective content format.

The collection is encoded as a CBOR [RFC7049] array with an even
number of elements. The second, fourth, sixth, etc. element is a
byte string containing a representation, or the value "null" if an
optional part is indicated as not given. The first, third, fifth,
etc. element is an unsigned integer specifying the content format ID
of the representation following it. Where needed by an application,
each such format identifying element alternatively can be a text
string giving the media type name plus potentially some parameters.

For example, a collection containing two representations, one with
content format ID 42 and one with content format ID 0, looks like
this in CBOR diagnostic notation:

    [42, h'0123456789abcdef', 0, h'3031323334']

For illustration, the structure of an application/multipart-core
representation can be described by the CDDL [I-D.ietf-cbor-cddl]
specification in Figure 1:

```
multipart-core = [* multipart-part]
multipart-part = (type: uint .size 2 / text, part: bytes / null)
```

Figure 1: CDDL for application/multipart-core

3. IANA Considerations

3.1. Registration of media type application/multipart-core

IANA is requested to register the following media type [RFC6838]:

Type name: application

Subtype name: multipart-core

Required parameters: N/A

Optional parameters: N/A

Encoding considerations: binary

Security considerations: See the Security Considerations Section of
   RFCthis

Interoperability considerations: N/A

Published specification: RFCthis

   Applications that use this media type: Applications that need to
      combine representations of potentially several media types into
      one, e.g., EST-CoAP [I-D.ietf-ace-coap-est]

   Fragment identifier considerations: N/A

   Additional information:

      Deprecated alias names for this type: N/A

      Magic number(s): N/A

      File extension(s): N/A

      Macintosh file type code(s): N/A

   Person & email address to contact for further information:
      iesg&ietf.org

   Intended usage: COMMON

   Restrictions on usage: N/A

   Author: CoRE WG

   Change controller: IESG

   Provisional registration? (standards tree only): no

3.2. Registration of a Content-Format identifier for application/multipart-core

   IANA is requested to register the following Content-Format to the
   "CoAP Content-Formats" subregistry, within the "Constrained RESTful
   Environments (CoRE) Parameters" registry, from the IETF Review space
   (specifically, 256..999):

```
    +----------------------------+----------+------+-----------+
    | Media Type                 | Encoding | ID   | Reference |
    +----------------------------+----------+------+-----------+
    | application/multipart-core | --       | TBD1 | RFCthis   |
    +----------------------------+----------+------+-----------+
```

4. Security Considerations

   The security considerations of [RFC7049] apply. In particular,
   resource exhaustion attacks may employ large values for the byte

   string size fields, or deeply nested structures of recursively
   embedded application/multipart-core representations.

5. References

5.1. Normative References

   [RFC7049]   Bormann, C. and P. Hoffman, "Concise Binary Object
               Representation (CBOR)", RFC 7049, DOI 10.17487/RFC7049,
               October 2013, <https://www.rfc-editor.org/info/rfc7049>.

   [RFC7252]   Shelby, Z., Hartke, K., and C. Bormann, "The Constrained
               Application Protocol (CoAP)", RFC 7252,
               DOI 10.17487/RFC7252, June 2014,
               <https://www.rfc-editor.org/info/rfc7252>.

5.2. Informative References

   [I-D.ietf-ace-coap-est]
               Stok, P., Kampanakis, P., Kumar, S., Richardson, M.,
               Furuhed, M., and S. Raza, "EST over secure CoAP (EST-
               coaps)", draft-ietf-ace-coap-est-01 (work in progress),
               June 2018.

   [I-D.ietf-cbor-cddl]
               Birkholz, H., Vigano, C., and C. Bormann, "Concise data
               definition language (CDDL): a notational convention to
               express CBOR data structures", draft-ietf-cbor-cddl-02
               (work in progress), February 2018.

   [RFC6838]   Freed, N., Klensin, J., and T. Hansen, "Media Type
               Specifications and Registration Procedures", BCP 13,
               RFC 6838, DOI 10.17487/RFC6838, January 2013,
               <https://www.rfc-editor.org/info/rfc6838>.

Acknowledgements

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