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The application/maybe media type
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Abstract

Many media types may be used in situations where it may beneficial to indicate that the object represented in this media type is not yet (or no longer) present.

The Observe option introduced in Observing Resources in the Constrained Application Protocol (CoAP) (RFC7641) requires sequences of responses (notifications) to carry the same Content-Format.

The application/maybe media type provides a way to use a single media type (and thus Content-Format) to express presence or absence of information in a specific media type.

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1. Introduction

(See Abstract.)

1.1. Terminology

This memo uses terms from [RFC7252], [RFC7641] and [RFC7049].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here. These words may also appear in this document in lower case as plain English words, absent their normative meanings.

The term "byte", abbreviated by "B", is used in its now customary sense as a synonym for "octet".

2. The application/maybe media type

An application/maybe object either indicates the absence of the underlying media type or its presence together with an object of that media type.

This is represented by a CBOR [RFC7049] object structured as follows (illustrated in CDDL [I-D.ietf-cbor-cddl]):

```
maybe = [
  ? (
    content-format: uint,
    content: bstr
  )
]
```

3. Discussion

The position for indicating a content-format could also provide an alternative for indicating a media type represented as a string.

```
maybe1 = [
  ? (
    (content-format: uint // media-type: tstr),
    content: bstr
  )
]
```

This would make the application/maybe media type easier to use with media types that do not have a content-format registered yet.

4. Implementation hints

This section describes the serialization for readers that may be new to CBOR. It does not contain any new information.

An absent object is represented by an empty CBOR array, which is serialized as a single byte with the value 0x80.

A present object is represented by a two-element CBOR array, which is serialized as 0x82 followed by the two elements. The first element is an unsigned integer for the Content-Format value, which is represented as described in Table 1. The second element is the object as a byte string, which is represented as a length as described in Table 2 followed by the bytes of the object.

Serialization	Value
0x00..0x17	0..23
0x18 0xnn	24..255
0x19 0xnn 0xnn	256..66535

Table 1: Serialization of content-format

Serialization	Length
0x40..0x57	0..23
0x58 0xnn	24..255
0x59 0xnn 0xnn	256..66535
0x5a 0xnn 0xnn 0xnn 0xnn	66536..4294967295
0x5b 0xnn .. 0xnn (8 bytes)	4294967296..

Table 2: Serialization of object length

For example, a present text/plain object (content-format 0) of value "Hello World" (11 characters) would be serialized as

0x82 0x00 0x4b H e l l o 0x20 w o r l d

In effect, the serialization is done by prefixing the object with information about its content-format.

5. IANA Considerations

TBD (add in the obvious template information).

6. Security Considerations

TBD

7. Acknowledgements

The potential need for an application/maybe media type was suggested by Klaus Hartke.

8. References

8.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

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[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

8.2. Informative References

[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.

[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>.

[RFC7641] Hartke, K., "Observing Resources in the Constrained Application Protocol (CoAP)", RFC 7641, DOI 10.17487/RFC7641, September 2015, <https://www.rfc-editor.org/info/rfc7641>.

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