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Constrained Application Protocol (CoAP): Corrections and Clarifications  
[draft-bormann-core-corr-clar-00](#)

Abstract

[RFC 7252](#) defines the Constrained Application Protocol (CoAP), along with a number of additional specifications, including [RFC 7641](#), [RFC 7959](#), [RFC 8132](#), and [RFC 8323](#). [RFC 6690](#) defines the link format that is used in CoAP self-description documents.

Some parts of the specification may be unclear or even contain errors that may lead to misinterpretations that may impair interoperability between different implementations. The present document provides corrections, additions, and clarifications to the RFCs cited; this document thus updates these RFCs. In addition, other clarifications related to the use of CoAP in other specifications, including [RFC 7390](#) and [RFC 8075](#), are also provided.

Status of This Memo

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**[1.](#) Introduction**

[RFC7252] defines the Constrained Application Protocol (CoAP), along with a number of additional specifications, including [[RFC7641](#)], [[RFC7959](#)], [[RFC8132](#)], and [[RFC8323](#)]. [[RFC6690](#)] defines the link format that is used in CoAP self-description documents.

During implementation and interoperability testing of these RFCs, and in their practical use, some ambiguities and common misinterpretations have been identified, as well as a few errors.

The present document summarizes identified issues and provides corrections needed for implementations of CoAP to interoperate, i.e., it constitutes an update to the RFCs referenced. This document also provides other clarifications related to common misinterpretations of the specification. References to CoAP should, therefore, also include this document.

In addition, some clarifications and corrections are also provided for documents that are related to CoAP, including [RFC 7390](#) and [RFC 8075](#).

### 1.1. Process

The present document is an Internet-Draft, which is not intended to be published as an RFC quickly. Instead, it will be maintained as a running document of the CoRE WG, probably for a number of years, until the need for new entries tails off and the document can finally be published as an RFC. (This paragraph to be rephrased when that happens.)

The status of this document as a running document of the WG implies a consensus process that is applied in making updates to it. The rest of this subsection provides more details about this consensus process. (This is the intended status; currently, the document is an individual submission only.)

(Consensus process TBD, but it will likely be based on an editor's version in a publicly accessible git repository, as well as periodic calls for consensus that lead to a new published Internet-Draft;.)

### 1.2. Terminology

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.

When a section of this document makes formal corrections, additions or invalidations to text in a referenced RFC, this is clearly summarized. The text from the RFC that is being addressed is given and labeled "INCOMPLETE", "INCORRECT", or "INCORRECT AND INVALIDATED", followed by the correct text labeled "CORRECTED", where applicable. When text is added that does not simply correct text in previous specifications, it is given with the label "FORMAL ADDITION".

Where a resolution has not yet been agreed, the resolution is marked PENDING.

In this document, a reference to a section in RFC nnnn is written as RFC nnnn-<number>, where <number> is the section number.

## 2. [RFC 7252](#)

### **2.1. RFC7252-5.10.5: Max-Age**

In the discussion of [[I-D.ietf-core-too-many-reqs](#)], a comment was made that it would be needed to define the point in time relative to which Max-Age is defined. A sender might reference it to the time it actually sends the message containing the option (and paragraph 3 of [RFC7252-5.10.5](#) indeed requests that Max-Age be updated each time a message is retransmitted). The receiver of the message does not have reliable information about the time of sending, though. It may instead reference the Max-Age to the time of reception. This in effect extends the time of Max-Age by the latency of the packet. This extension was deemed acceptable for the purposes of [[I-D.ietf-core-too-many-reqs](#)], but may be suboptimal when Max-Age is about the lifetime of a response object.

INCOMPLETE:

The value is intended to be current at the time of transmission.

PENDING.

### **3. IANA Considerations**

None yet.

(Individual clarifications may contain IANA considerations; these will then be referenced here.)

### **4. Security Considerations**

This document provides a number of corrections and clarifications to existing RFCs, but it does not make any changes with regard to the security aspects of the protocol. As a consequence, the security considerations of the referenced RFCs apply without additions.

(To be changed when that is no longer true; probably the security considerations will then be on the individual clarifications.)

### **5. References**

#### **5.1. 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>>.

- [RFC6690] Shelby, Z., "Constrained RESTful Environments (CoRE) Link Format", [RFC 6690](#), DOI 10.17487/RFC6690, August 2012, <<https://www.rfc-editor.org/info/rfc6690>>.
- [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>>.
- [RFC7959] Bormann, C. and Z. Shelby, Ed., "Block-Wise Transfers in the Constrained Application Protocol (CoAP)", [RFC 7959](#), DOI 10.17487/RFC7959, August 2016, <<https://www.rfc-editor.org/info/rfc7959>>.
- [RFC8132] van der Stok, P., Bormann, C., and A. Sehgal, "PATCH and FETCH Methods for the Constrained Application Protocol (CoAP)", [RFC 8132](#), DOI 10.17487/RFC8132, April 2017, <<https://www.rfc-editor.org/info/rfc8132>>.
- [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>>.
- [RFC8323] Bormann, C., Lemay, S., Tschofenig, H., Hartke, K., Silverajan, B., and B. Raymor, Ed., "CoAP (Constrained Application Protocol) over TCP, TLS, and WebSockets", [RFC 8323](#), DOI 10.17487/RFC8323, February 2018, <<https://www.rfc-editor.org/info/rfc8323>>.

## **5.2. Informative References**

- [I-D.ietf-core-too-many-reqs] Keranen, A., "Too Many Requests Response Code for the Constrained Application Protocol", [draft-ietf-core-too-many-reqs-05](#) (work in progress), October 2018.

## Acknowledgements

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