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Concise Binary Object Representation (CBOR) Sequences
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Abstract

This document describes the Concise Binary Object Representation (CBOR) Sequence format and associated media type "application/cbor-seq". A CBOR Sequence consists of any number of encoded CBOR data items, simply concatenated in sequence.

Structured syntax suffixes for media types allow other media types to build on them and make it explicit that they are built on an existing media type as their foundation. This specification defines and registers "+cbor-seq" as a structured syntax suffix for CBOR Sequences.

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[1.](#) Introduction

The Concise Binary Object Representation (CBOR) [[RFC7049](#)] can be used for serialization of data in the JSON [[RFC8259](#)] data model or its own, somewhat expanded data model. When serializing a sequence of such values, it is sometimes convenient to have a format where these sequences can simply be concatenated to obtain a serialization of the concatenated sequence of values, or to encode a sequence of values that might grow at the end by just appending further CBOR data items.

This document describes the concept and format of "CBOR Sequences", which are composed of zero or more encoded CBOR data items. CBOR Sequences can be consumed (and produced) incrementally without a streaming parser (or streaming encoder).

This document defines and registers the "application/cbor-seq" media type in the media type registry. Media type structured syntax suffixes [[RFC6838](#)] were introduced as a way for a media type to signal that it is based on another media type as its foundation. CBOR [[RFC7049](#)] defines the "+cbor" structured syntax suffix. This

document defines and registers the "+cbor-seq" structured syntax suffix in the "Structured Syntax Suffix Registry".

[1.1.](#) Conventions Used in This Document

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.

[2.](#) CBOR Sequence Format

Formally, a CBOR Sequence is a sequence of bytes that is either

- o an empty (zero-length) sequence of bytes
- o the sequence of bytes making up an encoded CBOR data item [[RFC7049](#)], followed by a CBOR Sequence.

In short, concatenating zero or more encoded CBOR data items generates a CBOR Sequence.

There is no end of sequence indicator. (If one is desired, CBOR-encoding an array of the CBOR data model values being encoded -- employing either a definite or an indefinite length encoding -- as a single CBOR data item may actually be the more appropriate representation.)

This specification makes use of the fact that CBOR data items are self-delimiting. Decoding a CBOR Sequence works as follows:

- o If the CBOR Sequence is an empty sequence of bytes, the result is an empty sequence of CBOR data model values.
- o Otherwise, decode a single CBOR data item from the bytes of the CBOR sequence, and insert the resulting CBOR data model value at the start of the result of decoding the rest of the bytes as a CBOR sequence.

This means that if any data item in the sequence is not well-formed, it is not possible to reliably decode the rest of the sequence. (An implementation may be able to recover from some errors in a sequence of bytes that is almost, but not entirely a well-formed encoded CBOR data item. Handling malformed data is outside the scope of this specification.)

This also means that the CBOR Sequence format can reliably detect truncation of the last CBOR data item in the sequence, but not entirely missing CBOR data items at the end. A CBOR Sequence decoder that is used for consuming streaming CBOR Sequence data may simply

pause for more data (e.g., by suspending and later resuming decoding) in case a truncated final item is being received.

[3.](#) The "+cbor-seq" Structured Syntax Suffix

The use case for the "+cbor-seq" structured syntax suffix is the same as for "+cbor": It SHOULD be used by a media type when parsing the CBOR Sequence of the object of the media type leads to a meaningful result, by simply using the generic CBOR Sequence processing.

Applications encountering such a media type can then either simply use generic processing if all they need is a generic view of the CBOR Sequence, or they can use generic CBOR Sequence tools for initial parsing and then implement their own specific processing on top of that generic parsing tool.

[4.](#) Security Considerations

The security considerations of CBOR [[RFC7049](#)] apply. This format provides no cryptographic integrity protection of any kind, but can be combined with security specifications such as COSE [[RFC8152](#)] to do so.

As usual, decoders must operate on input that is assumed to be untrusted. This means that decoders must fail gracefully in the face of malicious inputs.

[5.](#) IANA Considerations

5.1. Media Type

Media types are registered in the media types registry [[IANA.media-types](#)]. IANA is requested to register the MIME media type for CBOR Sequence, application/cbor-seq, as follows:

Type name: application

Subtype name: cbor-seq

Required parameters: N/A

Optional parameters: N/A

Encoding considerations: binary

Security considerations: See RFCthis, [Section 4](#).

Interoperability considerations: Described herein.

Published specification: RFCthis.

Applications that use this media type: Data serialization and deserialization.

Fragment identifier considerations: N/A

Additional information:

- o Deprecated alias names for this type: N/A
- o Magic number(s): N/A
- o File extension(s): N/A
- o Macintosh file type code(s): N/A

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

Intended usage: COMMON

Author: Carsten Bormann (cabo@tzi.org)

Change controller: IETF

5.2. CoAP Content-Format Registration

IANA is requested to assign a CoAP Content-Format ID for the media type "application/cbor-seq", in the CoAP Content-Formats subregistry of the core-parameter registry [[IANA.core-parameters](#)], from the "Expert Review" (0-255) range. The assigned ID is shown in Table 1.

Media type	Encoding	ID	Reference
application/cbor-seq	-	TBD63	RFCthis

Table 1: CoAP Content-Format ID

RFC editor: Please replace TBD63 by the number actually assigned and delete this paragraph.

5.3. Structured Syntax Suffix

Structured Syntax Suffixes are registered within the "Structured Syntax Suffix Registry" maintained at [[IANA.media-type-structured-suffix](#)]. IANA is requested to register the "+cbor-seq" structured syntax suffix in accordance with [[RFC6838](#)], as follows:

Name: CBOR Sequence

+suffix: +cbor-seq

References: RFCthis

Encoding considerations: binary

Fragment identifier considerations: The syntax and semantics of fragment identifiers specified for +cbor-seq SHOULD be as specified for "application/cbor-seq". (At publication of this document, there is no fragment identification syntax defined for "application/cbor-seq".)

The syntax and semantics for fragment identifiers for a specific "xxx/yyy+cbor-seq" SHOULD be processed as follows:

For cases defined in +cbor-seq, where the fragment identifier resolves per the +cbor-seq rules, then process as specified in +cbor-seq.

For cases defined in +cbor-seq, where the fragment identifier does not resolve per the +cbor-seq rules, then process as specified in "xxx/yyy+cbor-seq".

For cases not defined in +cbor-seq, then process as specified in "xxx/yyy+cbor-seq".

Interoperability considerations: n/a

Security considerations: See RFCthis, [Section 4](#)

Contact: CBOR WG mailing list (cbor@ietf.org), or any IESG-

designated successor.

Author/Change controller: IETF

6. References

6.1. Normative References

- [IANA.core-parameters]
IANA, "Constrained RESTful Environments (CoRE) Parameters",
<<http://www.iana.org/assignments/core-parameters>>.
- [IANA.media-type-structured-suffix]
IANA, "Structured Syntax Suffix Registry",
<<http://www.iana.org/assignments/media-type-structured-suffix>>.
- [IANA.media-types]
IANA, "Media Types",
<<http://www.iana.org/assignments/media-types>>.
- [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>>.
- [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>>.
- [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>>.

6.2. Informative References

Specifications and Registration Procedures", [BCP 13](#),
[RFC 6838](#), DOI 10.17487/RFC6838, January 2013,
<<https://www.rfc-editor.org/info/rfc6838>>.

- [RFC7464] Williams, N., "JavaScript Object Notation (JSON) Text Sequences", [RFC 7464](#), DOI 10.17487/RFC7464, February 2015, <<https://www.rfc-editor.org/info/rfc7464>>.
- [RFC8091] Wilde, E., "A Media Type Structured Syntax Suffix for JSON Text Sequences", [RFC 8091](#), DOI 10.17487/RFC8091, February 2017, <<https://www.rfc-editor.org/info/rfc8091>>.
- [RFC8152] Schaad, J., "CBOR Object Signing and Encryption (COSE)", [RFC 8152](#), DOI 10.17487/RFC8152, July 2017, <<https://www.rfc-editor.org/info/rfc8152>>.
- [RFC8259] Bray, T., Ed., "The JavaScript Object Notation (JSON) Data Interchange Format", STD 90, [RFC 8259](#), DOI 10.17487/RFC8259, December 2017, <<https://www.rfc-editor.org/info/rfc8259>>.

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