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Application-Oriented Literals in CBOR Extended Diagnostic Notation

Abstract

The Concise Binary Object Representation, CBOR (RFC 8949), defines a "diagnostic notation" in order to be able to converse about CBOR data items without having to resort to binary data.

This document specifies how to add application-oriented extensions to the diagnostic notation. It then defines two such extensions for the use of CBOR diagnostic notation with CoRAL and Constrained Resource Identifiers (draft-ietf-core-coral, draft-ietf-core-href).

About This Document

This note is to be removed before publishing as an RFC.

Status information for this document may be found at https://datatracker.ietf.org/doc/draft-bormann-cbor-edn-literals/.

Discussion of this document takes place on the cbor Working Group mailing list (mailto:cbor@ietf.org), which is archived at https://mailarchive.ietf.org/arch/browse/cbor/. Subscribe at https://www.ietf.org/mailman/listinfo/cbor/.

Source for this draft and an issue tracker can be found at https://github.com/cabo/edn-literal.

Status of This Memo

at any 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 30 September 2023.

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1. Introduction

For the Concise Binary Object Representation, CBOR, Section 8 of [RFC8949] in conjunction with Appendix G of [RFC8610] defines a "diagnostic notation" in order to be able to converse about CBOR data items without having to resort to binary data. Diagnostic notation is based on JSON, with extensions for representing CBOR constructs such as binary data and tags. (Standardizing this together with the actual interchange format does not serve to create another interchange format, but enables the use of a shared diagnostic notation in tools for and documents about CBOR.)

This document specifies how to add application-oriented extensions to the diagnostic notation. It then defines two such extensions for the use of CBOR diagnostic notation with CoRAL and Constrained Resource Identifiers [I-D.ietf-core-coral] [I-D.ietf-core-href].

Note that the Section 3 about CRIs may move to the [I-D.ietf-core-href] specification, depending on the relative speed of approval; the later document gets the section.

2. Application-Oriented Extension Literals

This document extends the syntax used in diagnostic notation for byte string literals to also be available for application-oriented extensions.

As per Section 8 of [RFC8949], the diagnostic notation can notate byte strings in a number of [RFC4648] base encodings, where the encoded text is enclosed in single quotes, prefixed by an identifier (>h< for base16, >b32< for base32, >h32< for base32hex, >b64< for base64 or base64url).

This syntax can be thought to establish a name space, with the names "h", "b32", "h32", and "b64" taken, but other names being unallocated. The present specification defines additional names for this namespace, which we call *application-extension identifiers*. For the quoted string, the same rules apply as for byte strings. In particular, the escaping rules of JSON strings are applied equivalently for application-oriented extensions, e.g., \\ stands for a single backslash and \' stands for a single quote.

An application-extension identifier is a name consisting of a lower-case ASCII letter (a-z) and zero or more additional ASCII characters that are either lower-case letters or digits (a-z0-9).

Application-extension identifiers are registered in a registry (Section 5.1). Prefixing a single-quoted string, an application-extension identifier is used to build an application-oriented extension literal, which stands for a CBOR data item the value of which is derived from the text given in the single-quoted string using a procedure defined in the specification for an application-extension identifier.

Examples for application-oriented extensions to CBOR diagnostic notation can be found in the following sections.

In addition, this document finally registers a media type identifier and a content-format for CBOR diagnostic notation. This does not elevate its status as an interchange format, but recognizes that interaction between tools is often smoother if media types can be used.

3. The "cri" Extension

The application-extension identifier "cri" is used to notate a Constrained Resource Identifier literal as per [I-D.ietf-core-href].

The text of the literal is a URI Reference as per [RFC3986] or an IRI Reference as per [RFC3987].

The value of the literal is a CRI that can be converted to the text of the literal using the procedure of Section 6.1 of [I-D.ietf-core-href]. Note that there may be more than one CRI that can be converted to the URI/IRI given; implementations are expected to favor the simplest variant available and make non-surprising choices otherwise.

As an example, the CBOR diagnostic notation

```
cri'https://example.com/bottarga/shaved'
```

is equivalent to

```
[-4, ["example", "com"], ["bottarga", "shaved"]]
```

4. The "dt" Extension

The application-extension identifier "dt" is used to notate a date/time literal that can be used as an Epoch-Based Date/Time as per Section 3.4.2 of [RFC8949].

The text of the literal is a Standard Date/Time String as per Section 3.4.1 of [RFC8949].

The value of the literal is a number representing the result of a conversion of the given Standard Date/Time String to an Epoch-Based Date/Time. If fractional seconds are given in the text (production time-fraction in Appendix A of [RFC3339]), the value is a floating-point number; the value is an integer number otherwise.

As an example, the CBOR diagnostic notation

```
dt'1969-07-21T02:56:16Z'
```

is equivalent to

```
-14159024
```

5. IANA Considerations

5.1. CBOR Diagnostic Notation application extension identifiers registry

IANA is requested to create a registry [[where?]] for application-extension identifiers, with the initial content shown in Table 1.

application-extension identifier	description	reference
h	Reserved	RFC8949
b32	Reserved	RFC8949
h32	Reserved	RFC8949
b64	Reserved	RFC8949
cri	Constrained Resource Identifier	RFCthis
dt	Date/Time	RFCthis

Table 1: Initial Content of application extension identifier registry

(Define policy: probably specification required?; detailed template)

5.2. Media Type

IANA is requested to add the following Media-Type to the "Media Types" registry [IANA.media-types].

Name	Template	Reference
cbor-diagnostic	application/cbor-diagnostic	RFC XXXX, Section 5.2

Table 2: New Media Type application/cbor-diagnostic

Type name: application
Subtype name: cbor-diagnostic
Required parameters: N/A
Optional parameters: N/A
Encoding considerations: binary (UTF-8)
Security considerations: Section 6 of RFC XXXX
Interoperability considerations: none
Published specification: Section 5.2 of RFC XXXX
Applications that use this media type: Tools interchanging a human-readable form of CBOR
Fragment identifier considerations: The syntax and semantics of fragment identifiers is as specified for "application/cbor". (At publication of RFC XXXX, there is no fragment identification syntax defined for "application/cbor".)
Person & email address to contact for further information: CBOR WG mailing list (cbor@ietf.org), or IETF Applications and Real-Time Area (art@ietf.org)

Intended usage: COMMON
Restrictions on usage: none
Author/Change controller: IETF
Provisional registration: no

5.3. Content-Format

IANA is requested to register a Content-Format number in the "CoAP Content-Formats" sub-registry, within the "Constrained RESTful Environments (CoRE) Parameters" Registry [IANA.core-parameters], as follows:

Content-Type	Content Coding	ID	Reference
application/cbor-diagnostic	-	TBD1	RFC XXXX

Table 3: New Content-Format

TBD1 is to be assigned from the space 256..999.

6. Security considerations

The security considerations of [RFC8949] and [RFC8610] apply.

Anything else meaningful to say here?

7. References

7.1. Normative References

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[RFC3986] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, DOI 10.17487/RFC3986, January 2005, <https://www.rfc-editor.org/rfc/rfc3986>.

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7.2. Informative References

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[IANA.core-parameters] IANA, "Constrained RESTful Environments (CoRE) Parameters", <https://www.iana.org/assignments/core-parameters>.

[RFC4648] Josefsson, S., "The Base16, Base32, and Base64 Data Encodings", RFC 4648, DOI 10.17487/RFC4648, October 2006, <https://www.rfc-editor.org/rfc/rfc4648>.

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The concept of application-oriented extensions to diagnostic notation, as well as the definition for the "dt" extension were inspired by the CoRAL work by Klaus Hartke.

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