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Concise Binary Object Representation (CBOR) Tag for Error Indications  
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## Abstract

The Concise Binary Object Representation (CBOR, [RFC 7049](https://tools.ietf.org/html/rfc7049)) is a data format whose design goals include the possibility of extremely small code size, fairly small message size, and extensibility without the need for version negotiation.

In CBOR, one point of extensibility is the definition of CBOR tags. While CBOR defines representations for null values and for an undefined value, there is no convention for expressing errors or exceptions in data structures, where the actual value desired could not be calculated due to an error. The present specification defines a tag for such error indications, enabling the addition of varying levels of detail.

## Note to Readers

Please discuss this draft on the mailing list [cbor@ietf.org](mailto:cbor@ietf.org) - subscribe at <https://www.ietf.org/mailman/listinfo/cbor> to follow the discussions.

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CBOR Tag for Error Indications

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">2</a>
<a href="#">2.</a>	Error Format . . . . .	<a href="#">3</a>
<a href="#">3.</a>	CDDL typenames . . . . .	<a href="#">5</a>
<a href="#">4.</a>	IANA Considerations . . . . .	<a href="#">5</a>
<a href="#">5.</a>	Security Considerations . . . . .	<a href="#">5</a>
<a href="#">6.</a>	References . . . . .	<a href="#">6</a>
<a href="#">6.1.</a>	Normative References . . . . .	<a href="#">6</a>
<a href="#">6.2.</a>	Informative References . . . . .	<a href="#">6</a>
	Acknowledgements . . . . .	<a href="#">6</a>
	Authors' Addresses . . . . .	<a href="#">6</a>

## [1.](#) Introduction

The Concise Binary Object Representation (CBOR, [[RFC7049](#)]) provides for the interchange of structured data without a requirement for a pre-agreed schema. [RFC 7049](#) defines a basic set of data types, as well as a tagging mechanism that enables extending the set of data types supported via an IANA registry.

In CBOR, one point of extensibility is the definition of CBOR tags. While CBOR defines representations for null values and for an undefined value, there is no convention for expressing errors or exceptions in data structures. The present specification defines a tag for such error indications, enabling varying levels of detail.



## 2. Error Format

An error value is indicated by CBOR tag TBD101, which tags a data item that may contain additional information about the error value:

- o If no further information is provided, the data item is the CBOR value null.
- o If a diagnostic text string is provided, the data item is that text string.
- o If more detailed information is provided, the data item is a map (CBOR major type 5), with text string or integer keys and values as defined by the application.

This specification does not further define what keys and values should be used in a map that is used as the tagged item for this tag. However, to maximize interoperability, the following keys and values are suggested for use whenever they are appropriate for an application (the keys are text strings, suggested value types are indicated in the table with CDDL names):

key	value	type
name	a formal name for the kind of error amenable to program processing, maybe a class name or a URI	text
code	a number assigned for the kind of error, e.g. an HTTP-style error code such as 404	int
message	human-readable description; what would be in the diagnostic text string if only that were provided	text
file	indicating location of error in program: file name	text
line	indicating location of error in program: line number	uint



column	indicating location of error in program: column	uint
	number	
+-----+	-----	+-----+

Note that these suggestions have been somewhat inspired by the JavaScript "Error" object (Section 19.5 of [[ECMA262](#)]), except that two-word forms of keys have been shortened to single words. There is no intention that the details of the JavaScript "Error" object are normative for the present specification. More generally, there is no intention to limit the use of the Tag defined here to those applications that would employ the JavaScript "Error" object.

(Discussion: changing lineNumber into line sounds like a good idea. Changing fileName into file is suboptimal, but reallu the problem is that neither says "source file". I was thinking about using "source" in place of "file".)



### 3. CDDL typenames

For the use with the CBOR Data Definition Language, CDDL [[I-D.ietf-cbor-cddl](#)], the type names defined in Figure 1 are recommended:

```
error = error-of<(null / text / {* (int/text) => any})>  
error-of<T> = #6.101(T)
```

Figure 1: Recommended type names for CDDL

### 4. IANA Considerations

In the registry [[IANA.cbor-tags](#)], IANA is requested to allocate the tag in Table 1 from the FCFS space, with the present document as the specification reference.

Tag	Data Item	Semantics
TBD101	null, text, map	[RFCthis] error indication



Table 1: Values for Tags

## 5. Security Considerations

The security considerations of [RFC 7049](#) apply.

Error/diagnostic information provided by a system can disclose internals of that to an attacker; care should be taken with the tag introduced here that its use does not facilitate attacks in this way.

Richter & Bormann Expires August 3, 2019 [Page 5]

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Internet-Draft CBOR Tag for Error Indications January 2019

## 6. References

### 6.1. Normative References

[I-D.ietf-cbor-cddl]

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[IANA.cbor-tags]

IANA, "Concise Binary Object Representation (CBOR) Tags", <<http://www.iana.org/assignments/cbor-tags>>.

[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>>.

## [6.2.](#) Informative References

[ECMA262] Ecma International, "ECMAScript 2018 Language Specification", ECMA Standard ECMA-262, 9th Edition, June 2018, <<https://www.ecma-international.org/publications/files/ECMA-ST/Ecma-262.pdf>>.

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