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Concise Binary Object Representation (CBOR) Tag for CBOR Templates  
draft-bormann-lpwan-cbor-template-02

## Abstract

The Concise Binary Object Representation (CBOR, [RFC 7049](#)) 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.

The present document makes use of this extensibility to define a CBOR tag for a variable within a CBOR data item, which then could be filled in by a separate process (e.g., from another CBOR data item).

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## [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.

With the work on static compression for CoAP [[RFC7252](#)] and CoAP application protocols [[I-D.ietf-core-comi](#)] on LPWANs [[I-D.ietf-lpwan-coap-static-context-hc](#)], there appears to be a need for defining CBOR data items that have within them some open positions in them that can later be filled in from a separate source (such as another CBOR data item). The anchor points for this substitution are called "variables" in this specification.

This document defines a CBOR tag for a variable in a CBOR data item. It is intended as the reference document for the IANA registration of the tag defined.

## [2.](#) Variable

A variable is a CBOR data item that typically is included as a part of a larger data item (the "CBOR template"). In a process that is

outside the scope of this specification, the variable is then substituted by an actual value in order to yield an instance from the template.

A variable is identified by the data item within the tag, the "variable identifier". Typically, variables are numbered by integers. Some applications may also benefit from the use of strings as identifiers. The specification of the tag does not make a restriction on the type of the identifier; however note that very complex variable identifiers may benefit from canonicalization to enable their comparison, cf. [section 3.9 of \[RFC7049\]](#).

We term a CBOR data item that contains one or more variables as a "CBOR template"; generally processes that accept CBOR templates with variables will also accept CBOR data items without variables, so we accept this as a degenerate case for "CBOR template". Note that a template may use the same variable (i.e., a variable with the same identifier) in multiple positions, leading to multiple substitutions of the same value.

### [2.1.](#) Example

An example for a CBOR template in diagnostic notation:

```
{ "name": "Carsten Bormann",  
  "place": 42(0) }
```

When this template undergoes substitution, with the variable 0 set to the value "Bremen", this would result in the data item:

```
{ "name": "Carsten Bormann",  
  "place": "Bremen" }
```

## [3.](#) CDDL typename

CDDL [[I-D.greevenbosch-appsawg-cbor-cddl](#)] definitions will typically describe the structure of a data item after substitution.

However, when the CDDL definition needs to explicitly identify the positions where substitutions can occur, the typename defined in

Figure 1 is recommended:

variable<varid> = #6.42(varid)

Figure 1: Recommended typenames for CDDL

4. IANA Considerations

RFC-Editor note: Please replace "42" throughout this document by the actual tag allocated and delete this note.

IANA is requested to allocate the tag 42 as in Table 1, with the present document as the specification reference.

Tag	Data Item	Semantics
42	any	CBOR variable

Table 1: Values for Tags

5. Security Considerations

The security considerations of RFC 7049 apply; the tag introduced here not expected to raise security considerations beyond those.

Obviously, any process for performing variable substitution as outlined in Section 2 needs to ensure that all of its inputs are derived considering the security objectives, and that the inputs are actually intended to fit together for this substitution.

For example, if a signed value includes the variables to be substituted, but does not contain a unique identifier for the template, then the structure resulting in substituting the variables

in the template must not be considered as having been signed. Identifying templates by a hash, or by an identifier (that needs to be specific to the actual value and version of the template) is recommended.

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## [6.](#) References

### [6.1.](#) Normative References

[I-D.greevenbosch-appsawg-cbor-cddl]

Birkholz, H., Vigano, C., and C. Bormann, "Concise data definition language (CDDL): a notational convention to express CBOR data structures", [draft-greevenbosch-appsawg-cbor-cddl-11](#) (work in progress), July 2017.

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## Contributors

Laurent Toutain suggested the creation of a mechanism for indicating which parts of a CBOR data item are not yet available or subject to change.

Jim Schaad contributed to the security considerations.

## Acknowledgements

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