An sdfType for Links

Abstract

This document defines and registers an sdfType "link" for the
Semantic Definition Format (SDF) for Data and Interactions of Things
(draft-ietf-asdf-sdf-12.txt).

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-asdf-sdftype-link/.

Discussion of this document takes place on the A Semantic Definition
Format for Data and Interactions of Things Working Group mailing
list (mailto:asdf@ietf.org), which is archived at https://
mailarchive.ietf.org/arch/browse/asdf/. Subscribe at https://
www.ietf.org/mailman/listinfo/asdf/.

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

Status of This Memo

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1. Introduction

   The Semantic Definition Format for Data and Interactions of Things
   (SDF, [I-D.ietf-asdf-sdf]) is a format for domain experts to use in
   the creation and maintenance of data and interaction models in the
   Internet of Things.

   A common data type that occurs in the modeling of IoT devices is the
   link. [RFC8288] defines the concept of Web Linking, which
   complements the target URI that any link will contain, with
   additional parameters, such as the "link relation type" that
   explains the relationship expressed by the link, as well as "target
   attributes" that provide additional information about the target of
   the link (without a need to "dereference", i.e., follow, the link).

   This document defines and registers an sdfType "link" for the
   Semantic Definition Format. This type models an abstract
   "serialization" [RFC8288] of a link, in a way that is compatible
   with the way SDF maps information models to its data modeling
   language.

1.1. Conventions and Definitions

The definitions of [RFC6690], [RFC8288], and [I-D.ietf-asdf-sdf] apply.

2. The sdfType "link"

The sdfType "link" is intended to be used with the SDF "type" of "object". The members of that object are strings that are named the same as the link parameter (attribute) names. The special parameter name "href" is used to express the link target. (Parameter names specific to the Constrained RESTful Environment (CoRE) are also discussed in [I-D.bormann-core-target-attr].)

An example for the instance of a link is provided in Section 5 of [RFC6690]:

```
</sensors/temp>;rt="temperature-c";if="sensor",
```

An sdfProperty that is used to describe an SDF affordance that is intended to hold a link like this (without getting specific on the actual link to the link target) could look like:

```
{
 "sdfProperty": {
  "temp-c-link": {
   "type": "object",
   "sdfType": "link",
   "properties": {
     "href": { "type": "string"},
     "rt": { "type": "string", "const": "temperature-c"},
     "if": { "type": "string", "const": "sensor"}
   }
  }
 }
}
```

3. Discussion

Links play an important role in SDF modeling both during definition time (for adding information to a model, as e.g., in sdfRef) and during run time (for making links to instances into a subject of data and interaction modeling). The present document is an early attempt at addressing the run-time usage of links, in particular links that fit the Web Linking [RFC8288] abstractions. A related draft [I-D.laari-asdf-relations] addresses definition-time links,

but does seem to touch modeling run-time use of links as well (e.g., by discussing "writable" link relations).

Not all links used in ecosystems are based on URIs. E.g., OMA has "object links", which are pairs of numbers (object/instance). These ecosystem links may have some structure that should be modeled in the SDF model (e.g., where the object id part of a link always has to have a specific value). This structure can be mapped into URI strings using some convention, e.g., an OMA object link could be oma-object:3303:0 (where oma-object is placeholder for a URI scheme to be defined). However, burying structural components of the ecosystem-specific link in a string syntax makes it hard to access and control those components from the model.

Examples are needed to show how the OCF collection pattern is addressed by the current specification.

4. Security Considerations

The security considerations of [RFC8288] apply in a general way, although modeling a link as a datatype does not incur all of the security considerations that will apply to actually interchanging these links.

(TODO)

5. IANA Considerations

TODO: This document registers the sdfType "link" in the SDF sdfType registry (which is to be defined in the SDF specification).

6. References

6.1. Normative References

[I-D.ietf-asdf-sdf] Koster, M. and C. Bormann, "Semantic Definition Format (SDF) for Data and Interactions of Things", Work in Progress, Internet-Draft, draft-ietf-asdf-sdf-12, 30 June 2022, <https://www.ietf.org/archive/id/draft-ietf-asdf-sdf-12.txt>.

[RFC8288]   Nottingham, M., "Web Linking", RFC 8288, DOI 10.17487/RFC8288, October 2017, <https://www.rfc-editor.org/info/rfc8288>.

6.2. Informative References

[I-D.bormann-core-target-attr]
             Bormann, C., "CoRE Target Attribute Registry", Work in Progress, Internet-Draft, draft-bormann-core-target-

attr-01, 6 November 2022, <https://www.ietf.org/archive/id/draft-bormann-core-target-attr-01.txt>.

[I-D.laari-asdf-relations]
Laari, P., "Extended relation information for Semantic Definition Format (SDF)", Work in Progress, Internet-Draft, draft-laari-asdf-relations-00, 3 June 2022, <https://www.ietf.org/archive/id/draft-laari-asdf-relations-00.txt>.

[RFC6690]   Shelby, Z., "Constrained RESTful Environments (CoRE) Link Format", RFC 6690, DOI 10.17487/RFC6690, August 2012, <https://www.rfc-editor.org/info/rfc6690>.

Acknowledgments

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