

Network Working Group
Internet-Draft
Intended status: Informational
Expires: August 30, 2019

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February 26, 2019

Extended Link Relationships draft-montoya-xrel-00

Abstract

This document defines XREL, a data format for describing extended hypermedia relationships identified by Uniform Resource Locators.

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Table of Contents

1.	Introduction	2
1.1.	Definitions and Terminology	2
1.1.1.	Terminology and Conformance Language	3
1.1.2.	General	3
1.1.3.	Documents description	4
1.2.	Motivation	4
2.	XREL Documents	4
2.1.	Format	4
2.2.	Relationship Object	5
2.2.1.	Properties	5
2.3.	XREL Document	5
2.3.1.	Document Example	5
2.4.	XREL Collection Document	6
2.4.1.	Document Example	6
2.5.	Identifying XREL Documents	6
2.6.	Fragment identifiers	6
2.7.	Identifying XREL Relationships	6
3.	IANA Considerations	7
3.1.	application/xrel	7
4.	Appendix A. Acknowledgments	8
5.	Appendix B. Frequently Asked Questions	8
5.1.	How can I submit comments or feedback to the editors?	8
5.2.	Why not include target attributes as defined by RFC8288 'Web Linking'?	8
6.	References	9
6.1.	Normative References	9
6.2.	Informative References	10
6.3.	URIs	10
	Author's Address	10

[1.](#) Introduction

This document defines XREL, a data format for describing extended hypermedia relationships identified by Uniform Resource Locators.

This document registers a media-type identifier with the IANA: "application/xrel". This registration is for community review and will be submitted to the IESG for review, approval, and registration with IANA.

[1.1.](#) Definitions and Terminology

1.1.1. Terminology and Conformance Language

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.

1.1.2. General

Representational State Transfer, or *REST*, is an architectural style for distributed hypermedia systems. Introduced and first defined in 2000 in Chapter 5, REST, of the doctoral dissertation "Architectural Styles and the Design of Network-based Software Architecture" by Roy Fielding.

Hypermedia, or hypertext, is defined by the presence of application control information embedded within, or as a layer above, the presentation of information. Hypermedia allows for a virtually unbound network of resources while also guiding users through an application as they navigate said relationships.

A *hypermedia relationship*, also known as a link relation, describes the semantics behind a virtual uni-directional association between two resources.

A *hypermedia relationship name* is an identifier for a hypermedia relationship.

A *resource* is the intended conceptual target of a hypertext reference.

Representational state indicates the current state of the requested resource, the desired state for the requested resource, or the value of some other resource, such as a representation of the input data within a client's query form, or a representation of some error condition for a response.

Application state is the state of the user's application of computing to a given task, controlled and stored by the user agent and can be composed of representations from multiple servers.

This document and the specification documented in it are heavily influenced by the RAML 1.0 Spec [[RAML](#)].

1.1.3. Documents description

A trailing question mark, for example `*description?*`, indicates an optional property.

Throughout this specification, `*markdown*` means GitHub-Flavored Markdown [[github.md](https://github.com/guidemedia/guidemedia.github.io)]. Tooling MAY choose to ignore some Markdown features to address security concerns.

1.2. Motivation

The Uniform Interface constraint of the REST architectural style dictates that hypermedia be the engine of application state. This means that the state of the application and its potential transitions are dictated by the presence of hypermedia relationships in-band and by the navigation of those relationships by an user (human or automated). In order for users to evaluate and select the appropriate relationships to navigate they must rely on an out-band understanding of relationships by their names.

While humans can derive meaning from relationship names in natural language, automated agents have relied on a central repository of standard names maintained by the Internet Assigned Numbers Authority (IANA). Instead of creating and registering entirely new link relations (i.e. "patient", "appointment", "schedulingService", etc.) with a central repository, authors can choose to create an XREL document; one that explains the vital, perhaps domain-specific, semantics of the relationship and which is identified by an URL controlled by the author.

This decentralization allows for a much lower entry barrier, which is not inconsistent with the general concept of the web, and enables different use cases. For example, a private organization is fully capable of defining their own repository of XREL definitions outside of the open Internet, after all standards are a byproduct of authority. Conversely, public XREL definitions would allow for serendipitous reuse, where useful relationships backed by stable URLs might be discovered and possibly become de facto standard.

2. XREL Documents

2.1. Format

Following RAML conventions, XREL documents are YAML documents. The file extension `".yaml"` SHALL be used to designate files containing XREL documents.

This specification uses YAML 1.2 [w3c.yaml] as its underlying format. YAML is a human-readable data format that aligns well with the design goals of this specification. As in YAML, all nodes such as keys, values, and tags, are case-sensitive.

To facilitate the automated processing of XREL documents, XREL imposes the following restrictions and requirements in addition to the core YAML 1.2 specification:

- o The first line of a XREL file consists of a YAML comment that specifies the XREL version and document type. Therefore, XREL processors cannot completely ignore all YAML comments.

2.2. Relationship Object

Explains the semantics of a hypermedia relationship.

2.2.1. Properties

+-----+-----+-----+-----+			
Name Type Description			
+-----+-----+-----+-----+			
description	string	Describes the semantics of a hypermedia	
		relationship. The semantics SHOULD	
		describe the relationship of the target	
		resource to the context resource, and not	
		any particular representation formats.	
		Markdown MAY be used for rich text	
		representation.	
+-----+-----+-----+-----+			

2.3. XREL Document

Defines a single Relationship Object.

The first line of a XREL document MUST begin with the text "%XREL 1.0" followed by nothing but the end of the line.

2.3.1. Document Example

```
%XREL 1.0
```

description: Refers to an event scheduling service resource related to the context resource.

Montoya

Expires August 30, 2019

[Page 5]

2.4. XREL Collection Document

Defines a map where the keys are the document scoped relationship names and the values are Relationship Objects. XREL Collections can be used to combine any collection of Relationship Objects.

The first line of a collection document MUST begin with the text "#%XREL 1.0 Collection" followed by nothing but the end of the line.

2.4.1. Document Example

```
#%XREL 1.0 Collection
```

```
schedulingService:
```

```
  description: Refers to an event scheduling service resource related to the
context resource.
```

```
patient:
```

```
  description: Refers to a patient resource related to the context resource.
```

2.5. Identifying XREL Documents

XREL documents are identified by unique URLs, this URL SHOULD be dereferenceable.

In order to reduce load on servers responding to XREL document requests, it is RECOMMENDED that servers use cache control directives that instruct client apps to locally cache the results. Clients making these XREL document requests SHOULD honor the server's caching directives.

2.6. Fragment identifiers

When applied to an XREL document, a URI fragment identifier MUST be a JSON Pointer [1] and be computed as such.

2.7. Identifying XREL Relationships

In the case of XREL Documents as specified in [Section 2.3](#), the URL that identifies that document also identifies the hypermedia relationship described in that document. For example, if the document example in [Section 2.3.1](#) is served at *http://docs.example.org/xrels/shedulingService* then this URL is the identifier for the relationship described in that document.

In the case of XREL Collection Documents as specified in [Section 2.4](#), fragment identifiers MUST be used for the relationships objects described in that document. For example, if the document example in [Section 2.4.1](#) is served at *http://docs.example.org/xrels/clinical* then *http://docs.example.org/xrels/clinical#/shedulingService* and

Montoya

Expires August 30, 2019

[Page 6]

<http://docs.example.org/xrels/clinical#/patient> identify the first and second Relationship Object, respectively.

3. IANA Considerations

This specification establishes the media type "application/xrel" for community review and will be submitted to the IESG for review, approval, and registration with IANA.

3.1. application/xrel

Type name: application

Subtype name: xrel

Required parameters: none

Optional parameters:

profile: A whitespace-separated list of URIs identifying specific constraints or conventions that apply to an XREL document. A profile must not change the semantics of the resource representation when processed without profile knowledge, so that clients both with and without knowledge of a profiled resource can safely use the same representation. The profile parameter may also be used by clients to express their preferences in the content negotiation process. It is recommended that profile URIs are dereferenceable and provide useful documentation at that URI.

Encoding considerations:

binary: Because of YAML's relation to JSON the same encoding considerations of application/json as specified in JavaScript Object Notation [[RFC3986](#)] apply.

Security considerations:

Because of YAML's relation to JSON this format shares security issues common to all JSON content types. The security issues of JavaScript Object Notation [[RFC3986](#), [section 6](#)], should be considered.

Interoperability considerations: none

Fragment identifier considerations:

Fragment identifiers are to be computed as defined by the JSON Pointer [[2](#)] specification.

Published specification: This Document

Applications that use this media type: Various

Additional information:

magic number(s): none

file extensions: .yaml

macintosh type file code: TEXT

object identifiers: none

Person to contact for further information:

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Intended usage: Common

Author/change controller: Jose Montoya

4. [Appendix A](#). Acknowledgments

Many thanks to Mike Amundsen, Jeff Michaud, Stu Charlton, Eric Wilde and Darrel Miller for their contributions in this space, even if not directly related to XREL documents.

5. [Appendix B](#). Frequently Asked Questions

5.1. How can I submit comments or feedback to the editors?

The issues list for this draft can be found at <https://github.com/phtal-org/internet-draft-xrel/issues> [3]. For additional information, see <https://phtal-org.github.io/internet-draft-xrel/> [4].

To provide feedback, use this issue tracker, the communication methods listed on the homepage, or email the document editors.

5.2. Why not include target attributes as defined by [RFC8288](#) 'Web Linking'?

Link relations are universal, they describe an `_association_` to a conceptual target and not the targets themselves nor their representations. It is the responsibility of the application authors

to communicate to their clients what data types are necessary to navigate a relationship and/or the data types that might be expected as a result.

This level of abstraction has value because it's easier to standardize representations (HTML Microformats, RAML data types, etc.) and link relations than it is to standardize objects and object-specific interfaces. Application servers are free to combine representations and link relations in any way they wish and to provide them in any order, all while remaining understandable to the client.

6. References

6.1. Normative References

[github.md]

McFarlane, J., "GitHub Flavored Markdown Spec", n.d., <<https://github.github.com/gfm/>>.

[RFC1738] Berners-Lee, T., Masinter, L., and M. McCahill, "Uniform Resource Locators (URL)", [RFC 1738](#), DOI 10.17487/RFC1738, December 1994, <<https://www.rfc-editor.org/info/rfc1738>>.

[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>>.

[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/info/rfc3986>>.

[RFC6901] Bryan, P., Ed., Zyp, K., and M. Nottingham, Ed., "JavaScript Object Notation (JSON) Pointer", [RFC 6901](#), DOI 10.17487/RFC6901, April 2013, <<https://www.rfc-editor.org/info/rfc6901>>.

[RFC7320] Nottingham, M., "URI Design and Ownership", [BCP 190](#), [RFC 7320](#), DOI 10.17487/RFC7320, July 2014, <<https://www.rfc-editor.org/info/rfc7320>>.

[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>>.

[W3C.yaml]

Ben Kiki, O, ., Evans, C, ., and I. Net, "YAML Aint Markup Language", 2009, <<http://www.yaml.org/spec/1.2/spec.html>>.

6.2. Informative References

[RAML] The RAML Workgroup, "RAML Specification", n.d., <<https://github.com/raml-org/raml-spec/blob/master/versions/raml-10/raml-10.md>>.

[REST] Fielding, R., "Architectural Styles and the Design of Network-based Software Architectures", Ph.D. Dissertation, University of California, Irvine, 2000, <http://www.ics.uci.edu/~fielding/pubs/dissertation/fielding_dissertation.pdf>.

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

[untangled]

Fielding, R., "Untangled, musings of Roy T. Fielding", n.d., <<http://roy.gbiv.com/untangled/>>.

[yahoo.rest]

"The REST Architectural Style List", n.d., <<https://groups.yahoo.com/neo/groups/rest-discuss/info>>.

6.3. URIs

[1] [RFC6901](#)

[2] [RFC6901](#)

[3] <https://github.com/phtal-org/internet-draft-xrel/issues>

[4] <https://phtal-org.github.io/internet-draft-xrel/>

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