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Web Linking

Abstract

This document specifies relation types for Web links, and defines a registry for them. It also defines the use of such links in HTTP headers with the Link header field.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741[1].

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc5988[2].

Copyright Notice

[1] https://www.rfc-editor.org/rfc/rfc5741.html#section-2
[2] http://www.rfc-editor.org/info/rfc5988
[3] http://trustee.ietf.org/license-info

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1. Introduction

A means of indicating the relationships between resources on the Web, as well as indicating the type of those relationships, has been available for some time in HTML [W3C.REC-html401-19991224], and more recently in Atom [RFC4287]. These mechanisms, although conceptually similar, are separately specified. However, links between resources need not be format specific; it can be useful to have typed links that are independent of their serialisation, especially when a resource has representations in multiple formats.

To this end, this document defines a framework for typed links that isn't specific to a particular serialisation or application. It does so by redefining the link relation registry established by Atom to have a broader domain, and adding to it the relations that are defined by HTML.

Furthermore, an HTTP header field for conveying typed links was defined in Section 19.6.2.4 of [RFC2068], but removed from [RFC2616], due to a lack of implementation experience. Since then, it has been implemented in some User Agents (e.g., for stylesheets), and several additional use cases have surfaced.

Because it was removed, the status of the Link header is unclear, leading some to consider minting new application-specific HTTP headers instead of reusing it. This document addresses this by re-specifying the Link header as one such serialisation, with updated but backwards-compatible syntax.

2. Notational Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14, [RFC2119], as scoped to those conformance targets.

This document uses the Augmented Backus-Naur Form (ABNF) notation of [RFC2616], and explicitly includes the following rules from it: quoted-string, token, SP (space), LOALPHA, DIGIT.

Additionally, the following rules are included from [RFC3986]: URI and URI-Reference; from [RFC4288]: type-name and subtype-name; from [W3C.REC-html401-19991224]: MediaDesc; from [RFC5646]: Language-Tag; and from [RFC5987], ext-value and parmname.

3. Links

In this specification, a link is a typed connection between two resources that are identified by Internationalised Resource Identifiers (IRIs) [RFC3987], and is comprised of:

- A context IRI,
- a link relation type (Section 4),
- a target IRI, and
- optionally, target attributes.

A link can be viewed as a statement of the form "{context IRI} has a {relation type} resource at {target IRI}, which has {target attributes}".

Note that in the common case, the context IRI will also be a URI [RFC3986], because many protocols (such as HTTP) do not support dereferencing IRIs. Likewise, the target IRI will be converted to a URI (see [RFC3987], Section 3.1) in serialisations that do not support IRIs (e.g., the Link header).

This specification does not place restrictions on the cardinality of links; there can be multiple links to and from a particular IRI, and multiple links of different types between two given IRIs. Likewise, the relative ordering of links in any particular serialisation, or between serialisations (e.g., the Link header and in-content links) is not specified or significant in this specification; applications that wish to consider ordering significant can do so.

Target attributes are a set of key/value pairs that describe the link or its target; for example, a media type hint. This specification does not attempt to coordinate their names or use, but does provide common target attributes for use in the Link HTTP header.

Finally, this specification does not define a general syntax for expressing links, nor does it mandate a specific context for any given link; it is expected that serialisations of links will specify both aspects. One such serialisation is communication of links through HTTP headers, specified in Section 5.

4. Link Relation Types

In the simplest case, a link relation type identifies the semantics of a link. For example, a link with the relation type "copyright" indicates that the resource identified by the target IRI is a statement of the copyright terms applying to the current context IRI.

Link relation types can also be used to indicate that the target resource has particular attributes, or exhibits particular behaviours; for example, a "service" link implies that the identified resource is part of a defined protocol (in this case, a service description).

Relation types are not to be confused with media types [RFC4288]; they do not identify the format of the representation that results when the link is dereferenced. Rather, they only describe how the current context is related to another resource.

Relation types SHOULD NOT infer any additional semantics based upon the presence or absence of another link relation type, or its own cardinality of occurrence. An exception to this is the combination of the "alternate" and "stylesheet" registered relation types, which has special meaning in HTML4 for historical reasons.

There are two kinds of relation types: registered and extension.

4.1. Registered Relation Types

Well-defined relation types can be registered as tokens for convenience and/or to promote reuse by other applications. This specification establishes an IANA registry of such relation types; see Section 6.2.

Registered relation type names MUST conform to the reg-rel-type rule, and MUST be compared character-by-character in a case-insensitive fashion. They SHOULD be appropriate to the specificity of the relation type; i.e., if the semantics are highly specific to a particular application, the name should reflect that, so that more general names are available for less specific use.

Registered relation types MUST NOT constrain the media type of the context IRI, and MUST NOT constrain the available representation media types of the target IRI. However, they can specify the behaviours and properties of the target resource (e.g., allowable HTTP methods, request and response media types that must be supported).

Additionally, specific applications of linking may require additional data to be included in the registry. For example, Web browsers might want to know what kinds of links should be downloaded when they archive a Web page; if this application-specific information is in the registry, new link relation types can control this behaviour without unnecessary coordination.

To accommodate this, per-entry application data can be added to the Link Relation Type registry, by registering it in the Link Relation Application Data registry (Section 6.3).

4.2. Extension Relation Types

Applications that don't wish to register a relation type can use an extension relation type, which is a URI [RFC3986] that uniquely identifies the relation type. Although the URI can point to a resource that contains a definition of the semantics of the relation type, clients SHOULD NOT automatically access that resource to avoid overburdening its server.

When extension relation types are compared, they MUST be compared as strings (after converting to URIs if serialised in a different format, such as a Curie [W3C.CR-curie-20090116]) in a case-insensitive fashion, character-by-character. Because of this, all-lowercase URIs SHOULD be used for extension relations.

Note that while extension relation types are required to be URIs, a serialisation of links can specify that they are expressed in another form, as long as they can be converted to URIs.

5. The Link Header Field

The Link entity-header field provides a means for serialising one or more links in HTTP headers. It is semantically equivalent to the <LINK> element in HTML, as well as the atom:link feed-level element in Atom [RFC4287].

```
Link           = "Link" ":" #link-value
link-value     = "<" URI-Reference ">" *( ";" link-param )
link-param     = ( ( "rel" "=" relation-types )
               | ( "anchor" "=" <"> URI-Reference <"> )
               | ( "rev" "=" relation-types )
               | ( "hreflang" "=" Language-Tag )
               | ( "media" "=" ( MediaDesc | ( <"> MediaDesc <"> ) ) )
               | ( "title" "=" quoted-string )
               | ( "title*" "=" ext-value )
               | ( "type" "=" ( media-type | quoted-mt ) )
               | ( link-extension ) )
link-extension = ( parmname [ "=" ( ptoken | quoted-string ) ] )
               | ( ext-name-star "=" ext-value )
ext-name-star  = parmname "*" ; reserved for RFC2231-profiled
                              ; extensions.  Whitespace NOT
                              ; allowed in between.
ptoken         = 1*ptokenchar
ptokenchar     = "!" | "#" | "$" | "%" | "&" | "'" | "("
               | ")" | "*" | "+" | "-" | "." | "/" | DIGIT
               | ":" | "<" | "=" | ">" | "?" | "@" | ALPHA
               | "[" | "]" | "^" | "_" | "`" | "{" | "|"
               | "}" | "~"
media-type     = type-name "/" subtype-name
quoted-mt      = <"> media-type <">
relation-types = relation-type
               | <"> relation-type *( 1*SP relation-type ) <">
relation-type  = reg-rel-type | ext-rel-type
reg-rel-type   = LOALPHA *( LOALPHA | DIGIT | "." | "-" )
ext-rel-type   = URI
```

5.1. Target IRI

Each link-value conveys one target IRI as a URI-Reference (after conversion to one, if necessary; see [RFC3987], Section 3.1) inside angle brackets ("<>"). If the URI-Reference is relative, parsers MUST resolve it as per [RFC3986], Section 5. Note that any base IRI from the message's content is not applied.

5.2. Context IRI

By default, the context of a link conveyed in the Link header field is the IRI of the requested resource.

When present, the anchor parameter overrides this with another URI, such as a fragment of this resource, or a third resource (i.e., when the anchor value is an absolute URI). If the anchor parameter's value is a relative URI, parsers MUST resolve it as per [RFC3986], Section 5. Note that any base URI from the body's content is not applied.

Consuming implementations can choose to ignore links with an anchor parameter. For example, the application in use may not allow the context IRI to be assigned to a different resource. In such cases, the entire link is to be ignored; consuming implementations MUST NOT process the link without applying the anchor.

Note that depending on HTTP status code and response headers, the context IRI might be "anonymous" (i.e., no context IRI is available). For instance, this is the case on a 404 response to a GET request.

5.3. Relation Type

The relation type of a link is conveyed in the "rel" parameter's value. The "rel" parameter MUST NOT appear more than once in a given link-value; occurrences after the first MUST be ignored by parsers.

The "rev" parameter has been used in the past to indicate that the semantics of the relationship are in the reverse direction. That is, a link from A to B with REL="X" expresses the same relationship as a link from B to A with REV="X". "rev" is deprecated by this specification because it often confuses authors and readers; in most cases, using a separate relation type is preferable.

Note that extension relation types are REQUIRED to be absolute URIs in Link headers, and MUST be quoted if they contain a semicolon (";") or comma (",") (as these characters are used as delimiters in the header itself).

5.4. Target Attributes

The "hreflang", "media", "title", "title*", "type", and any link-extension link-params are considered to be target attributes for the link.

The "hreflang" parameter, when present, is a hint indicating what the language of the result of dereferencing the link should be. Note that this is only a hint; for example, it does not override the Content-Language header of a HTTP response obtained by actually following the link. Multiple "hreflang" parameters on a single link-value indicate that multiple languages are available from the indicated resource.

The "media" parameter, when present, is used to indicate intended destination medium or media for style information (see [W3C.REC-html401-19991224], Section 6.13). Note that this may be updated by [W3C.CR-css3-mediaqueries-20090915]). Its value MUST be quoted if it contains a semicolon (";") or comma (","), and there MUST NOT be more than one "media" parameter in a link-value.

The "title" parameter, when present, is used to label the destination of a link such that it can be used as a human-readable identifier (e.g., a menu entry) in the language indicated by the Content-Language header (if present). The "title" parameter MUST NOT appear more than once in a given link-value; occurrences after the first MUST be ignored by parsers.

The "title*" parameter can be used to encode this label in a different character set, and/or contain language information as per [RFC5987]. The "title*" parameter MUST NOT appear more than once in a given link-value; occurrences after the first MUST be ignored by parsers. If the parameter does not contain language information, its language is indicated by the Content-Language header (when present).

If both the "title" and "title*" parameters appear in a link-value, processors SHOULD use the "title*" parameter's value.

The "type" parameter, when present, is a hint indicating what the media type of the result of dereferencing the link should be. Note that this is only a hint; for example, it does not override the Content-Type header of a HTTP response obtained by actually following the link. There MUST NOT be more than one type parameter in a link-value.

5.5. Examples

For example:

```
Link: <http://example.com/TheBook/chapter2>; rel="previous";
      title="previous chapter"
```

indicates that "chapter2" is previous to this resource in a logical navigation path.

Similarly,

```
Link: </>; rel="http://example.net/foo"
```

indicates that the root resource ("/") is related to this resource with the extension relation type "http://example.net/foo".

The example below shows an instance of the Link header encoding multiple links, and also the use of RFC 2231 encoding to encode both non-ASCII characters and language information.

```
Link: </TheBook/chapter2>;
      rel="previous"; title*=UTF-8'de'letztes%20Kapitel,
      </TheBook/chapter4>;
      rel="next"; title*=UTF-8'de'n%c3%a4chstes%20Kapitel
```

Here, both links have titles encoded in UTF-8, use the German language ("de"), and the second link contains the Unicode code point U+00E4 ("LATIN SMALL LETTER A WITH DIAERESIS").

Note that link-values can convey multiple links between the same target and context IRIs; for example:

```
    Link: <http://example.org/>;
          rel="start http://example.net/relation/other"
```

Here, the link to "http://example.org/" has the registered relation type "start" and the extension relation type "http://example.net/relation/other".

6. IANA Considerations

6.1. Link HTTP Header Registration

This specification updates the Message Header registry entry for "Link" in HTTP [RFC3864] to refer to this document.

Header field:	Link
Applicable protocol:	http
Status:	standard
Author/change controller:	IETF (iesg@ietf.org) Internet Engineering Task Force
Specification document(s):	[RFC5988]

6.2. Link Relation Type Registry

This specification establishes the Link Relation Type registry, and updates Atom [RFC4287] to refer to it in place of the "Registry of Link Relations".

The underlying registry data (e.g., the XML file) must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions (<http://trustee.ietf.org/license-info>).

6.2.1. Registering New Link Relation Types

Relation types are registered on the advice of a Designated Expert (appointed by the IESG or their delegate), with a Specification Required (using terminology from [RFC5226]).

The requirements for registered relation types are described in Section 4.1.

Registration requests consist of the completed registration template below, typically published in an RFC or Open Standard (in the sense described by [RFC2026], Section 7). However, to allow for the allocation of values prior to publication, the Designated Expert may approve registration once they are satisfied that a specification will be published.

Note that relation types can be registered by third parties, if the Designated Expert determines that an unregistered relation type is widely deployed and not likely to be registered in a timely manner.

The registration template is:

- Relation Name:
- Description:
- Reference:
- Notes: [optional]
- Application Data: [optional]

Registration requests should be sent to the link-relations@ietf.org mailing list, marked clearly in the subject line (e.g., "NEW RELATION - example" to register an "example" relation type).

Within at most 14 days of the request, the Designated Expert(s) will either approve or deny the registration request, communicating this decision to the review list and IANA. Denials should include an explanation and, if applicable, suggestions as to how to make the request successful.

Decisions (or lack thereof) made by the Designated Expert can be first appealed to Application Area Directors (contactable using app-ads@tools.ietf.org email address or directly by looking up their email addresses on http://www.iesg.org/ website) and, if the appellant is not satisfied with the response, to the full IESG (using the iesg@iesg.org mailing list).

IANA should only accept registry updates from the Designated Expert(s), and should direct all requests for registration to the review mailing list.

6.2.2. Initial Registry Contents

The Link Relation Type registry's initial contents are:

- Relation Name: alternate
- Description: Designates a substitute for the link's context.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: appendix
- Description: Refers to an appendix.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: bookmark
- Description: Refers to a bookmark or entry point.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: chapter
- Description: Refers to a chapter in a collection of resources.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: contents
- Description: Refers to a table of contents.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: copyright
- Description: Refers to a copyright statement that applies to the link's context.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: current
- Description: Refers to a resource containing the most recent item(s) in a collection of resources.
- Reference: [RFC5005]
- Relation Name: describedby
- Description: Refers to a resource providing information about the link's context.
- Documentation: <http://www.w3.org/TR/powder-dr/#assoc-linking>
- Relation Name: edit
- Description: Refers to a resource that can be used to edit the link's context.
- Reference: [RFC5023]
- Relation Name: edit-media
- Description: Refers to a resource that can be used to edit media associated with the link's context.
- Reference: [RFC5023]
- Relation Name: enclosure
- Description: Identifies a related resource that is potentially large and might require special handling.
- Reference: [RFC4287]
- Relation Name: first
- Description: An IRI that refers to the furthest preceding resource in a series of resources.
- Reference: [RFC5988]
- Notes: this relation type registration did not indicate a reference. Originally requested by Mark Nottingham in December 2004.
- Relation Name: glossary
- Description: Refers to a glossary of terms.

- Reference: [W3C.REC-html401-19991224]
- Relation Name: help
- Description: Refers to a resource offering help (more information, links to other sources information, etc.)
- Reference: [W3C.REC-html401-19991224]
- Relation Name: hub
- Description: Refers to a hub that enables registration for notification of updates to the context.
- Reference: <http://pubsubhubbub.googlecode.com/> <http://pubsubhubbub.googlecode.com/svn/trunk/pubsubhubbub-core-0.3.html>
- Notes: this relation type was requested by Brett Slatkin.
- Relation Name: index
- Description: Refers to an index.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: last
- Description: An IRI that refers to the furthest following resource in a series of resources.
- Reference: [RFC5988]
- Notes: this relation type registration did not indicate a reference. Originally requested by Mark Nottingham in December 2004.
- Relation Name: latest-version
- Description: Points to a resource containing the latest (e.g., current) version of the context.
- Reference: [RFC5829]
- Relation Name: license
- Description: Refers to a license associated with the link's context.
- Reference: [RFC4946]
- Relation Name: next
- Description: Refers to the next resource in a ordered series of resources.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: next-archive
- Description: Refers to the immediately following archive resource.
- Reference: [RFC5005]
- Relation Name: payment
- Description: indicates a resource where payment is accepted.
- Reference: [RFC5988]
- Notes: this relation type registration did not indicate a reference. Requested by Joshua Kinberg and Robert Sayre. It is meant as a general way to facilitate acts of payment, and thus this specification makes no assumptions on the type of payment or transaction protocol. Examples may include a Web page where donations are accepted or where goods and services are available for purchase. rel="payment" is not intended to initiate an automated transaction. In Atom documents, a link element with a rel="payment" attribute may exist at the feed/channel level and/or the entry/item level. For example, a rel="payment" link at the feed/channel level may point to a "tip jar" URI, whereas an entry/item containing a book review may include a rel="payment" link that points to the location where the book may be purchased through an online retailer.
- Relation Name: prev
- Description: Refers to the previous resource in an ordered series of resources. Synonym for "previous".
- Reference: [W3C.REC-html401-19991224]

- Relation Name: predecessor-version
- Description: Points to a resource containing the predecessor version in the version history.
- Reference: [RFC5829]
- Relation Name: previous
- Description: Refers to the previous resource in an ordered series of resources. Synonym for "prev".
- Reference: [W3C.REC-html401-19991224]
- Relation Name: prev-archive
- Description: Refers to the immediately preceding archive resource.
- Reference: [RFC5005]
- Relation Name: related
- Description: Identifies a related resource.
- Reference: [RFC4287]
- Relation Name: replies
- Description: Identifies a resource that is a reply to the context of the link.
- Reference: [RFC4685]
- Relation Name: section
- Description: Refers to a section in a collection of resources.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: self
- Description: Conveys an identifier for the link's context.
- Reference: [RFC4287]
- Relation Name: service
- Description: Indicates a URI that can be used to retrieve a service document.
- Reference: [RFC5023]
- Notes: When used in an Atom document, this relation type specifies Atom Publishing Protocol service documents by default. Requested by James Snell.
- Relation Name: start
- Description: Refers to the first resource in a collection of resources.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: stylesheet
- Description: Refers to an external style sheet.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: subsection
- Description: Refers to a resource serving as a subsection in a collection of resources.
- Reference: [W3C.REC-html401-19991224]
- Relation Name: successor-version
- Description: Points to a resource containing the successor version in the version history.
- Reference: [RFC5829]
- Relation Name: up
- Description: Refers to a parent document in a hierarchy of documents.
- Reference: [RFC5988]
- Notes: this relation type registration did not indicate a reference. Requested by Noah Slater.

- Relation Name: version-history
- Description: points to a resource containing the version history for the context.
- Reference: [RFC5829]
- Relation Name: via
- Description: Identifies a resource that is the source of the information in the link's context.
- Reference: [RFC4287]
- Relation Name: working-copy
- Description: Points to a working copy for this resource.
- Reference: [RFC5829]
- Relation Name: working-copy-of
- Description: Points to the versioned resource from which this working copy was obtained.
- Reference: [RFC5829]

6.3. Link Relation Application Data Registry

This specification also establishes the Link Relation Application Field registry, to allow entries in the Link Relation Type registry to be extended with application-specific data (hereafter, "app data") specific to all instances of a given link relation type.

Application data is registered on the advice of a Designated Expert (appointed by the IESG or their delegate), with a Specification Required (using terminology from [RFC5226]).

Registration requests consist of the completed registration template below:

- Application Name:
- Description:
- Default Value:
- Notes: [optional]

The Description SHOULD identify the value space of the app data. The Default Value MUST be appropriate to entries to which the app data does not apply.

Entries that pre-date the addition of app data will automatically be considered to have the default value for that app data; if there are exceptions, the modification of such entries should be coordinated by the Designated Expert(s), in consultation with the author of the proposed app data as well as the registrant of the existing entry (if possible).

Registration requests should be sent to the link-relations@ietf.org mailing list, marked clearly in the subject line (e.g., "NEW APP DATA - example" to register "example" app data).

Within at most 14 days of the request, the Designated Expert will either approve or deny the registration request, communicating this decision to the review list. Denials should include an explanation and, if applicable, suggestions as to how to make the request successful. Registration requests that are undetermined for a period longer than 21 days can be brought to the IESG's attention (using the iesg@iesg.org mailing list) for resolution.

When a registration request is successful, the Designated Expert will forward it to IANA for publication. IANA should only accept registry updates from the Designated Expert(s), and should direct all requests for registration to the review mailing list.

7. Security Considerations

The content of the Link header field is not secure, private or integrity-guaranteed, and due caution should be exercised when using it. Use of Transport Layer Security (TLS) with HTTP ([RFC2818] and [RFC2817]) is currently the only end-to-end way to provide such protection.

Applications that take advantage of typed links should consider the attack vectors opened by automatically following, trusting, or otherwise using links gathered from HTTP headers. In particular, Link headers that use the "anchor" parameter to associate a link's context with another resource should be treated with due caution.

The Link entity-header field makes extensive use of IRIs and URIs. See [RFC3987] for security considerations relating to IRIs. See [RFC3986] for security considerations relating to URIs. See [RFC2616] for security considerations relating to HTTP headers.

8. Internationalisation Considerations

Target IRIs may need to be converted to URIs in order to express them in serialisations that do not support IRIs. This includes the Link HTTP header.

Similarly, the anchor parameter of the Link header does not support IRIs, and therefore IRIs must be converted to URIs before inclusion there.

Relation types are defined as URIs, not IRIs, to aid in their comparison. It is not expected that they will be displayed to end users.

9. References

9.1. Normative References

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9.2. Informative References

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Appendix A. Notes on Using the Link Header with the HTML4 Format

HTML motivated the original syntax of the Link header, and many of the design decisions in this document are driven by a desire to stay compatible with these uses.

In HTML4, the link element can be mapped to links as specified here by using the "href" attribute for the target URI, and "rel" to convey the relation type, as in the Link header. The context of the link is the URI associated with the entire HTML document.

All of the link relation types defined by HTML4 have been included in the Link Relation Type registry, so they can be used without modification. However, there are several potential ways to serialise extension relation types into HTML4, including

- As absolute URIs,
- using the document-wide "profile" attribute's URI as a prefix for relation types, or
- using the RDFa [W3C.REC-rdfa-syntax-20081014] convention of mapping token prefixes to URIs (in a manner similar to XML name spaces) (note that RDFa is only defined to work in XHTML [W3C.REC-xhtml-basic-20080729], but is sometimes used in HTML4).

Individual applications of linking will therefore need to define how their extension links should be serialised into HTML4.

Surveys of existing HTML content have shown that unregistered link relation types that are not URIs are (perhaps inevitably) common. Consuming HTML implementations should not consider such unregistered short links to be errors, but rather relation types with a local scope (i.e., their meaning is specific and perhaps private to that document).

HTML4 also defines several attributes on links that are not explicitly defined by the Link header. These attributes can be serialised as link-extensions to maintain fidelity.

Finally, the HTML4 specification gives a special meaning when the "alternate" and "stylesheet" relation types coincide in the same link. Such links should be serialised in the Link header using a single list of relation-types (e.g., rel="alternate stylesheet") to preserve this relationship.

Appendix B. Notes on Using the Link Header with the Atom Format

Atom conveys links in the atom:link element, with the "href" attribute indicating the target IRI and the "rel" attribute containing the relation type. The context of the link is either a feed IRI or an entry ID, depending on where it appears; generally, feed-level links are obvious candidates for transmission as a Link header.

When serialising an atom:link into a Link header, it is necessary to convert target IRIs (if used) to URIs.

Atom defines extension relation types in terms of IRIs. This specification re-defines them as URIs, to simplify and reduce errors in their comparison.

Atom allows registered link relation types to be serialised as absolute URIs. Such relation types SHOULD be converted to the appropriate registered form (e.g., "http://www.iana.org/assignments/relation/self" to "self") so that they are not mistaken for extension relation types.

Furthermore, Atom link relation types are always compared in a case-sensitive fashion; therefore, registered link relation types SHOULD be converted to their registered form (usually, lowercase) when serialised in an Atom document.

Note also that while the Link header allows multiple relations to be serialised in a single link, atom:link does not. In this case, a single link-value may map to several atom:link elements.

As with HTML, atom:link defines some attributes that are not explicitly mirrored in the Link header syntax, but they can also be used as link-extensions to maintain fidelity.

Appendix C. Acknowledgements

This specification lifts the idea and definition for the Link header from RFC 2068; credit for it belongs entirely to the authors of and contributors to that document. The link relation type registrations themselves are sourced from several documents; see the applicable references.

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