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host-meta: Web Host Metadata draft-hammer-hostmeta-07

Abstract

This memo describes a method for locating host metadata for Web-based protocols.

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1. Introduction

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Web-based protocols often require the discovery of host policy or metadata, where host is not a single resource but the entity controlling the collection of resources identified by Universal Resource Identifiers (URI) with a common host as defined by [\[RFC3986\]](#) ([Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier \(URI\): Generic Syntax," January 2005.](#)). While these protocols have a wide range of metadata needs, they often define metadata that is concise, has simple syntax requirements, and can benefit from storing its metadata in a common location used by other related protocols.

Because there is no URI or resource available to describe a host, many of the methods used for associating per-resource metadata (such as HTTP headers) are not available. This often leads to the overloading of the root HTTP resource (e.g. 'http://example.com/') with host metadata that is not specific to the root resource, and often has nothing to do it. This memo registers the "well-known" URI suffix host-meta in the Well-Known URI Registry established by [\[RFC5785\]](#) ([Nottingham, M. and E. Hammer-Lahav, "Defining Well-Known Uniform Resource Identifiers \(URIs\)," April 2010.](#)), and specifies a simple, general-purpose metadata document for hosts, to be used by multiple Web-based protocols.

[[Please discuss this draft on the apps-discuss@ietf.org mailing list.]]

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1.1. Example

The following is a simple host-meta document for the 'example.com' and 'www.example.com' hosts with a link providing host-wide copyright information and a link template providing a URI for obtaining resource-specific author information for each resource within the host-meta document scope:

```
<?xml version='1.0' encoding='UTF-8'?>
<XRD xmlns='http://docs.oasis-open.org/ns/xri/xrd-1.0'
      xmlns:hm='http://host-meta.net/ns/1.0'>

  <hm:Host>example.com</hm:Host>
  <hm:Host>www.example.com</hm:Host>

  <Link rel='license'
        href='http://example.com/license'>
    <Title xml:lang='en-us'>Site License Policy</Title>
  </Link>
  <Link rel='author'
        template='http://meta.example.com?uri={uri}'>
    <Title xml:lang='en-us'>Author Profile</Title>
  </Link>
</XRD>
```

1.2. Namespace and Version

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The host-meta document uses the XRD 1.0 XML namespace URI [\[W3C.REC-xml-names-19990114\]](#) (Hollander, D., Layman, A., and T. Bray, "Namespaces in XML," January 1999.):

http://docs.oasis-open.org/ns/xri/xrd-1.0

The XML namespace URI for the host-meta specific extension elements defined in this specification is:

http://host-meta.net/ns/1.0

1.3. Notational Conventions

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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 [\[RFC2119\]](#) (Bradner, S.,

["Key words for use in RFCs to Indicate Requirement Levels," March 1997.](#))

Examples in this specification uses the namespace prefix `hm:` for the extension Namespace URI identified in [Section 1.2 \(Namespace and Version\)](#). The `hm:` namespace prefix is arbitrary and not is semantically significant. Element names without a namespace prefix belong to the XRD 1.0 XML namespace identified in [Section 1.2 \(Namespace and Version\)](#). This document uses the Augmented Backus-Naur Form (ABNF) notation of [\[RFC5234\] \(Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF," January 2008.\)](#). Additionally, the following rules are included from [\[RFC3986\] \(Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier \(URI\): Generic Syntax," January 2005.\)](#): `reserved`, `unreserved`, and `host`.

2. Metadata Scope

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Each host-meta document describes one or more hosts, where a host is not a single resource but the entity controlling the collection of resources identified by URIs with a common host as defined by [\[RFC3986\] \(Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier \(URI\): Generic Syntax," January 2005.\)](#), across all ports and schemes.

The scope MUST be expressed explicitly within the document using the `hm:Host` element as described in [Section 3.1 \(The 'hm:Host' Element\)](#).

The host-meta scope does not apply to any other hostname (or sub-domain) not explicitly declared. For example, `'example.net'`, `'example.com'`, and `'www.example.com'` all have different and non-overlapping scopes.

3. The host-meta Document Format

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The host-meta document uses the XRD 1.0 document format as defined by [\[OASIS.XRD-1.0\] \(Hammer-Lahav, E. and W. Norris, "Extensible Resource Descriptor \(XRD\) Version 1.0 \(work in progress\)," .\)](#), which provides a simple and extensible XML-based schema for describing resources. This memo defines additional elements and processing rules needed to describe hosts. Documents MAY include any XRD element not explicitly excluded.

The host-meta document root MUST be an XRD element. The document SHOULD NOT include a `Subject` element, as at this time no URI is available to identify hosts. The use of the `Alias` element in host-meta is undefined and NOT RECOMMENDED.

This memo defines the `hm:Host` element for declaring document scope. The subject (or "context resource" as defined by

[\[I-D.nottingham-http-link-header\]](#) (Nottingham, M., "Web Linking," July 2009.) of the XRD Property and Link elements consists of the hosts included in the document scope. However, the subject of Link elements with a template attribute is the individual resources (included in the document scope) applied to the link template as described in [Section 3.2 \(The 'Link' Element\)](#).

3.1. The 'hm:Host' Element

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The 'hm:Host' element is used to declare the scope of the host-meta document and is defined as a child element of the root XRD element. The parent XRD element MUST include one but MAY include more hm:Host elements (order does not matter). If a host-meta document includes more than one hm:Host element, it does not signify any relationship between the individual hosts other than sharing the same metadata included in the document.

The element value syntax ABNF:

```
Host-Element-Value = host
```

3.2. The 'Link' Element

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The XRD Link element, when used with the href attribute, conveys a link relation between the hosts described by the document and a common target URI.

For example, the following link declares a common author for the entire scope:

```
<Link rel='author' href='http://example.com/author' />
```

However, a Link element with a template attribute conveys relations whose context are the individual resources within the host-meta document scope, and whose target is constructed by applying each context resource URI to the template. The template string MAY contain a URI string without any variables to represent a resource-level relation that is identical for every individual resource.

For example, a blog with multiple authors can provide information about each article's author by providing an endpoint with a parameter set to the URI of each article. Each article has a unique author, but all share the same pattern of where that information is located:

```
<Link rel='author' template='http://example.com?author={uri}' />
```

3.2.1. Template Syntax

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This memo defines a simple template syntax for URI transformation. A template is a string containing brace-enclosed ("{}") variable names marking the parts of the string that are to be substituted by the corresponding variable values.

Before substituting template variables, any value character other than unreserved (as defined by [\[RFC3986\] \(Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier \(URI\): Generic Syntax," January 2005.\)](#)) MUST be percent-encoded per [\[RFC3986\] \(Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier \(URI\): Generic Syntax," January 2005.\)](#).

This memo defines a single variable - uri - as the entire context resource URI. Protocols MAY define additional relation-specific variables and syntax rules, but SHOULD only do so for protocol-specific relation types, and MUST NOT change the meaning of the uri variable. If a client is unable to successfully process a template (e.g. unknown variable names, unknown or incompatible syntax) the parent Link element SHOULD be ignored.

The template syntax ABNF:

```
URI-Template = *( uri-char | variable )
variable     = "{" var-name "}"
uri-char     = ( reserved | unreserved )
var-name     = "uri" | ( 1*var-char )
var-char     = ALPHA / DIGIT / "." / "_"
```

For example:

```
Input:      http://example.com/r?f=1
Template:   http://example.org?q={uri}
Output:     http://example.org?q=http%3A%2F%2Fexample.com%2Fr%3Ff%3D1
```

4. Obtaining host-meta Documents

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Clients obtain the host-meta document for a given host by making an HTTPS [\[RFC2818\] \(Rescorla, E., "HTTP Over TLS," May 2000.\)](#) GET request to the host's port 443 for the /.well-known/host-meta path. If the request fails to produce a valid host-meta document, clients make an HTTP [\[RFC2616\] \(Fielding, R., Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P., and T. Berners-Lee, "Hypertext Transfer](#)

[Protocol -- HTTP/1.1," June 1999.\)](#) GET request to the host's port 80 for the /.well-known/host-meta path.

Servers MUST support at least one but SHOULD support both ports. If both ports are supported, they MUST serve the same document. Clients MAY attempt to obtain the host-meta document from either port, SHOULD attempt using port 443 first, and SHOULD attempt the other port if the first fails.

For example, the following request is used to obtain the host-meta document for the 'example.com' host:

```
GET /.well-known/host-meta HTTP/1.1
Host: example.com
```

If a representation is successfully obtained, but is not in the format described above, clients should infer that the path is being used for other purposes, and not process the response as a host-meta document. To aid in this process, authorities using this mechanism SHOULD correctly label host-meta responses with the application/xrd+xml internet media type.

If the server response indicates that the host-meta resource is located elsewhere (a 301, 302, or 307 response status code), the client SHOULD try to obtain the resource from the location provided in the response. This means that the host-meta document for one host MAY be retrieved from a another host. Likewise, if the resource is not available or does not exist (indicated respectively, by the 404 and 410 response status codes) at both ports, the client should infer that metadata is not available via this mechanism.

The scope declared within the host-meta document MUST match the desired host. Clients MUST NOT use host-meta documents when the desired host (used to obtain the document) is not listed in the document.

5. Security Considerations

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The metadata returned by the host-meta resource is presumed to be under the control of the appropriate authority and representative of all the resources described by it. If this resource is compromised or otherwise under the control of another party, it may represent a risk to the security of the server and data served by it, depending on what protocols use it.

The host-meta scope is explicitly declared by the hm:Host elements listed in the document. Clients SHOULD evaluate the authority of a host-meta document obtained from one host to describe another host. Protocols that change the scope from the one declared in the document without careful consideration can incur security risks.

Protocols using host-meta templates SHOULD evaluate the construction of their templates as well as any protocol-specific variables or syntax to

ensure that the templates cannot be abused by an attacker. For example, a client can be tricked into following a malicious link due to a poorly constructed template which produces unexpected results when its variable values contain unexpected characters.

Protocols MAY restrict document retrieval to HTTPS based on their security needs. Protocols utilizing host-meta documents obtained via other methods not described in this memo SHOULD consider the security and authority risks associated with such methods.

6. IANA Considerations

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6.1. The host-meta Well-Known URI

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This memo registers the 'host-meta' well-known URI in the Well-Known URI Registry as defined by [\[RFC5785\] \(Nottingham, M. and E. Hammer-Lahav, "Defining Well-Known Uniform Resource Identifiers \(URIs\)," April 2010.\)](#).

URI suffix: host-meta

Change controller: IETF

Specification document(s): [[this document]]

Related information: None

Appendix A. host-meta XML Schema

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The following is the XML schema for the host-meta XRD extension elements:

```
<?xml version="1.0" encoding="UTF-8"?>
<schema
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:hm="http://host-meta.net/ns/1.0"
  targetNamespace="http://host-meta.net/ns/1.0"
  elementFormDefault="unqualified"
  attributeFormDefault="unqualified"
  version="1.0">

  <element name="Host" type="hm:HostType"/>

  <complexType name="HostType">
    <simpleContent>
      <extension base="string">
        <anyAttribute namespace="##other" processContents="lax"/>
      </extension>
    </simpleContent>
  </complexType>

</schema>
```

Appendix B. Acknowledgments

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The author would like to acknowledge the contributions of everyone who provided feedback and use cases for this memo; in particular, Dirk Balfanz, DeWitt Clinton, Blaine Cook, Eve Maler, Breno de Medeiros, Brad Fitzpatrick, James Manger, Will Norris, Mark Nottingham, John Panzer, Drummond Reed, and Peter Saint-Andre.

Appendix C. Document History

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[[to be removed by the RFC editor before publication as an RFC]]

-07

*Minor editorial clarifications.

*Added XML schema for host-meta extension.

*Updated XRD reference to the latest draft (no normative changes).

-06

- *Updated well-known reference to RFC 5785.

- *Minor editorial changes.

- *Made HTTPS a higher priority (SHOULD) over HTTP.

-05

- *Adjusted syntax to the latest XRD schema.

- *Added note about using a link template without variables.

-04

- *Corrected the <hm:Host> example.

-03

- *Changed scope to an entire host (per RFC 3986).

- *Simplified template syntax to always percent-encode values and vocabulary to a single 'uri' variable.

- *Changed document retrieval to always use HTTP(S).

- *Added security consideration about the use of templates.

- *Explicitly defined the root element to be 'XRD'.

-02

- *Changed Scope element syntax from attributes to URI-like string value.

-01

- *Editorial rewrite.

- *Redefined scope as a scheme-authority pair.

- *Added document structure section.

-00

- *Initial draft.

7. Normative References

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[OASIS.XRD-1.0]	Hammer-Lahav, E. and W. Norris, " Extensible Resource Descriptor (XRD) Version 1.0 (work in progress) " (HTML).
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[RFC2616]	Fielding, R. , Gettys, J. , Mogul, J. , Frystyk, H. , Masinter, L. , Leach, P. , and T. Berners-Lee , " Hypertext Transfer Protocol -- HTTP/1.1 ," RFC 2616, June 1999 (TXT , PS , PDF , HTML , XML).
[RFC2818]	Rescorla, E., " HTTP Over TLS ," RFC 2818, May 2000 (TXT).
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[W3C.REC-P3P-20020416]	Marchiori, M., " The Platform for Privacy Preferences 1.0 (P3P1.0) Specification ," World Wide Web Consortium Recommendation REC-P3P-20020416, April 2002 (HTML).
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Author's Address

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	Eran Hammer-Lahav
	Yahoo!
Email:	eran@hueniverse.com
URI:	http://hueniverse.com