Network Working Group
Internet-Draft
Obsoletes: 5785 (if approved)
Intended status: Standards Track
Expires: October 7, 2018

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April 5, 2018

Defining Well-Known Uniform Resource Identifiers (URIs)
draft-nottingham-rfc5785bis-05

Abstract

This memo defines a path prefix for "well-known locations", "/.well-known/", in selected Uniform Resource Identifier (URI) schemes.

Note to Readers

RFC EDITOR: please remove this section before publication

This draft is a proposed revision of RFC5875.

The issues list for this draft can be found at https://github.com/mnot/I-D/labels/rfc5785bis [1].

The most recent (often, unpublished) draft is at https://mnot.github.io/I-D/rfc5785bis/ [2].

Recent changes are listed at https://github.com/mnot/I-D/commits/gh-pages/rfc5785bis [3].

See also the draft's current status in the IETF datatracker, at https://datatracker.ietf.org/doc/draft-nottingham-rfc5785bis/ [4].

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on October 7, 2018.

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1. Introduction

Some applications on the Web require the discovery of information about an origin [RFC6454] (sometimes called "site-wide metadata") before making a request. For example, the Robots Exclusion Protocol (http://www.robotstxt.org/ [5]) specifies a way for automated processes to obtain permission to access resources; likewise, the Platform for Privacy Preferences [W3C.REC-P3P-20020416] tells user-agents how to discover privacy policy before interacting with an origin server.

While there are several ways to access per-resource metadata (e.g., HTTP headers, WebDAV's PROPFIND [RFC4918]), the perceived overhead (either in terms of client-perceived latency and/or deployment difficulties) associated with them often precludes their use in these scenarios.

When this happens, one solution is designating a "well-known location" for data or services related to the origin overall, so that it can be easily located. However, this approach has the drawback of risking collisions, both with other such designated "well-known locations" and with resources that the origin has created (or wishes to create).

At the same time, it has become more popular to use HTTP as a substrate for non-Web protocols. Sometimes, such protocols need a way to locate one or more resources on a given host.

To address these uses, this memo defines a path prefix in HTTP(S) URIs for these "well-known locations", "/.well-known/". Future specifications that need to define a resource for such metadata can register their use to avoid collisions and minimise impingement upon origins' URI space.

Well-known URIs can also be used with other URI schemes, but only when those schemes' definitions explicitly allow it.

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 RFC 2119 [RFC2119].

3. Well-Known URIs

A well-known URI is a URI [RFC3986] whose path component begins with the characters "/.well-known/", and whose scheme is "HTTP", "HTTPS", or another scheme that has explicitly been specified to use well-known URIs.

Applications that wish to mint new well-known URIs MUST register them, following the procedures in Section 5.1.

For example, if an application registers the name 'example', the corresponding well-known URI on 'http://www.example.com/' would be 'http://www.example.com/.well-known/example'.

Registered names MUST conform to the segment-nz production in [RFC3986]. This means they cannot contain the "/" character.

Registered names for a specific application SHOULD be correspondingly precise; "squatting" on generic terms is not encouraged. For example, if the Example application wants a well-known location for metadata, an appropriate registered name might be "example-metadata" or even "example.com-metadata", not "metadata".

At a minimum, a registration will reference a specification that defines the format and associated media type to be obtained by dereferencing the well-known URI, along with the URI scheme(s) that the well-known URI can be used with. If no URI schemes are explicitly specified, "HTTP" and "HTTPS" are assumed.

It MAY also contain additional information, such as the syntax of additional path components, query strings and/or fragment identifiers to be appended to the well-known URI, or protocol-specific details (e.g., HTTP [RFC7231] method handling).

Note that this specification defines neither how to determine the hostname to use to find the well-known URI for a particular application, nor the scope of the metadata discovered by dereferencing the well-known URI; both should be defined by the application itself.

Also, this specification does not define a format or media-type for the resource located at "/.well-known/" and clients should not expect a resource to exist at that location.

Well-known URIs are only valid when rooted in the top of the path's hierarchy; they MUST NOT be used in other parts of the path. For example, "/.well-known/example" is a valid use, but "/foo/.well-known/example" is not.

See also Section 4 for Security Considerations regarding well-known locations.

3.1. Registering Well-Known URIs

The "Well-Known URIs" registry is located at "https://www.iana.org/assignments/well-known-uris/". Registration requests can be made by following the instructions located there or by sending an email to the "wellknown-uri-review@ietf.org" mailing list.

Registration requests consist of at least the following information:

URI suffix: The name requested for the well-known URI, relative to "/.well-known/"; e.g., "example".

Change controller: For Standards-Track RFCs, state "IETF". For others, give the name of the responsible party. Other details (e.g., postal address, e-mail address, home page URI) may also be included.

Specification document(s): Reference to the document that specifies the field, preferably including a URI that can be used to retrieve a copy of the document. An indication of the relevant sections may also be included, but is not required.

Related information: Optionally, citations to additional documents containing further relevant information.

General requirements for registered relation types are described in Section 3.

Registrations MUST reference a freely available, stable specification.

Note that well-known URIs can be registered by third parties (including the expert(s)), if the expert(s) determines that an unregistered well-known URI is widely deployed and not likely to be registered in a timely manner otherwise. Such registrations still are subject to the requirements defined, including the need to reference a specification.

4. Security Considerations

Applications minting new well-known URIs, as well as administrators deploying them, will need to consider several security-related issues, including (but not limited to) exposure of sensitive data, denial-of-service attacks (in addition to normal load issues), server and client authentication, vulnerability to DNS rebinding attacks, and attacks where limited access to a server grants the ability to affect how well-known URIs are served.

4.1. Interaction with the Web

In particular, applications using well-known URIs for HTTP or HTTPS URLs need to be aware that well-known resources will be accessible to Web browsers, and therefore is potentially able to be manipulated by content obtained from other parts of that origin. If an attacker is able to inject content (e.g., through a Cross-Site Scripting vulnerability), they will be able to make potentially arbitrary requests to the well-known resource.

HTTP and HTTPS also use origins as a security boundary for many other mechanisms, including (but not limited to) Cookies [RFC6265], Web

Storage [W3C.REC-webstorage-20160419] and many capabilities. Applications defining well-known locations should not assume that they have sole access to these mechanisms.

Applications defining well-known URIs should not assume or require that they are the only application using the origin, since this is a common deployment pattern; instead, they should use appropriate mechanisms to mitigate the risks of co-existing with Web applications, such as (but not limited to):

- Using Strict Transport Security [RFC6797] to assure that HTTPS is used
- Using Content-Security-Policy [W3C.WD-CSP3-20160913] to constrain the capabilities of content, thereby mitigating Cross-Site Scripting attacks (which are possible if client-provided data is exposed in any part of a response in the application)
- Using X-Frame-Options [RFC7034] to prevent content from being included in a HTML frame from another origin, thereby enabling "clickjacking"
- Using Referrer-Policy [W3C.CR-referrer-policy-20170126] to prevent sensitive data in URLs from being leaked in the Referer request header
- Using the 'HttpOnly' flag on Cookies to assure that cookies are not exposed to browser scripting languages [RFC6265]

4.2. Scoping Applications

This memo does not specify the scope of applicability of metadata or policy obtained from a well-known URI, and does not specify how to discover a well-known URI for a particular application.

Individual applications using this mechanism must define both aspects; if this is not specified, security issues can arise from implementation deviations and confusion about boundaries between applications.

Applying metadata discovered in a well-known URI to resources other than those co-located on the same origin risks administrative as well as security issues. For example, allowing "https://example.com/.well-known/example" to apply policy to "https://department.example.com", "https://www.example.com" or even "https://www.example.com:8000" assumes a relationship between hosts where there may be none, or there may be conflicting motivations.

4.3. Hidden Capabilities

Applications using well-known locations should consider that some server administrators might be unaware of its existence (especially on operating systems that hide directories whose names begin with "."). This means that if an attacker has write access to the .well-known directory, they would be able to control its contents, possibly without the administrator realising it.

5. IANA Considerations

5.1. The Well-Known URI Registry

This specification updates the registration procedures for the "Well-Known URI" registry, first defined in [RFC5785]; see Section 3.1.

Well-known URIs are registered on the advice of one or more experts (appointed by the IESG or their delegate), with a Specification Required (using terminology from [RFC8126]).

The Experts' primary considerations in evaluating registration requests are: * Conformance to the requirements in Section 3 * The availability and stability of the specifying document * The security considerations outlined in Section 4

IANA will direct any incoming requests regarding the registry to this document and, if defined, the processes established by the expert(s); typically, this will mean referring them to the registry Web page.

IANA should replace all references to RFC 5988 in that registry have been replaced with references to this document.

6. References

6.1. Normative References

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[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>.

[RFC6454] Barth, A., "The Web Origin Concept", RFC 6454, DOI 10.17487/RFC6454, December 2011, <https://www.rfc-editor.org/info/rfc6454>.

[RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

6.2. Informative References

[RFC4918] Dusseault, L., Ed., "HTTP Extensions for Web Distributed Authoring and Versioning (WebDAV)", RFC 4918, DOI 10.17487/RFC4918, June 2007, <https://www.rfc-editor.org/info/rfc4918>.

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[RFC6265] Barth, A., "HTTP State Management Mechanism", RFC 6265, DOI 10.17487/RFC6265, April 2011, <https://www.rfc-editor.org/info/rfc6265>.

[RFC6797] Hodges, J., Jackson, C., and A. Barth, "HTTP Strict Transport Security (HSTS)", RFC 6797, DOI 10.17487/RFC6797, November 2012, <https://www.rfc-editor.org/info/rfc6797>.

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[RFC7231] Fielding, R., Ed. and J. Reschke, Ed., "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content", RFC 7231, DOI 10.17487/RFC7231, June 2014, <https://www.rfc-editor.org/info/rfc7231>.

[W3C.CR-referrer-policy-20170126] Eisinger, J. and E. Stark, "Referrer Policy", World Wide Web Consortium CR CR-referrer-policy-20170126, January 2017, <https://www.w3.org/TR/2017/CR-referrer-policy-20170126>.

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Marchiori, M., "The Platform for Privacy Preferences 1.0 (P3P1.0) Specification", World Wide Web Consortium Recommendation REC-P3P-20020416, April 2002, <http://www.w3.org/TR/2002/REC-P3P-20020416>.

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Hickson, I., "Web Storage (Second Edition)", World Wide Web Consortium Recommendation REC-webstorage-20160419, April 2016, <http://www.w3.org/TR/2016/REC-webstorage-20160419>.

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West, M., "Content Security Policy Level 3", World Wide Web Consortium WD WD-CSP3-20160913, September 2016, <https://www.w3.org/TR/2016/WD-CSP3-20160913>.

6.3. URIs

[1] https://github.com/mnot/I-D/labels/rfc5785bis

[2] https://mnot.github.io/I-D/rfc5785bis/

[3] https://github.com/mnot/I-D/commits/gh-pages/rfc5785bis

[4] https://datatracker.ietf.org/doc/draft-nottingham-rfc5785bis/

[5] http://www.robotstxt.org/

Appendix A. Frequently Asked Questions

1. Aren't well-known locations bad for the Web?

   They are, but for various reasons - both technical and social - they are sometimes necessary. This memo defines a "sandbox" for them, to reduce the risks of collision and to minimise the impact upon pre-existing URIs on sites.

2. Why /.well-known?

   It's short, descriptive, and according to search indices, not widely used.

3. What impact does this have on existing mechanisms, such as P3P and robots.txt?

   None, until they choose to use this mechanism.

4. Why aren't per-directory well-known locations defined?

   Allowing every URI path segment to have a well-known location (e.g., "/images/.well-known/") would increase the risks of colliding with a pre-existing URI on a site, and generally these solutions are found not to scale well, because they're too "chatty".

Appendix B. Changes from RFC5785

- Allow non-Web well-known locations
- Adjust IANA instructions
- Update references
- Various other clarifications

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