Procedures for Standards Track Documents to Refer Normatively to Documents at a Lower Level

Abstract

IETF procedures generally require that a standards track RFC may not have a normative reference to another standards track document at a lower maturity level or to a non standards track specification (other than specifications from other standards bodies). For example, a standards track document may not have a normative reference to an informational RFC. Exceptions to this rule are sometimes needed as the IETF uses informational RFCs to describe non-IETF standards or IETF-specific modes of use of such standards. This document defines the procedure used in these circumstances.

This document merges and updates, and thus obsoletes, RFC 3967, RFC 4897, and RFC 8067.

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1. Introduction

   The Internet Standards Process [RFC2026] Section 4.2.4 specifies the
   following:

 Standards track specifications normally must not depend on other
 standards track specifications which are at a lower maturity level
 or on non standards track specifications other than referenced
 specifications from other standards bodies.

   One intent is to avoid creating a perception that a standard is more
   mature than it actually is.

   It should also be noted that Best Current Practice documents
   [RFC1818] have generally been considered similar to Standards Track
   documents in terms of what they can reference. For example, a
   normative reference to an Experimental RFC has been considered an
   improper reference per [RFC2026].

   This document describes a process for allowing normative references
   to documents at lower maturity levels ("downrefs"), after due notice
   and consideration as the document progresses toward publication. The
   original process was defined in [RFC3967] and later amended by

[RFC4897] and [RFC8067]. This document consolidates those, and presents further guidance regarding normative references to non-IETF documents.

1.1. Normative References

Within an RFC, references to other documents fall into two general categories: "normative" and "informative". Broadly speaking, a normative reference specifies a document that must be read to fully understand or implement the subject matter in the new RFC, or whose contents are effectively part of the new RFC, as its omission would leave the new RFC incompletely specified. An informative reference is not normative; rather, it provides only additional background information.

An exact and precise definition of what is (and is not) a normative reference has proven challenging in practice, as the details and implications can be subtle. Moreover, whether a reference needs to be normative can depend on the context in which a particular RFC is being published in the first place. For example, in the context of an IETF Standard, it is important that all dependent pieces be clearly specified and available in an archival form so that there is no disagreement over what constitutes a standard. This is not always the case for other documents.

The rest of this section provides guidance on what might (and might not) be considered normative in the context of the IETF standards process.

In the IETF, it is a basic assumption that implementors must have a clear understanding of what they need to implement in order to be fully compliant with a standard and to be able to interoperate with other implementations of that standard. For documents that are referenced, any document that includes key information an implementer needs would be normative. For example, if one needs to understand a packet format defined in another document in order to fully implement a specification, the reference to that format would be normative. Likewise, if a reference to a required algorithm is made, the reference would be normative.

Some specific examples:

  *If a protocol relies on IPsec to provide security, one cannot
   fully implement the protocol unless the specification for IPsec
   is available; hence, the reference would be normative. The
   referenced specification would likely include details about
   specific key management requirements, which transforms are
   required and which are optional, etc.

*In MIB documents, an IMPORTS clause by definition is a normative
  reference.

 *When a reference to an example is made, such a reference need not
  be normative. For example, text such as "an algorithm such as the
  one specified in [RFCxxxx] would be acceptable" indicates an
  informative reference, since that cited algorithm is just one of
  several possible algorithms that could be used.

2. The Need for Downward References

There are a number of circumstances in which an IETF document may
need to make a normative reference to a document at a lower maturity
level, but such a reference conflicts with Section 4.2.4 of
[RFC2026]. For example:

 *A standards track document may need to refer to a protocol or
  algorithm developed by an external body but modified, adapted, or
  profiled by an IETF informational RFC, for example, MD5 [RFC1321]
  and HMAC [RFC2104]. Note that this does not override the IETF's
  duty to see that the specification is indeed sufficiently clear
  to enable creation of interoperable implementations.

 *A standards document may need to refer to a proprietary protocol,
  and the IETF normally documents proprietary protocols using
  informational RFCs.

 *A migration or co-existence document may need to define a
  standards track mechanism for migration from, and/or co-existence
  with, an historic protocol, a proprietary protocol, or possibly a
  non-standards track protocol.

 *There are exceptional procedural or legal reasons that force the
  target of the normative reference to be an informational or
  historical RFC or to be at a lower standards level than the
  referring document.

 *A BCP document may want to describe best current practices for
  experimental or informational specifications.

3. Definitions

A reference involves two documents, the one in which the reference
is embedded and the document referenced. Where needed for clarity,
these documents are referred to as the "source document" and "target
document", respectively.

The term "Standards-Track document", as used in this specification,
is assumed to include BCPs but not Informational, Experimental, or
Historic documents of any variety or origin.

4. Procedure

The following sections describe the procedures to be used by
authors/editors and the IESG when handling downrefs.

4.1. Authors and Editors

When a Standards-Track or BCP document requires a normative
reference to a document of lower maturity, the authors/editors
should apply the following very simple procedure:

  *The reference text (i.e., in the "Normative References" section
   of the source document) is written as usual.

  *A note is included in the reference text that indicates that the
   reference is to a target document of a lower maturity level, that
   some caution should be used since it may be less stable than the
   document from which it is being referenced, and, optionally,
   explaining why the downref is appropriate.

The Internet Engineering Steering Group (IESG) may, at its
discretion, specify the exact text to be used, establish procedures
regarding the text to use, or give guidance on this text. When
establishing procedures, the IESG should seek appropriate community
review.

These annotations are part of the source document. If members of the
community consider either the downref or the annotation text to be
inappropriate, those issues can be raised at any time during the
document life cycle, just as with any other text in the document.
There is no separate review of these references.

At the option of the author/editor, similar notes may be attached to
non-normative references.

4.2. The IESG

With appropriate community review, the IESG may establish procedures
for when normative downref should delay a document and when downrefs
should be noted. Absent specific guidance, authors and reviewers
should use their best judgment. It is assumed that, in a significant
majority of cases, noting a downref is preferable to delaying
publication.

When a document is presented to the IESG for publication that
contains a downref not called out by the author/editor(s) as
described in the previous section, it is strongly recommended that
the normal IETF Last Call procedure will be issued, with the need
for the downref explicitly documented in the Last Call itself. Any

community comments on the appropriateness of downrefs will be considered by the IESG as part of its deliberations.

If, by oversight, the Last Call does not identify the downref, the IESG may choose to repeat the Last Call with the downref properly identified. If it elects not to do so, then any future downref to the same target document is subject again to the procedures described in this document. In making this decision, the IESG should take into account the general discussion in Section 2.

Once a specific downref to a particular document has been accepted by the community (e.g., has been mentioned in one or more Last Calls), an Area Director may waive subsequent notices in the Last Call of downrefs to it. This should only occur when the same document (and version) are being referenced and when the Area Director believes that the document's use is an accepted part of the community's understanding of the relevant technical area. For example, the use of MD5 [RFC1321] and HMAC [RFC2104] is well known among cryptographers. Such documents are added to the "Downref Registry".

In the case of a downref approved in this manner, the annotations described above should be added to the reference unless the IESG, after consideration of Last Call input, concludes it is inappropriate.

This procedure should not be used if the proper step is to move the document to which the reference is being made into the appropriate category. It is not intended as an easy way out of normal process. Rather, the procedure is intended for dealing with specific cases where putting particular documents into the required category is problematic and unlikely ever to happen.

5. IETF Target Documents

The "downward reference by annotation" model specified here is applicable only to published Standards-Track RFCs at lower maturity levels.

Obviously, such downward references are part of the relevant source document at IETF Last Call and subject to comments from the community.

Advancing documents, when appropriate, is still considered preferable to the use of either this procedure or the one specified in [RFC3967]. This specification does not impose a specific test or requirement to determine appropriateness. This is partially because it would be impossible to do so for the general case, but more so because the intention is to permit the IESG and the community to balance the importance of getting a source document published

against the time and difficulty associated with upgrading a target
document. That requirement is intended to be less stringent than the
one of [RFC3967].

6. Non-IETF Target Documents

A references to a non-IETF document provides a few challenges
relative to the RFC series:

   *its development may not have been as rigorous as the Standards-
    Track document referencing it;

   *the actual reference to it (e.g., a web link) may have dubious
    stability;

   *it may be subject to unexpected revision in situ;

   *it may not be freely available.

The IESG may, at its discretion, establish policies regarding
external documents referenced normatively by Standards-Track RFCs in
light of these challenges. Such policies are to be developed with
solicitation of community input.

At a minimum, authors/editors of source documents need to secure
freely available copies of the target documents for use by all
anticipated reviewers during the source document's life cycle, which
includes working group participants, any member of the community
that chooses to participate in Last Call discussions, area review
teams, IANA expert reviewers, and members of the IESG.

7. Security Considerations

This document is not known to create any new vulnerabilities for the
Internet. On the other hand, inappropriate or excessive use of these
processes might be considered a downgrade attack on the quality of
IETF standards or, worse, on the rigorous review of security aspects
of standards.

8. References

8.1. Normative References

[RFC2026] Bradner, S., "The Internet Standards Process -- Revision
           3", BCP 9, RFC 2026, DOI 10.17487/RFC2026, October 1996,
           <https://www.rfc-editor.org/info/rfc2026>.

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Level", BCP 97, RFC 3967, DOI 10.17487/RFC3967, December 2004, <https://www.rfc-editor.org/info/rfc3967>.

[RFC4897] Klensin, J. and S. Hartman, "Handling Normative References to Standards-Track Documents", BCP 97, RFC 4897, DOI 10.17487/RFC4897, June 2007, <https://www.rfc-editor.org/info/rfc4897>.

8.2. Informative References

[RFC1321] Rivest, R., "The MD5 Message-Digest Algorithm", RFC 1321, DOI 10.17487/RFC1321, April 1992, <https://www.rfc-editor.org/info/rfc1321>.

[RFC1818] Postel, J., Li, T., and Y. Rekhter, "Best Current Practices", RFC 1818, DOI 10.17487/RFC1818, August 1995, <https://www.rfc-editor.org/info/rfc1818>.

[RFC2104] Krawczyk, H., Bellare, M., and R. Canetti, "HMAC: Keyed-Hashing for Message Authentication", RFC 2104, DOI 10.17487/RFC2104, February 1997, <https://www.rfc-editor.org/info/rfc2104>.

[RFC8067] Leiba, B., "Updating When Standards Track Documents May Refer Normatively to Documents at a Lower Level", BCP 97, RFC 8067, DOI 10.17487/RFC8067, January 2017, <https://www.rfc-editor.org/info/rfc8067>.

Appendix A. Changes Since RFC8067

The following are the changes in this document relative to the prior state of BCP 97:

   *o Apply erratum #2793.

Appendix B. Acknowledgments

This editor offers a salute to the authors of and contributors to RFC 3967, RFC 4897, and RFC 8067: Randy Bush, Thomas Narten, John Klensin, Sam Hartman, and Barry Leiba.

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