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Internet Standards Documentation (ISDs) and Maturity Levels
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Abstract

The current IETF standard-track maturity level definitions, including the assumption that most specification of successful protocols would advance rapidly to Internet Standard, the never-used automatic expiration mechanism, and the STD nnnn designation, have not worked well. Users of IETF Standards have found it difficult to determine what standards were associated with others in groups, the actual status of specifications within a related group, and the level of interoperability testing and deployment and use for any given standard or set of features. The community has rarely used the "requirement level" mechanism in recent years. There is now an errata mechanism for published RFCs, but the errata lists do not provide authoritative, consensus-based, corrections to standards-track documents. This document suggests that all of those issues are symptoms of a single system of interrelated issues and problems and proposes an integrated solution.

Copyright Notice

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1. Introduction

1.1. Status of This Version

[[anchor3: RFC Editor: This subsection should have been revised and removed to a background discussion elsewhere in the document, probably to the "Motivation and Historical Context" appendix, by the time it reaches you.]]

The original ISD (originally "Internet Standards Documents") proposal was last actively discussed in the NEWTRK WG at IETF 63 in August 2005. Private discussions of it have continued and at least some people (in addition to the author(s)) seem to believe it sheds light on some important issues and may be a useful proposal. So it is being reissued at this time, with extensive changes suggested by the discussions at IETF 63 and in the subsequent months and years, to reactivate it and contribute to a new set of discussions of these issues in the weeks leading up to IETF 78.

While it started with the NEWTRK ISD proposal, this document reflects an expanded understanding of the problems and argues strongly for a comprehensive approach to them in preference to a strategy of applying small patches that may not provide any useful results.

1.2. Present Status in the IETF and the Role of this Proposal

The IETF has produced a large (and useful) body of work. In many ways, the IETF has been a victim of its own success and that of the Internet As the standards which the IETF produces have seen wider deployment by parties outside of the IETF development communty, the system of documentation and updating within the RFC Series has caused some amount of confusion. RFC 2026 [RFC2026] contains provisions that were expected to give the community useful information about the maturity level and requirement level for particular standards and to identify sets of documents that conceptually made up a single standard. Some of those provisions have been used too little in the last decade or so to make them consistently useful; others have proven to have insufficient granularity.

The "STD" label is described as part of the Internet Standards Process [RFC2026]. It identifies a subseries of the RFC series, with their numbers being assigned when documents are published as Internet Standards. The purpose and organization of the STD series is defined in more detail in the formal introduction to that collection [RFC1311]. Beyond those brief statements, the organization of the series has largely been a matter of oral tradition. Documents are formally treated as independent of each other unless they are associated with a single "STD" number. Those numbers do not convey

nearly as much information as needed and that is only in part because they are assigned only to Full Standards. Even at the Full Standard level, many of the grouping decisions have been made as part of the RFC indexing process, rather than explicitly by the IESG as part of the standards process and some may be controversial. RFC 1311, written before the standards process reforms of the 1992-1994 period (see, e.g., [RFC1396] and [RFC1602]), assigns responsibility for defining the content of STD documents to the IAB, but was never updated to reflect the change to IESG responsibility for the standards track. The intent has been to permit a stable reference to particular specifications and groups of documents making up a specification, a reference that survives replacement of one RFC with another, addition or deletion of RFCs from the collective specification, and so on.

While the intentions are fairly clear and quite desirable, this document suggests that the system has never worked well, especially for STDs that comprise (or point to) several RFCs. There is no easily-accessible audit track that specifies which documents were part of an standard (identified by an STD number) at a particular time (which can be very important for determining what a specification that points to an STD actually means or requires). Historically, the community and the IESG have not been heavily involved in the process of organizing and grouping standards-track documents by STD number. In retrospect, some of the decisions have been, or should have been, controversial and have led to misunderstandings about what is implied by conformance to a standard. In addition, the "do not assign an STD number until the specification reaches full Internet Standard" model is unrealistic in a world in which much of the Internet runs on Proposed Standards and in which the IETF only very rarely approves and publishes "Applicability Statement" documents (and, when it does publish them, has not published them in a consistent way -- several documents that rationally fall into that category have been published as BCPs instead).

This document provides mechanisms for an audit trail and specific "benchmark" documentation for Internet Standards. While the documents it specifies may assist in the creation of dynamic web pages, or may be linked to bug tracking systems, those are not its primary intent.

The discussion and proposal that follows are written in terms of the three standards track maturity levels defined in RFC 2026 (Proposed, Draft, and Internet Standard). If either the number of names for those levels change in the future, the need for effective and descriptive grouping mechanism and narrative descriptions of status will not change.

Appendix A describes some of the specific IETF issues, identified during 2004, that led to the development of this specification.

Early prototype examples of the type of documents contemplated here appear in [ISD-Examples1] and, to a lesser extent, [ISD-Examples-Process]. Those examples are just examples; they are not part of this specification or definition.
[[anchor5: Note in Draft: this section needs updating. If those examples are still needed, they will need to be updated.]]

1.3. This Proposal and the Standards Track

This document is, explicitly, a proposal for changes to the IETF Standards Track and associated procedures, not a proposal for, e.g., a supplemental document series with informational and perhaps informal value. If approved, it would

- Eliminate and replace the STD numbering series with a formal mechanism for identifying standards that is more suited to today's realities and IETF procedures.

- Change the rigid sequencing of the RFC 2026 standards maturity level category levels and the "downreferencing" problem discussed in several contexts [RFC3967] [RFC4897] to a more flexible arrangement in which the relationships among various documents could be explained, rather than just being assigned simple and often somewhat inappropriate categories.

- Improve on the use of the "Obsoletes" and "Updates" categories, which are used inconsistently in many cases (leading to confusion and periodic debates about what they mean), with a mechanism for systematic description and finer classification.

- Provide an alternate mechanism for expressing the properties of "Applicability Statements" (AS) and recommendations for use (the "requirement levels" of Section 3.3 of RFC 2026) without eliminating the availability of formal ASs as an alternate model.

- Eliminate the use of the BCP category for Applicability Statements and other information about the status of standards-track documents, including any implementation or interoperability reports that are published as RFCs. The BCP category would remain available for its other purposes.

- Change the IETF's current environment in which RFC numbers are the general identifier used for standards. Instead, RFC numbers would return to their original role as serial document identifiers. That would both help clarify the role of those numbers (without

subjecting the community to the trauma of replace them) and to significantly improve on the problem of confusion between "RFC" and "Standard".

[[anchor7: The changes are significant enough that, were this document approved either in text or just as a series of concepts, such approval should almost certainly be immediately followed by revision and replacement of RFC 2026. The document is, however, written as an update to RFC 2026 on the assumption that no fundamental change is being made to the role of the IESG with regard to, e.g., approval of standards. Were such changes made, the document would need to be updated although perhaps not significantly.]]

[[If approved]] This document updates RFC 2026 with regard to Last Calls and how the standards process is documented, RFC 3710 with regard to the IESG's list of responsibilities and procedures, and RFC 3967 and 4897 on references. It obsoletes the description of the STD document series in RFC 1311.

2. Proposal Overview

This document proposes that a new document series be created, called Internet Standards Documents ("ISD"s) and that these be real documents, separate from the underlying RFCs. It also specifies that, for trivial cases --standards whose specification consists of only a single RFC, that are at the first level ("Proposed") with no need for narrative history or additional explanations-- an ISD number might identify the RFC itself rather than a separate ISD document. The documents would be managed under the direction of the IESG as part of the standards-specification process. In general, they would not be simply pointers in indexes as, e.g., the STD series has been, or being the RFCs themselves with different file names or packaging. It proposes that ISD numbers be assigned when specifications enter the formal standards track (Proposed Standard under the model described in RFC 2026), or at IESG discretion, earlier, that actual documents be created as needed, and that the documents be used to track maturation, applicability recommendations, and history of those specifications.

To aid in transition and reduce the likelihood of time-wasting bureaucracy, separate ISD documents are optional for simple specifications at the entry level to the standards track (i.e., "Proposed Standards"). In those cases, the ISD number will simply identify an individual RFC.

When separate ISD documents are created, this specification outlines

the format of those documents and variations on it. That format is different from the format of protocol specification documents and the RFC series generally [RFC2223] [RFC2223bis].

Debate continues in the IETF about the proper threshold for Proposed Standards with regard to both protocol quality and document quality. Part of the problem is the use of a single, unqualified, label that may not be a good match to all situations. The documents proposed here will allow more flexibility by permitting the IESG to attach appropriate qualifying notes as needed. For example, if the community concluded that a specification should be published as a Proposed Standard, but that potential implementers should be warned that IETF confidence in its stability was lower than usual, these documents would be an appropriate place to publish that type of evaluation. Conversely, if interoperable implementations already existed before the Proposed Standard was published, the corresponding ISD document would be an appropriate place to note that fact.

These documents, and documents authoritatively (normatively) referenced from them, will become, essentially, the definitions of standards. Consequently, any changes to them will occur only under IESG authority and responsibility. The IESG may, at its discretion, and with appropriate announcements to, and consultation of, the community, delegate authority for some sections to groups responsible for the ongoing maintenance of the standards, but may not relinquish responsibility for the documents themselves. However, nothing in this specification prohibits (or requires) IESG authorization of placement of links in the STD documents that point to less formal and less authoritative discussions of, or comments on, the relevant standards should they deem that appropriate.

Because these documents can be linked to documents at any stage of development, ISD identifying information can be created at any time the IESG concludes that is appropriate. In particular, if a stable identifier for a standard is needed, e.g., for referencing by another organization, an ISD may be created and an identifier assigned before RFC publication and either before or after formal Protocol Actions are taken on some or all of the associated base RFC documents. Agreements on the circumstances under which that would be appropriate are not the subject of this document.

By extension from the above, the IESG will need to make determinations, ideally after creating guidelines and getting community review and assent to them, as to criteria (e.g., length, importance, degree of discussion needed) by which authoritative comments and qualifications about standards will be incorporated into the ISD documents. If an ISD document is created, the starting point and minimum descriptive and qualifying text for new standards will be

the text of the Protocol Action Notice.

3. A New Document Series

When the IESG agrees to move a document onto the standards track, it determines whether the document should become part of an existing group of standards or starts a new one. If it is new, it causes a new Internet Standard number ("ISD number") and name ("ISD name") to be assigned to it. If multiple, related, specifications are approved at the same time, they may be assigned the same ISD number and name. More broadly, the ISD will be the basis of the Standards Action itself: For standards-track, and standards-track-related, documents, the ISD itself is the subject of an IETF Last Call, carrying with it the normatively-referenced documents. The ISD and those documents are approved together or not at all (see Section 9). Multi-draft Last Calls have become common in recent years, so this does not require new mechanisms.

Assignment of an ISD number and name, and assignment of a specification to it, usually results in a corresponding ISD document being created or updated, as described below. Following good sense and existing precedent, the IESG may decide to include documents that are not themselves on the standards track (e.g., Informational documents explaining, or describing alternatives to, an agreed-upon standard) in references from a ISD document once that document is defined by the assignment of a name and number.

When documents are introduced into, or advanced on, the standards track, this specification anticipates that preparation (or revision) of the relevant ISD document will be the responsibility of the WG (for WG-produced documents) or document authors (for other types of submissions) but leaves it to the IESG to work out and adapt procedures as they find appropriate and efficient.

Advancement of a document on the standards track, publication of applicability statements, other issues of sufficient and substantive importance to require alerting implementers or the community will also result in modifications to the relevant ISD document. Errata and corrections to existing RFCs will require incorporation into the ISD and IETF Last Call only if the IESG concludes that they are sufficiently important to justify that level of determination and reporting of community consensus. The existing errata mechanism will be unchanged for more ordinary changes. It is explicitly anticipated that documents may be moved from one maturity level to another (i.e., under the current system, to Draft, Full, or Historic, or even from Experimental to Proposed) by changing the ISD document (or issuing a new ISD document) to identify the new level and include any relevant

notes as an alternative to modifying the relevant RFC text and issuing new RFCs.

Particular RFCs may move in and out of a ISD (except for the historical record) as one RFC replaces another. Because the ISD document is expected to contain prose, it will be possible to deal with the long-standing issues of what "Updates" means by identifying the relevant sections or concepts. And, again because there is descriptive prose present, the IESG will be able to deal appropriately with the relationship between an old Full Standard and a newer document, at a lower maturity level, that is intended to replace it by specifying whatever they consider appropriate about what the implementer or other reader should look at.

While RFCs are permanent, ISD documents are expected to evolve and incorporate changes over time. However, they are also expected to include explicit change histories, or a method of easily and accurately generating such histories (see Section 7) in order to make it possible for a reader to examine a current ISD document and determine the status of the relevant standard at any particular previous time. An ISD number or name, once bound to a particular conceptual standard, is never reused for a different concept.

4. Publication and Formatting

ISDs constitute an entirely new document series, to be managed directly by the IESG as part of its management of the standards process. ISDs are not to be published as part of the RFC series. The basic source format of an ISD will be XML, conforming to an appropriate and IESG-designated schema. For archival and external reference purposes, the formal archival form of the ISD will be ASCII text generated from the XML. However, it is anticipated that web pages with embedded links will also be generated from the XML and made accessible from the IETF home page.

Draft versions of ISDs or proposals for updating them may be posted as Internet-Drafts. Such posting will generally be required in conjunction with Last Calls, especially for documents that replace or update others, unless the IESG devises an alternate procedure. Since current Internet-Draft format requirements are based on RFC formats and requirements, posting drafts for ISDs as Internet-Drafts may require some extensions to the Internet-Draft posting rules.

As mentioned above, ISDs will be identified by a name and the combination of a serially-assigned standard number and a date with resolution in days. The numbers for ISDs and those for STDs (see [RFC1311]) are generally not expected to be synchronized.

5. Content and Organization of an ISD Document

An ISD document is expected to follow the general layout and formatting conventions of an RFC (because the community is familiar with them). The components listed below may appear, or are expected to appear as described in Section 6. As with RFCs, additional sections may be included as needed and appropriate. Note that ISDs don't have authors: the RFCs have authors, but, because an ISD is a summary of IETF consensus, if there were an "author" of an ISD, it would always be "IETF" or perhaps the IESG or Secretariat.

The items shown with asterisks are required if an actual ISD document is produced at all (see Section 6).

The Working Group or individual that prepares an ISD draft prior to initiation of an IETF Last Call is expected to supply the information described below. The IESG may, as part of Standards Track processing, modify that material, perhaps as the result of the Last Call process or to include additional information about, or qualifications on, an approval action.

Title.* It is desirable for standards to have titles as well as numbers and acronyms (names). As others have pointed out, it would make them, especially those that involve multiple RFCs, a lot easier to talk about. For example, by common usage, the "name" of an ISD might be "SMTP" with a title of "Simple Mail Transfer Protocol".

Standard Acronym and Number* The ISD will be associated with both an abbreviated name or acronym that is descriptive of the standard and a standard number, the latter of which will be serially-assigned.

Date.* This is the date the ISD was last updated. Everything else belongs in history or annotation. This date will specify a day, not just a month.

Abstract.* As with the title, it would be good to have these for standards, describing what the whole package does and not just what individual RFCs do.

Maturity, Implementations, and Applicability Level*

ISDs as a whole do not have maturity levels in the traditional sense. At the same time, it is useful for the ISD to have a section that provides information about implementation, interoperability, and deployment experience. If some of the

normatively-referenced RFCs are intended to replace earlier, more mature ones, the ISD would normally be expected to describe and explain that situation. If an ISD is retired in its entirety, no matter what maturity levels are associated with its individual documents, this entry may be "Historic" with optional additional descriptive text.

RFC list.* For each RFC that is currently associated with this ISD, the name, title, document date, and maturity level most recently assigned and its date. Optionally, an abbreviated abstract, applicability comments, errata, and other notes and commentary can be associated with some or all of the RFCs. When there is a non-obvious relationship among the various documents, it should be described either here or in the applicability remarks below, as appropriate (or in a separate section, if one is required).

Applicability Remarks about the standard. Any remarks about applicability that seem useful or appropriate, as authorized.

Security Remarks about the standard. Any authorized remarks about the security implications or considerations of the standard that are not completely reflected in the component RFCs.

History. This section should define, directly or indirectly, the entire record of changes to the definition of the documents and applicability statements that make up the standard, with dates identified. It should, in particular, identify the point at which one document superseded or updated another. See Section 7 for further discussion.

6. Requirements

The intention of this specification is to require ISDs only when they provide enough significant information to be worth the effort and to make them optional (and discouraged) otherwise. Consequently:

1. If a specification at Proposed Standard consists of a single document and the IESG or WG sees no need to attach additional information or comments, no separate ISD document is needed and the ISD number will point simply to the RFC. This approach should be appropriate for a large fraction of the existing Proposed Standards until such time as they are revised or updated.

2. If an existing specification consists of several documents bound together in some obvious way (such as an existing assignment of a STD number), the ISD by default will consist only of the required

information identified above, including a list of RFCs.

Historical note: This is a degenerate case that should be generated automatically, essentially equivalent to the "Set of RFC Documents" (SRD) proposal made during the NEWTRK effort [SRD-Proposal].

3. It may be appropriate to generate a separate ISD document if the IESG wishes to add annotation material or make information in a Protocol Action statement or evaluation record more easily available to readers than has been traditional for RFCs. Whether to do this or not is at the discretion of the IESG although, obviously, the IESG may delegate the work of generating the text to someone else, e.g., a document shepherd or WG Chair.

4. It may be appropriate to generate a separate ISD document when a new specification updates or replaces an older one in a way that may make a description the relationships beneficial to the reader. Whether to provide that information in an ISD document, as part of the text of the new document, or in some combination should be at the discretion of the author, WG, or IESG.

5. When a standards-track specification is published that consists of several separate RFCs that logically form parts of a single document, either an ISD document is required to describe the relationships or one of the documents must contain a "road map" with that information, ideally with a skeletal ISD document that points to it.

6. An ISD document is required for a specification newly being moved to Draft Standard or otherwise requiring an interoperability report. The ISD should either contain a summary of, and link to, that interoperability report or be a way to publish its content.

7. An ISD document is required for a specification newly being moved to Internet Standard or otherwise requiring a analysis of deployment and utility. The ISD should either contain a summary of, and link to, such a report or the report itself.

8. An ISD document is required to support Applicability Statement or "requirements" level information for a technical specification when that information does not appear in the technical specification document itself. The ISD document may either contain the relevant information or provide a pointer to an RFC that contains it.

9. An ISD document is required if a substantive error is discovered in the document of a specification, a decision is made to not

reissue the specification, and it is necessary to document consensus agreement about the correction. This provision does not replace the "RFC Errata" system for less critical changes or corrections.

In summary, while ISD numbers are assigned any time documents enter the standards track (and retroactively to documents on the standards track when this specification is adopted), ISD documents are optional for any existing specification and for new specifications at the level now known as "Proposed Standard" unless the document involves complex relationships. They are required for new documents for which interoperability reports or deployment and utility analyses are required (in today's vocabulary, documents moving to "Draft Standard" or "Internet Standard"). They are optional for all other standards-track specifications but strongly recommended, especially for new (or newly-revised) documents when their use would add clarity.

The level of detail required in those ISD documents should be determined by good sense and the balance between more information, timeliness, and resources. In general, more information is better, but timely documents completed within resource constraints are also better. Because the documents are an integral part of standards-track specifications, the required judgments are left to the IESG as the evaluator of community consensus.

7. Change Histories

A goal for the ISD concept --highly desirable but not required-- is to be able to have someone using a standard for reference or procurement purposes to be able to identify the exact status and content of that standard at any particular time. The desire for a "history" section above reflects that goal, not a desire to specifically identify changes that are not substantive. If "history" information is supplied, the requirement could be realized in any of several ways, including, in no particular order:

1. Retaining an explicit thread of previous versions of the ISD and keeping those documents permanently and easily available.

2. Using carefully-designed XML markup to identify changes and permit generating either the current ISD document or a snapshot as of any particular date by an appropriate directive.

3. Including an explicit narrative history in the ISD itself, with only the current version being considered relevant.

Of course, there may be other possibilities and those listed above are not mutually-exclusive.

8. Relation To and Future of Existing Maturity Levels

This document is written on the assumption that the Maturity Levels described in RFC 2026 will remain unchanged and that, with respect to those levels, ISDs will simply be a recording and referencing mechanism for the relevant interoperability and deployment and utility reports. However, once sufficient experience has been accumulated with ISDs and the system is working smoothly, the IETF may consider whether to retire the formal Maturity Levels entirely in favor of ISDs containing one or both of those reports and decoupling document updates for documentation quality from advancement in maturity level.

9. Procedure for New Standards and Associated ISDs

This document changes the Standards-track processing model of RFC 2026 to reflect these new ISD numbers and, where appropriate, ISD documents. The spirit of the 2026 model is not changed although introduction of ISDs may evolve into such changes in the future (see Section 8).

9.1. Replacement for RFC 2026, Section 6.1.1

Initiation of Action

A specification that is intended to enter or advance in the Internet standards track shall be described in a draft ISD document unless it is a standalone single-document specification with no prior ISD document entering the standard track at the first ("Proposed Standard") level, in which case preparation of a draft ISD document is at the discretion of the author, any relevant WG, and the responsible Area Director. Any draft ISD document will update any previous ISD document for the same base standard. It will contain normative references to the RFCs and other specifications that define the details of the standard, including explanatory text for any changes or qualifications. Such a draft ISD document shall be posted as an Internet-Draft (see section 2.2 of RFC 2026) even if the underlying RFCs have not changed since their publication. It shall remain as an Internet-Draft for a period of time, not less than two weeks, to permit useful community review, after which a recommendation for action may be initiated.

A standards action is initiated by a recommendation by the IETF

Working group responsible for a specification to its Area Director, copied to the IETF Secretariat or, in the case of a specification not associated with a Working Group, a recommendation by an individual to the IESG.

9.2. Replacement for the third paragraph of RFC 2026, Section 6.1.2

The IESG will send notice to the IETF of the pending IESG consideration of the document(s) to permit a final review by the general Internet community. This "Last-Call" notification shall be via electronic mail to the IETF Announce mailing list. The Last-Call will cover the text of any relevant documents and materials including the text of the draft ISD document if one exists, noting especially those documents that have changed or that otherwise deserve special consideration by the community. Comments on a Last-Call shall be accepted from anyone, and should be sent as directed in the Last-Call announcement.

9.3. Insertion at the end of RFC 2026, Section 6.1.2

If, as a result of the Last-Call, the IESG determines that revisions or modifications are needed, it may request that the submitter modify either the underlying specification document(s) or the text describing them in the ISD, as it deems appropriate.

[[Note in draft: We anticipate that some fraction of the document adjustments that are now handled by notes from the IESG to the RFC Editor, especially those that document restrictions on the use or applicability of protocols, will be handled by adjusting ISD text instead. However, this provision is designed primarily to avoid holding up the processing of a new specification that modifies an existing standard with Last Call comments about the text that describes the existing standard. (It may be useful to edit and retain some portion of this note in the final version of this document.)]]

9.4. Replacement for first paragraph of RFC 2026 Section 6.1.3

If a standards action is approved, the IESG may incorporate any Protocol Action text into the ISD document if one exists (and, may, at its discretion, generate an ISD document to record that Protocol Action text) and publishes it (updating or superceding any previous version), using mechanisms of its choice. An ISD number is assigned to the specification at the time of the Protocol Action if one had not be assigned earlier. The IESG also sends a notice to the RFC Editor to publish any new or revised specifications as RFCs. The ISD document, if one is generated, will be issued at the same time as the Protocol Action and will reference new or revised technical

specifications in their Internet-Draft form until the RFC(s) are actually published, at which point the ISD document will be updated as an administrative procedure (i.e., without a requirement for a further Last-Call or IESG action). Any documents previously posted as Internet-Drafts shall be removed from the Internet-Drafts directory when they are published in ISD document or RFC form. All Protocol Action notices, and notices sent to the RFC Editor or IETF administrative entities, in conjunction with a Standards Action shall be copied to the IETF.

9.5. Updating of RFC 2026, Section 3.3

Section 3.3 of RFC 2026 specifies Requirement and recommendation levels for standards-track documents. It, too, will need updating in the light of provisions associated with how those concepts can be expressed in ISDs and, in particular, for Applicability Statements that are embedded in an ISD rather than being published as separate RFCs. However, the intent should be clear from this document and that updating should probably be performed as part of a complete review and rewrite of RFC 2026, rather than being "Updated" by inclusion in this document.

[[Note in Draft: A review of the rest of section 6.1.3 and all of 6.2 through 6.4 of RFC 2026 indicates that they are ripe for updating. Since most of the reasons for that are unrelated to this document, proposed revisions are not included here. However, any revision of 6.2, 6.3, or 6.4 should clarify the difference between revising an ISD document and revising the underlying RFCs, favoring the former when possible for smaller changes. The procedures outlined in those sections are not affected by this document; only the particular specifications being referenced or changes are (and that only in some cases).]]

10. Transition and Workload Analysis

10.1. Transition Model for Legacy Documents

Obviously, we now have many full Internet Standards, with STD numbers assigned and packaging defined by those numbers, that are not associated with ISD documents as described here. We have even more documents at Proposed or Draft Standard levels that do not have either documents of this type or grouping and a large number of documents for which interoperability reports and deployment analyses are not readily available. Some of those documents should almost certainly be bound to existing packages defined by STD numbers. If this process is not bootstrapped by issuing at least ISD numbers for those documents, it probably won't work. So the following approach,

which can be applied more less mechanically, is suggested:

- Alter the templates for the RFC Index and similar documents to contain provisions for an ISD reference element

- For all documents now identified as Standards Track, and for non-procedural BCPs, insert an indication that an ISD document is, or may be, pending. Depending on IESG decisions and available of resources within the community, some standards-track RFCs, and hence the associated standards, might remain in "ISD pending" state for an extended period.

- For each existing STD number, assign a name or acronym and, unless the STD number applies to a single RFC, create a prototype ISD document. Reuse of the STD numbers as ISD numbers would save some time and avoid some confusion, but such binding is not required (see Section 4). For documents that have been assigned STD numbers, this step and the management of titles and abstracts, as discussed below, can be done from the existing std-index being maintained by the RFC Editor. These prototype documents should be populated with the list of RFCs now associated with the STD number. All of them should be identified as Internet Standards. Again, prototype ISD documents are not required for Internet Standards defined by a single RFC unless someone prepares such a document and the IESG concludes that it is desirable for clarity.

- For each existing Proposed or Draft Standard, assign an ISD name and number. Exceptions should be made and documents grouped (and an ISD document generated for the group) when it is obvious and uncontroversial that several documents belong together and someone can be found to do the work.
  [[anchor16: It is noted, without necessarily making a recommendation, that grouping has historically been performed by the RFC Editor rather than the IESG and that the assignments have usually been considered reasonable (no categorization system will ever satisfy everyone all of the time). If resources are available within the RFC Editor function, having the RFC Editor perform that role might be an appropriate way to move forward with existing standards-track documents, resources and priorities permitting.]]

  In the interest of a smooth and rapid transition, ISD documents should generally be generated for legacy documents only when the base RFCs are revised or some other reason (e.g., a substantive correction requiring documentation of consensus for the change or creation of an interoperability report) exists. It would defeat the intent of this proposal if creation of ISD documents became a

priority in its own right, competing with other IETF work.

- Where ISD template documents are created, for both the existing full standards and for documents associated with RFCs at a lower maturity level, omit any applicability, errata, or similar sections but include, for convenience and non-normatively, links to the RFC Editor's errata page where applicable.

- Again for all of these template documents, omit the History section or populate it with a note to the effect that the Standard existed before the relevant date and the document is initialized as of that date.

- It will be important to preserve the STD numbers and index indefinitely, because some references exist to them. However, that list will not be expanded, i.e., STD numbers will not be assigned to new documents. Similarly, no further BCP numbers will be assigned to protocol specifications or operational BCP documents that supplement technical specifications; those documents are expected to be absorbed into, or referenced from, the ISD series. IETF Procedural BCPs and BCPs that specify best technical or operational practices independent of particular technical specifications that define protocols are not covered in this document.

10.2. IESG and Community Workload

During the review of the NEWTRK document that preceeded this one, some people argued that creating this sort of document series is additional work for the IESG. That should not be the case in practice, especially with changes incorporated into this specification to make ISD documents optional in many circumstances. Even when the IESG or others decide to create ISD documents and include extensive background or historical information in them, all of the relevant information is created today. It is scattered in meeting minutes and secretariat notes, protocol action notices, discussions about whether to restart WGs to deal with problems, etc. Today that information, much of it quite useful, gets lost or at least becomes quite difficult to find. Conversely, ISD documents should reduce workload by considerably reducing the pressure to find editors to write or rewrite RFCs whose purpose is ultimately "this document is just like RFC xxxx, except that section 3.1.3 is removed to permit promoting the specification to the next maturity level". The IESG can certainly still insist on that procedure if it deems it necessary, but it should also be possible to Last Call a revised ISD that contains more or less that sentence and not touch the RFC at all. Or, especially for simple specifications at Proposed Standard, it can choose to dispense with an ISD document entirely. When a

document is being advanced and requires, e.g., an interoperability report, if a WG or individual submitter responsible for creating or updating the specification cannot cannot come up with an appropriate title and abstract/brief description to capture that report in an ISD document, we are in a kind of trouble that goes well beyond any procedural issues.

For a new specification document intended to be processed onto the standards track (including non-procedural BCPs), responsibility for advising on whether the standards-track document will require a new ISD number or should become part of an existing ISD and for either demonstrating that an ISD document is not needed or for preparing a draft of a new or revised ISD and lies with the relevant WG or other submitter. The IESG will issue a Last Call that includes any proposed ISD text along with the substantive document(s). They will then modify the ISD text as needed based on input during Last Call and internal discussions. In general, the new or revised ISD text will be issued at the same time as (or replacing) the Protocol Action Notice, referencing the approved Internet-Draft and containing copies of any RFC Editor instructions. That material would then be replaced in the ISD when the relevant documents are published.

Where they exist and are used, ISD documents are intended to become the repository for the substantive content of Protocol Action Notices and for IESG statements and qualifications about what they are approving. This will include any "known defects" or "this must be fixed when the document is advanced to the next maturity level" statements.

It is the intent of this specification that all substantive or normative changes to an ISD be the result of IETF consensus, i.e., that the change be made only after a Last Call and IESG review and approval. However, more flexibility and less formality is appropriate for at least some non-normative changes, commentary, etc. The IESG is tasked with specifying and documenting the types of changes that do not require Last Calls or IESG approval, and the processes for making those changes.

This document carefully does not specify the registry mechanism for assigning new ISD numbers, nor the details of publication and repository mechanisms for the documents, although it specifies some requirements for them (see Section 4). Either or both might sensibly be done by the RFC Editor (that arrangement would certainly be consistent with historical precedents), but, if only because the ISD series would be a new task for them, it seems wise to leave this question to the IETF administrative process to sort out as seems appropriate in the broad administrative context.

Regardless of what organizational arrangements are responsible for updating and maintaining these documents, and in spite of their containing a cumulative change history, they should be treated as archival -- at least as archival as the RFC series.

11. References and Citations Involving ISDs

11.1. References to ISDs or References to RFCs

Before this proposal was generated, vendors who wished to specify what they support, and potential customers who wished to specify what they wanted to purchase, had a choice between referencing specific RFCs (to get precision) or, for Internet Standards, a specific STD number (in an attempt to get "the most current version"). For other than full standards, the RFC numbers were the only choice. Except for providing stable numbers mechanism for referencing all standards-track specifications, not just Internet Standards, this proposal does not change either of those options: both are still free to use the existing forms. In the rare case in which a vendor is deliberately attempting to confuse its potential customers, this mechanism is not likely to help very much either. It does, however, provide a third option, which is to specify the state of an ISD (and hence a Standard) as of a particular date (even a date in the past or future) or within a particular date range. So, whatever the referencing issues are today, this certainly does not make them worse and almost certainly makes them better.

It should also be noted that other Standardization bodies have had difficulties when referencing RFCs. It is not always clear whether an RFC or an STD should be referenced. When a reference is made, there can be problems when the RFC that is referenced becomes updated or obsoleted.

11.2. References from ISD Documents

11.2.1. Document References

An ISD can be thought of as anchored in one of more "base documents": RFCs that, in combination, specify the technical content of the standard itself. These base documents must be standards-track technical specifications or operational or Applicability Statement BCPs (i.e., not IETF Process BCPs [RFC2026] or other types of documents). All references to base documents are, essentially by definition, normative and must follow the traditional rules of the RFC Editor for stability of references [RFC2223] [RFC2223bis] and subsequent modifications for IETF Track documents [RFC3967] [RFC4897]. However, an ISD may reference, informationally, any

document or material felt to be helpful in understanding the standard or its context.

References to, and discussion of, base documents may, and normally will, associate standards-track maturity levels with those documents. Underlying RFCs associated with complete (non-template) ISD documents are no longer considered to have such maturity levels.

11.2.2. Errata and Corrections

Errata and other corrections that represent IETF consensus (i.e., based on an IESG, or IESG-delegated, determination after Last Call) are normative and identified in a way that distinguishes them from suggested errata or changes that are not known to represent IETF consensus. The latter may still be included in the ISD document as informative material under the general "felt to be helpful" provision of the previous subsection.

11.3. Citing an ISD

[[anchor21: Note in Draft: As this document progresses, this subsection should be reviewed and updated as needed by the RFC Series Editor (RSE) and applicable Citation Committees.]]

Once ISD numbers become available for a given IETF-produced Standard, references to those standards are expected to take one of the following forms, depending on the needs of the authors and the standards of the publication in which the reference appears.

1. Internet Engineering Task Force (IETF), ISD-TITLE (Internet Standard ISD NNNN), as of YYYY.MM.DD

2. Internet Engineering Task Force (IETF), "ISD-TITLE" (Internet Standard ISD NNNN), as of YYYY.MM.DD, specifically as described in RFC-AUTHOR, "RFC-TITLE", RFC NNNN, DATE.

The substitutions for the capitalized strings should be obvious. If an RFC reference appears, as in the second form, it may be repeated for each relevant RFC. URI references to document locations and the ISSN for the RFC Series may be added if required (or permitted by author preference) by the relevant publication.

12. IANA Considerations

This document does not anticipate any specific tasks for the IANA. However, over time, it may be desirable to review and update the

descriptions of various registries to refer to ISD numbers, rather than RFC numbers, as the definitions or authority for those registries. See also Section 10.2.

13. Security Considerations

This document specifies an administrative procedure for the IETF and hence does not raise any new issues about the security of the Internet. However, the availability of the type of document described here may provide a convenient mechanism and repository of vulnerabilities and other issues that are discovered after RFCs are issued but that do not justify updating (or for which resources are not available to update) the relevant RFC. Having an obvious place to look for those notifications and discussions for standards-track documents might enhance overall security somewhat.

14. Contributor

John A Loughney served as co-editor of the predecessor document developed by the NEWTRK WG. While there are parts of this version with which he might disagree and for which he bears no responsibility, it would have been impossible without his text and other contributions.

15. Acknowledgements

The general ideas described here have been discussed on and off for several years, but had never been turned into public documents prior to the work of the NEWTRK WG around 2005. Thanks are due to several generations of IAB and IESG members and to RFC Editor staff for helping to clarify the ideas and to identify some variants that would or would not work. The ideas in this specific presentation are, of course, those of the author and are ones with which some of the contributors might disagree. Pekka Savola provided extensive and very useful comments on a preliminary version of the initial draft. Harald Alvestrand, Bob Braden, and several others made comments on the first posted draft that resulted in important clarifications. Discussions during and after IETF 60 led to further changes and the consolidation of the previous relevant documents. Bob Braden suggested not trying to reuse the term "STD", and provided new term "ISD". Additional helpful comments and corrections were provided by Pekka Savola and Scott Bradner.

Despite favorable treatment from the NEWTRK WG, the IESG concluded in the last half of 2005 and first half of 2006 that the proposal would

result in too much additional work for its members (there were also some other considerations) and declined to let the community consider the work. Without IESG backing, there was little likelihood or either clear community consensus or of successful implementation, so the work was dropped along with other NEWTRK efforts. Several of the participants in the WG believe that the IESG's conclusion was in error and that, one some transition period was over, the ISD proposal might actually reduce IESG workload. In any event, this draft reflects several comments and ideas developed during those discussions; the efforts of both the IESG at the time and the community are greatly appreciated.

This version is based upon, and succeeds, the NEWTRK Working Group draft, draft-ietf-newtrk-repurposing-isd, and includes much of its text. Contributions from the many discussions and participants in that WG are gratefully acknowledged.

16. Changes from Previous Versions

[[anchor27: Note in Draft: This section is to be removed before RFC publication.]]

Version 00 This version of the document is the successor to draft-ietf-newtrk-repurposing-isd-04, posted in March 2006. Anyone interested in long-term change history should refer to that draft.

The NEWTRK document focused on replacing the STD and BCP numbers with a more general and narrative approach. The 2010 version of the specification explicitly expands the standards track part of that change into the basis for a comprehensive overhaul of the "maturity level" and "requirements level" mechanisms and drops the connection to BCPs. Section 1.4 of the NEWTRK document on "Concepts, Generality, and Specificity" has been removed.

17. References

17.1. Normative References

[RFC2026] Bradner, S., "The Internet Standards Process -- Revision 3", BCP 9, RFC 2026, October 1996.

[RFC3967] Bush, R. and T. Narten, "Clarifying when Standards Track Documents may Refer Normatively to Documents at a Lower Level", BCP 97, RFC 3967, December 2004.

[RFC4897] Klensin, J. and S. Hartman, "Handling Normative References to Standards-Track Documents", BCP 97, RFC 4897, June 2007.

17.2. Informative References

[ISD-Examples-Process]
Bradner, S., "Sample ISD for the IETF Standards Process", draft-ietf-newtrk-sample-isd-00 (work in progress), October 2004.

[ISD-Examples1]
Klensin, J., "Internet Standards Documentation (ISDs) - Examples", draft-ietf-newtrk-sample-isd-00 (work in progress), October 2004.

[RFC1311] Postel, J., "Introduction to the STD Notes", RFC 1311, March 1992.

[RFC1396] Crocker, S., "The Process for Organization of Internet Standards Working Group (POISED)", RFC 1396, January 1993.

[RFC1602] Huitema, C. and P. Gross, "The Internet Standards Process -- Revision 2", RFC 1602, March 1994.

[RFC2223] Postel, J. and J. Reynolds, "Instructions to RFC Authors", RFC 2223, October 1997.

[RFC2223bis]
RFC Editor, "RFC Style Guide", November 2008, <http://www.rfc-editor.org/styleguide.html>.

[RFC3774] Davies, E., "IETF Problem Statement", RFC 3774, May 2004.

[SRD-Proposal]
Otis, D. and J. Leslie, "XML structure for Set of RFC Descriptors", October 2005, <https://datatracker.ietf.org/doc/draft-otis-newtrk-rfc-set/>.

Appendix A. Motivation and Historical Context

Appendix A.1. Problem(s)

The following problems are excerpted from Section 2.4 of the IETF Problem statement [RFC3774].

- Relatively few specifications are now progressed beyond Proposed Standard (PS) to Draft Standard (DS) level, and even fewer to Full Standard (FS).

- There is no formal bug reporting or tracking system in place for IETF specifications.

- The periodic review of protocols at PS and DS levels specified in are not being carried out, allowing protocols to persist in these lower maturity levels for extended periods of time, whereas the process would normally expect them to progress or be relegated to Historic status.

- No individual or body is given the task of 'maintaining' a specification after the original WG has closed down. Specifications are generally only updated when a need for a new version is perceived. No attempt is normally made to correct bugs in the specification (whether they affect operation or not) and the specification is not updated to reflect parts of the specification that have fallen into disuse or were, in fact, never implemented. This is in part because the current procedures would require a standard to revert to the PS maturity level even when specification maintenance is carried out which can be demonstrated to have no or minimal effect on an existing protocol at DS or FS level.

- Few Specifications Progress Beyond Proposed Standard. The IETF, as of late, does not have a good track record of moving protocols beyond Proposed Standard. In fact, the goal of most Working Groups is to produce a set of RFCs and then shut down. Working groups that do this are considered to have succeeded. There are only a handful of long-lived working groups, such as IPv6, whose charters include progressing standards beyond Proposed Standards. Occasionally, new working groups need to be spun up to make sense of the existing set of RFCS, such as tcpm (TCP Maintenance).

- There is no Formal Bug Reporting or Tracking System. Bugs in a specification can be found at any point. There have been bugs found even in Full Standards. How do we ensure correctness in our own standards?

This document takes the position that many of the problems identified about are inherent in the design of the current standards track and its relevance to many protocols in the contemporary world and suggests that a comprehensive revision is necessary. We discuss the problems identified in more detail below.

Appendix A.2. Periodic Reviews of Protocols are not Being Carried Out

Many protocols suffer from benign neglect. The working group charged with developing the protocol becomes dormant or is shut down. The principal authors of the specification may no longer be involved in the IETF. Further development of the protocol may even be officially discouraged.

Other standards development organizations (SDOs) may consider extensions or modification to the protocols. This causes problems for parties interested in the technology, as it becomes unclear as to exactly what specifies a particular protocol. Additionally, it makes it hard to track errors in or updates to a specification or protocol.

Appendix A.3. There is no Maintenance Team Responsible for a Protocol

Specifications are generally only updated when a need for a new version is perceived. No attempt is normally made to correct bugs in the specification (whether they affect operation or not) and the specification is not updated to reflect parts of the specification that have fallen into disuse or were, in fact, never implemented. This is in part because the current procedures would require a standard to revert to the PS maturity level even when specification maintenance is carried out which can be demonstrated to have no or minimal effect on an existing protocol at DS or FS level.

Appendix A.4. Implementers and those Using Standards in Procurement Do Not Know What to Reference

[[anchor34: ??? ... to be supplied ???]]

Appendix A.5. A Mechanism is Needed to Supply Stable References to Standards to other Bodies, Sometimes Well Before the RFCs are Published

[[anchor36: ??? ... to be supplied ???]]

Appendix B. Notes on the Design

In the process of developing this specification, several notes and comments were made about tradeoffs. Those notes appear below, essentially unedited. They are not a normative part of the specification.

[[anchor38: Note in Draft: the list that follows has not yet been updated from the NEWTRK version and may not be consistent with the normative part of the text. It may be best to just delete it before

publication.]]

Appendix B.1. Comments, discussion notes, and proposed errata

If it makes sense to the community to have an archive of comments, discussion, or proposed errata on the documents, that is fine. It would be useful for these documents to identify the locations of those archives. But we should be very careful that the contents of such archives are not confused with the content of the specifications unless they go through some sort of formal review and consensus process. The description of that process in the specification is deliberately open-ended and flexible. If the IESG is willing to accept and maintain formal responsibility for whatever appears in ISD documents, they could include some non-normative changes being made by, e.g., maintenance committees should the community want to move in that direction.

Appendix B.2. Numbers versus Names

There was an extended debate in the Working Group as to whether ISDs were better identified by acronyms or serial numbers. There are advantages to names or acronyms and and to numbers. The former are easier to remember as long as there are not too many of them and are usually more human friendly. The latter are very precise and language-independent. The choice between the two did not appear to be worth the amount of energy it would have taken to reach consensus, if even that were possible. Consequently, the document recommends assigning both a number and a name (acronym or other string) to each ISD.

Appendix B.3. Citations of Informative Material

There is discussion in Section 11.2.1 about the inclusion of informative (non-normative) material, but no specific guidance is given about what material is and is not appropriate, other than that it is "felt to be helpful". The apparent ambiguity is deliberate, relying on good sense and the requirement that substantive changes to ISDs must be Last Called in the IETF, rather than an attempt to make specific rules that would probably be inappropriate for some future situation.

Appendix C. Open Issues

[[anchor43: Note in Draft: the list that follows has not yet been updated from the NEWTRK version. It may not be consistent with the normative part of the text: that text resolves some of the issues and makes others irrelevant. It may be best to just delete it before

publication.]]

The following issues are still open, or were raised too late in the editing cycle to be addressed in this draft.

ISD Authors

The introduction to Section 5 indicates that ISDs do not have authors and that any author, editor, or contributor information should be put into an Acknowledgements or Contributors section. A recent suggestion was made on the NEWTRK mailing list to the effect that listing authorship might motivate people to create these documents, especially for standards-track documents that existed prior to the introduction of ISDs. The arguments against this remain that (i) the possibility that giving ISDs authors would detract from credit for the authors and editors of the substantive (normally RFC) documents themselves and (ii) that the responsible "author" for an ISD should properly be the IETF itself. But this issue needs to be resolved.

Level of Specification

The authors of this document, with what appears to be the general agreement of the NEWTRK WG, deliberately did not specify a number of details, preferring instead to give the IESG the option of making choices it found comfortable and adjusting those choices as experience developed. It is clear, at least to the authors, that ISDs will not succeed unless they have enthusiastic IESG support, and quibbling about essentially arbitrary details is not a good way to obtain that support or to determine whether it exists. However, it is probable that the community and the IESG will discover some topics that should be specified in precise detail and others that should be specified in even less detail than now appears above. This item is inserted here as a placeholder to note that the question of level of detail is still, intentionally, unresolved.

Strawman details

This draft specification contains details in Section 9, Section 11.3 and elsewhere that need to be checked and verified as what is wanted. Much of that burden falls more appropriately on the IESG than on the community.

Additional rationale

In addition, this draft contains several notes in draft that explain tentative design choices. Those will be moved to the appropriate appendix, or, if appropriate, dropped, in the next draft. Having them inline now would appear to facilitate efficient review.

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