

INTERNET-DRAFT
[draft-rfc-editor-rfc2223bis-02.txt](#)
Obsoletes: [2223](#)
Category: Informational
Expires: October 2002

J. Reynolds, Editor
R. Braden, Editor
RFC Editor
23 April 2002

Instructions to Request for Comments (RFC) Authors

** DRAFT **

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

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."

The list of current Internet-Drafts can be accessed at
<http://www.ietf.org/ietf/lid-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at
<http://www.ietf.org/shadow.html>.

Copyright Notice

Copyright (C) The Internet Society (2002). All Rights Reserved.

Abstract

This memo provides instructions for authors of Request for Comments (RFC) documents, including formatting requirements and editorial policies. This document addresses frequently asked questions, and serves as a guideline for constructing a properly formatted RFC.

Internet-Draft

Instructions to RFC Authors

23 April 2002

Table of Contents

1.	Introduction	3
1.1	The RFC Document Series	3
1.2	The RFC Editor	3
1.3	The RFC Publication Process	4
2.	RFC Editorial and Publication Policies	6
3.	General Format Rules for RFCs	11
3.1	General ASCII Format Rules	11
3.2	Postscript Format Rules	14
3.3	Header and Footer Formats	15
3.4	Protocol Data Definitions	15
4.	Required Sections in an RFC	16
5.	RFC Information and Contacts	22
6.	Acknowledgments	23
Appendix A	- RFC Boilerplate	28
Appendix B	- RFC Preparation Tools	29
Appendix C	- ASCII Character Set	30
Appendix D	- Changes from RFC 2223	31
	Normative References	32
	Informative References	32
	Security Considerations	32
	Authors' Addresses	33
	Full Copyright Statement	34

Changes from -01 version

1. Clarified rules for hyphenation ([Section 3.1](#) (6)).
2. Added guideline on example URLs ([Section 2.8](#)).
3. Clarify that dangling normative references are strictly prohibited only for standards-track documents ([Section 2.7](#)).

[1.](#) Introduction

This Request for Comments (RFC) document provides instructions for authors regarding the preparation of RFCs and describes RFC publication policies.

1.1 The RFC Document Series

The Requests for Comments documents, commonly known as RFCs, form a series of more than 3000 memos about computer communication and packet switching networks. The official specification documents of the Internet protocol suite are defined by the Internet Engineering Task Force (IETF) and the Internet Engineering Steering Group (IESG). These specifications are recorded and published as standards track RFCs (described in a later section and in [RFC 2026](#)). As a result, the RFC publication process plays an important role in the Internet standards process.

The RFC series was started in 1969 as a set of technical and organizational notes of the ARPAnet research community [[1](#)]. Since the early 1980s, the series has focused on the development of the Internet and the TCP/IP protocol suite. Memos in the RFC series discuss many aspects of networking, including protocols, procedures, programs, and concepts as well as meeting notes, opinions, and sometimes humor. For more information on the history of the RFC series, see [RFC 2555](#), "30 Years of RFCs" [[1](#)].

The RFC numbers provide a single unique address space for locating a particular RFC. It has proven useful to define specific subsets or "sub-series" of the RFCs by attaching a secondary index. There are three secondary indexes in use: -- FYI (For Your Information) [[4](#)], BCP (Best Current Practice) [[5](#)], and STD (Standard) [[6](#)].

1.2 The RFC Editor

The RFC series is published by the RFC Editor, an organization

that is funded by the Internet Society (ISOC) and is a project at the Information Sciences Institute of the University of Southern California (USC/ISI).

The RFC Editor is responsible for the final editorial review and the publication of RFCs. The RFC Editor also maintains the official RFC archive and the master index file, which are accessible via the Web, FTP, and email (see URL in [Section 5.](#))

1.3 The RFC Publication Process

A more complete explanation of the RFC publication procedures will be found in [RFC 2026](#) [2].

1.3.1 RFC Submission

The procedure for submitting a document for publication as an RFC differs slightly depending upon the document's source. Submissions come from the IETF or from an individual.

Before the RFC Editor considers publication of a document, it must first be submitted as an Internet-Draft (I-D) [1]. All RFCs have been I-Ds, but not all I-Ds become RFCs.

o Submission from the IETF

RFCs most often originate in the IETF and are submitted to the RFC Editor from the Internet Engineering Steering Group (IESG). These submissions are transmitted via official messages that are recorded at the IETF web site. An IESG submission may have any of these status values: Proposed Standard, Draft Standard, Standard, BCP, Experimental, or Informational, as determined by the IESG. A document with Proposed Standard, Draft Standard, or Standard status is said to be a standards-track document [2].

IETF RFCs normally originate in working groups. However, there are individual submissions to the IESG that have been

accepted into the IETF process.

o Individual Submission

Individuals can also submit Internet-Drafts directly to the RFC Editor for publication as RFCs. Such individual submissions may have Experimental or Informational status. The choice is determined by the author with the agreement of the IESG (see below).

Once the document has been posted as an Internet-Draft, you should contact rfc-editor@rfc-editor.org and request that your document be reviewed for publication as an Informational or Experimental RFC (please specify which). Note that the RFC Editor does not accept independent standards track submissions, as all standards track documents must be submitted to the appropriate area directors of the IETF.

Since Internet-Drafts are precursors to RFCs, the rules for formatting Internet-Drafts are consistent with the RFC formatting rules presented below. Specific Internet-Draft guidelines are available from the IETF web page.

If the author has used nroff to prepare the Internet-Draft, it is helpful to make this available to the RFC Editor. If there is a Postscript and/or PDF version of the document, the author should inform the RFC Editor at the time of submission of the ASCII version.

1.3.2 RFC Review

Memos intended to become RFCs must first be published as Internet-Drafts. This allows feedback from members of the Internet community and the IESG.

The IESG reviews IETF RFC submissions for quality and conformance with IETF procedures. The IESG also reviews individual submissions to ensure they do not conflict with work in progress in the IETF and to ensure technical quality. When the topic of an individual submission is closely related to an

existing IETF Working Group, the IESG may request that the author coordinate with the working group. This may result in the production of a revised memo as a working group Internet-Draft, which will eventually emerge from the IETF process as a publication recommendation from the IESG to the RFC Editor.

The IESG may suggest improvements to the author of the document prior to publication. It may be determined that the submitted document is not appropriate material for publication as an RFC. In some cases the IESG will agree to the publication with the addition of an "IESG Position" statement in the document that defines a limited context within which the specification is valid, to prevent its misuse.

The RFC Editor will publish all documents submitted from the IESG but reserves the right to discuss with the IESG any issues about particular documents. The RFC Editor makes the final decision about individual submission publications.

1.3.3 Publication

Once a document has been submitted to the RFC Editor, it enters the RFC Editor's queue. The queue is publicly accessible at the RFC Editor Web site ([Section 6](#)). The RFC remains in the queue until it is published, or until the IESG or author requests that it be removed.

The RFC Editor ensures that the document follows the rules described in this document. The RFC Editor may make minor editorial changes to clarify readability and to provide a uniform style and format. If significant changes are required to satisfy the rules and/or to bring the RFC up to publication quality, the memo will often be returned to the author for the additional work.

When editing of the document is complete, the RFC Editor will send the result to the authors for careful proof-reading. This quality control step is critical to maintaining the quality of RFCs. This process has a nominal 48 hour (2 working days) timeout, so this is known as the "Authors' 48 Hours" process. The RFC Editor is always willing to give authors a reasonable amount of additional time to review the document. In general,

all listed authors are considered to be equally responsible for the correctness of the final document.

In practice, the editorial process among the IESG, the RFC Editor, and the author(s) can be lengthy and convoluted, and the time spent in the RFC Editor's queue can vary greatly. Problems found by either group often result in document revisions by the authors. These revisions may require the publication of another Internet-Draft, and the result must be re-reviewed. Publication may be held up awaiting Internet Assigned Numbers Authority (IANA) assignments, or in order to synchronize publication with that of related RFCs.

[2.](#) RFC Editorial and Publication Policies

This section summarizes some general policies governing the publication of RFCs.

2.1 Immutability

Since the RFCs form an archival series, an RFC cannot be altered once it is published. To change the contents of an RFC, a new RFC must be written that obsoletes the previous one. (Early in the history of RFCs, the Editor did occasionally make small editorial changes after publication, but this led to confusion regarding which version was correct, and it was a slippery slope. To avoid these pitfalls, the never-change rule is now strictly enforced.)

Although RFCs are subjected to careful scrutiny by the RFC Editor and the authors before publication, errors do sometimes creep in. For this reason, the RFC Editor strongly recommends that the authors thoroughly review the document during the "authors' 48 hours" period.

The RFC Editor maintains an online list of errata for existing RFCs. If you find what you believe to be an error in an RFC, consult the errata page at the RFC Editor web site. If the bug is not listed, please send e-mail to the authors of the document, and cc: the RFC Editor at: rfc-editor@rfc-editor.org.

2.2 Not all RFCs are Standards

Eager salesmen have been known to imply that all RFCs represent official Internet standards. This is completely false and misleading. While some RFCs are standards track documents, many have the status of Informational or Experimental and do not represent a standard of any kind. Even those documents on the standards track come in three grades -- Proposed Standard, Draft Standard, and Standard -- and only the last is a full standard.

2.3 Publication Language

Like the Internet itself, the IETF and the Internet Society are international organizations with representation from all areas of the world. However, English is the primary language in which IETF business is conducted, and English is the official publication language for RFCs.

RFCs submitted for publication are required to meet a reasonable standard for clear and correct English.

[RFC 2026](#) specifically allows RFCs to be translated into languages other than English. Repositories may exist for RFCs that have been translated into particular languages. This is highly desirable and useful. However, it is not possible for the RFC Editor to certify that such translations are accurate. Therefore, the function of the RFC Editor, with respect to non-English RFCs, is limited to providing pointers to non-English language RFC repositories. Upon request, the RFC Editor will list any such repository on its Web page.

2.4 Publication Format(s)

RFCs are published as ASCII text (.txt) files. However, secondary or alternative versions of an RFC may be provided in PostScript and/or PDF, to allow the inclusion of fancy diagrams and graphs that cannot possibly be rendered in ASCII.

The continued use of ASCII text for RFCs, despite the spread of "more modern" printing formats, is intermittently debated by the Internet community. The consensus continues to be that the great advantages of plain ASCII text -- the ability

to readily edit, cut-and-paste, and search documents, as well

as the ubiquitous availability of tools for these functions
-- have made the ASCII choice a clear winner.

The ASCII text version is always the official specification, and it must adequately and completely define the technical content. (A very few exceptions have been made over the 30 year history of RFCs, allowing a definitive .ps version with no .txt version.) The primacy of the ASCII version typically requires that the critical diagrams and packet formats be rendered as "ASCII art" in the .txt version.

Postscript and PDF versions suffer from a serious flaw: the RFC Editor cannot easily make editorial changes in the source file to produce a new document in either of these formats. This makes the editorial process somewhat painful for both the author and editor. When a .ps (or .pdf) version is submitted with a .txt version, the RFC Editor will first edit the .txt version. The final form of the .txt version (or, when feasible, the diffs) will be returned to the author. The author must then update the .ps/.pdf files to match, as closely as possible, the content and format of the ASCII .txt file. When the RFC Editor agrees that the .ps/.pdf versions are acceptable, they will be published simultaneously.

However, an extremely popular operating system does not deal well with ASCII files. For the convenience of the users of this system, the RFC Editor provides PDF versions of all RFCs (see [Section 5](#)).

2.5 Consistent Document Style

The RFC Editor attempts to enforce a consistent style of RFCs. To do this, the RFC Editor may choose to reformat a submitted RFC or ask the author to reformat it. Effort is minimized when the submitted document matches the style of the most recent RFCs. Please read the rules and recommendations that are presented in following sections of this memo and look at some recent RFCs, to adopt an appropriate style.

To format most ASCII RFCs for publication, the RFC Editor uses the unix "nroff" program with a very simple set of the formatting commands (or "requests") from the "ms" macro package (see [Appendix A](#)). If a memo submitted to be an RFC has been prepared by the author using nroff, it is helpful to make the nroff source available when the document is submitted.

When a .ps version is published, the RFC Editor will also publish a corresponding .pdf version by using the 'distill' utility.

2.6 Assignment of RFC Numbers

RFC numbers are not assigned until very late in the editorial process to avoid gaps in the RFC number series. Requests for early assignment of an RFC number for use in another forum are generally denied unless they originate from the IAB (Internet Architecture Board) or the IESG.

2.7 Normative References

Within an RFC, references to other documents fall into two general categories: "normative" and "informative". Normative references specify documents that must be read to understand or implement the technology in the new RFC, or whose technology must be present for the technology in the new RFC to work. An informative reference is not normative; rather, it only provides additional information. For example, an informative reference might provide background or historical information. Material in an informative reference is not required to implement the technology in the RFC.

The distinction between normative and informative references is often important. The IETF standards process and the RFC Editor publication process need to know whether a reference to a work in progress is normative. A standards-track RFC cannot be published until all of the documents that it lists as normative references have been published. In practice, this often results in the simultaneous publication of a group of inter-related RFCs.

An RFC must include separate lists of normative and informative references (see [Section 4.8](#) below.)

2.8 URLs in RFCs

The use of URLs in RFCs is discouraged, because many URLs are not stable references. Exceptions may be made for normative references in those cases where the URL is demonstrably the most stable reference available.

RFCs that include URLs as generic examples must be careful to use the particular example URLs defined in [RFC 2606](#), "Reserved Top-Level DNS Names" [[10](#)], to avoid accidental conflicts with real URLs.

2.9 Titles

Choosing an appropriate title for an RFC is not a trivial

exercise. A good title should fairly represent the scope and purpose of the document, without being too general or too wordy.

Any acronyms in a title should be expanded, unless they are so common (like TCP, IP, SNMP, FTP, etc.) that every member of the IETF can be expected to recognize it immediately. It may be helpful to follow the expansion with the parenthesized acronym.

"Encoding Rules for the Common Routing Encapsulation
Extension Protocol (CREEP)"

Authors should be aware that the title of an RFC may be subject to policy considerations in addition to the requirement that it provide a concise and technically sound summary of the document contents. For example, at various times in the history of the IETF, the words "Requirements" and "Policies" as well as the phrase "The Directory" have been banned from RFC titles, each for its own reason.

RFCs that document a particular company's private protocol must bear a title of the form "Company XXX's ... Protocol", to clearly differentiate it from an IETF product.

2.10 IANA Considerations

Many RFCs define protocol specifications that require the assignment of values to protocol parameters, and some define new parameter fields. Assignment of these parameter values is often (and sometimes must be) deferred until publication of the defining RFC. The IANA and the RFC Editor collaborate closely to ensure that all required parameters are assigned and entered into the final RFC text.

Any RFC that defines a new "namespace" [\[9\]](#) of assigned numbers should include an IANA Considerations section specifying how that space should be administered. See "Guidelines for Writing an IANA Considerations Section in RFCs" [\[9\]](#) for a detailed discussion of the issues to be considered and the contents of this section.

2.11 Relation to other RFCs

Sometimes an RFC adds information on a topic discussed in a

previous RFC or completely replaces an earlier RFC. Two terms are used for these cases: Updates and Obsoletes, respectively.

Updates

Specifies an earlier document whose contents are modified or augmented by the new document. The new document cannot be used alone, it can only be used in conjunction with the earlier document.

Obsoletes

Specifies an earlier document that is replaced by the new document. The new document can be used alone as a replacement for the obsoleted document. The new document may contain revised information or all of the same information plus some new information, however extensive or brief that new information may be.

In lists of RFCs and in the RFC-Index (but not on the RFCs themselves) the following are used for older documents that were referred to by Obsoletes or Updates relations in newer documents:

Obsoleted-by

Used to specify newer document(s) that replace the older document.

Updated-by

Used to specify newer document(s) that modify or augment the older document.

2.12 Author Lists

Long lists of authors are not generally acceptable in the first page header of an RFC. While there may be occasional exceptions, in general the person (or the few people) who *wrote* the document should be listed as the author(s). Even when there are many contributors, there is often a single person tasked with integrating the results into a single document; that person may be listed as "Editor". Others who contributed substantially to

developing the specification may be listed in a Contributors section or an Acknowledgment section (defined later). A list of a few authors is still acceptable.

2.13 April 1 RFCs

Many years ago the RFC Editor established the practice of publishing one or more satire documents on April 1 of each year. Readers should be aware that many of the RFCs bearing the date April 1 are not to be taken seriously. The RFC Editor reviews April 1 RFC submissions for cleverness, humor, and topical association with computer networking, and a few of the best are published. Submissions must be made to the RFC Editor in time for review and publication.

[3.](#) General Format Rules for RFCs

The following formatting rules are intentionally incomplete in some details. They attempt to define only what is strictly necessary for uniformity and simplicity (a virtue). Some latitude is allowed to accommodate a broad range of printers, systems, and evolving requirements. The general objective is to create a series of documents that are reasonably uniform and are easy to read, while accommodating a wide range of content.

3.1 General ASCII Format Rules

(1) Character code

The character code is ASCII (See [Appendix E](#)). Only the printable ASCII characters and the three control characters CR, LF, and FF are allowed.

Notes: CR and LF must be used only as provided in rule (2), and LF must be used only as provided in rule (3). Tab (HT) characters and Backspace (BS) characters are never allowed (hence there can be no underlining; see (4) below).

(2) Width

Each line must be limited to 72 characters followed by the character sequence that denotes an end-of-line (EOL). This limit includes any left-side indentation.

Note: An ASCII RFC is expected to be stored on a file disk using the EOL sequence of that system. For example, MS DOS-based systems use the two-character sequence CR LF (Carriage Return followed by Line Feed), Unix systems use the single character LF for EOL, and EBCDIC systems use the single character NL (New Line).

Whenever an RFC is transmitted across the Internet, Internet protocol convention requires that each line of text be followed by the two-character EOL sequence CR LF (Carriage Return followed by Line Feed). A user level protocol (e.g., FTP, Telnet, HTTP, SMTP, ...) must make the appropriate EOL transformation at each line end. Note that binary transmission of ASCII RFC files can cause the sender's EOL convention to "leak" into the receiver, causing confusion.

(3) Height

Each page must be limited to 58 lines followed by a Form Feed (FF) character, followed by an EOL sequence. The 58 line limit includes the headers and footers specified below.

All pages, except perhaps the first and last, should have the same number of lines when headers and footers are included. That is, footers should not "bounce" from page to page.

Note: The maximum line count includes blank lines. However, the first line will normally be the first header line and the last line will be the final footer line; that is, it will not begin or end with a blank line.

Note: 58 lines is the maximum; 55 is more commonly used and may actually produce more readable formatting. The

nroff parameters suggested in [Appendix A](#) produce 55 line pages on many printers, for example.

Note: The effect of the Height rule is that the following character sequence will be used:

<Last non-blank line of page p> <EOL> FF <EOL>

<First line of page p+1> <EOL> ...

As transmitted across the Internet as ASCII text, the character sequence is:

<Last non-blank line of page p> CR LF FF CR LF

<First line of page p+1> CR LF ...

Finally, note that the sequence FF CR LF has an ambiguous effect: on some printers, the FF implies an EOL, so this may produce a blank line; on other printers it will produce no blank line. The number 58 and this sequence were designed to render this ambiguity unimportant, assuming the (once predominant) printer standard of 60 lines per page.

(4) No Overstriking

No overstriking (or underlining) is allowed.

(5) No Filling

Do not fill the text with extra spaces to provide a straight right margin. Do not right justify the text.

(6) No Hyphenation

Do not use hyphenation at the right margin to split existing words. However, hyphenated word sequences (e.g., "Internet-Draft") may be split at the hyphen across successive lines.

Note: There are good reasons why the right page margin is required to be "ragged", and why hyphenation of words at the right margin is prohibited. Studies have shown that text is harder to read when fixed-size spaces are inserted to adjust the right margins, regardless of which font is used or how smoothly the blank filler is inserted. In addition, when technical text in a fixed-width font is hyphenated at the right margin, the printed result is not only less readable but also ugly.

(7) Spaces at the End of a Sentence

When a sentence ended by a period is immediately followed by another sentence, there should be two blank spaces after the period. This rule provides clarity when an RFC is displayed or printed with a fixed-width font.

(8) Footnotes

Do not use footnotes. If such notes are necessary, put them at the end of a section, or at the end of the document.

(9) Line Spacing

Use single-spaced text within a paragraph, and one blank line between paragraphs.

(10) Page Numbering

Pages must be numbered consecutively, starting from 1 on the first (cover) page.

(11) Headers and Footers

RFCs must have running headers and footers, as defined below in [Section 3C](#). The headers and footers must be separated

from the body by at least one and preferably two blank lines.

(12) Indentation

Successive indentation of sub-subsections (as in this document, for example) is recommended but not required. Experience has shown that indentation by multiples of 3 columns works well. In any case, the careful use of indentation can make a very great improvement in the readability of a document.

3.2 PostScript Format Rules

- (1p) Standard page size is 8 1/2 by 11 inches.
- (2p) Leave a margin of 1 inch on all sides (top, bottom, left, and right).
- (3p) Main text should have a point size of no less than 10 points with a line spacing of 12 points.
- (4p) Footnotes and graph notations no smaller than 8 points with a line spacing of 9.6 points.
- (5p) Three fonts are acceptable: Helvetica, Times Roman, and Courier, plus their bold-face and italic versions. These are the three standard fonts on most PostScript printers.
- (6p) Prepare diagrams and images based on lowest common denominator PostScript. Consider common PostScript printer functionality and memory requirements.
- (7p) The following PostScript commands should not be used:
initgraphics, erasepage, copypage, grestoreall, initmatrix,
initclip, banddevice, framedevice, nulldevice or renderbands.

Note that the number of pages in a document and the page numbers on which various sections fall will likely differ between the ASCII and the PostScript versions of an RFC. Thus, cross references in the text by section number usually are easier to keep consistent than cross references by page number.

3.3 Header and Footer Formats

RFCs must include running headers and footers that obey the following rules.

o Running Headers

The running header in one line (on page 2 and all subsequent pages) has the RFC number on the left (RFC nnnn), the title (possibly shortened) in the center, and the publication date (Month Year) on the right.

o Running Footers

All pages contain a one-line running footer, with the author's last name on the left, the category centered, and the page number on the right ([Page nn]).

If there are two authors, the form "name & name" may be used; for more than two authors, use the form "name, et al."

3.4 Protocol Data Definitions

Many years ago, the RFC series adopted a pictorial approach to representing data structures such as protocol headers. Furthermore, the research community adopted a "big-endian" convention in which the bits and bytes are shown in network byte order, byte zero is the first byte shown, and bit zero is the most significant bit in a word or a field [8].

For example, [RFC 791](#) contains the following definition of the IP header format. We strongly recommend that a new RFC follow the same formatting conventions, which have been found to work well.

Internet-Draft

Instructions to RFC Authors

23 April 2002

0										1										2										3									
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1								
+--+																																							

Example Internet Datagram Header

4. Sections in an RFC

An RFC may contain the following sections. Some of these are optional, but if they are present they must be in this order (except where noted).

1. First-page header
2. Status of this Memo
3. Copyright Notice
4. IESG Note
5. Abstract
6. Table of Contents
7. Body of memo
8. References
9. Security Considerations
10. IANA Considerations
11. Contributors
12. Acknowledgments
13. Authors' Addresses
14. Full Copyright Statement

The rules for each of these sections are described below in

corresponding subsections.

The Body of the memo will normally contain section numbers. Sections preceding the Body must not have section numbers; section numbers are optional for sections following the Body.

4.1. First-Page Header

Please see the front page of this memo for an example of the front page heading. On the first page there is no running header. The top of the first page has the following items left justified:

"Network Working Group"

This traditional title must be left-justified on the first line of the heading. It denoted the ARPANET research group that founded the RFC series.

"Request for Comments: nnnn"

Identifies this as an RFC and specifies the number, left-justified on the second line. The actual number is filled in at the last moment prior to publication by the RFC Editor.

"BCP: nn" or

"FYI: nn" or

"STD: nn"

One of these optional left-justified items indicates the sub-series number, if the RFC is a member of a sub-series.

"Updates: nnnn" or "Updates: nnnn, ..., nnnn"

Optional left-justified field, containing an RFC number or a comma-separated list of RFC numbers that are updated by this RFC. See [Section 5](#).

"Obsoletes: nnnn" or "Obsoletes: nnnn, ... , nnnn"

Optional left-justified field, containing an RFC number or a comma-separated list of RFC numbers that are obsoleted by this RFC. See [Section 5](#).

"Category: xxxxxxxxx"

Required left-justified field specifying the category (i.e., status) of this RFC. Here xxxxxxxx, the document status (see [RFC 2026](#) [2]), may be one of: Standards Track, Best Current Practice, Informational, or Experimental.

The "Standards Track" category indicates that the status is one of: Proposed Standard, Draft Standard, or Standard. The actual status may be found in STD 1, "Official Internet Standards", or from the RFC Editor web site.

RFC Editor

Informational

[Page 18]

Internet-Draft

Instructions to RFC Authors

23 April 2002

The following information appears right-justified in the header:

Author

The author's name (first initial and last name only), right-justified on the first line of the heading.

Organization

The author's organization, indicated on the line following the Author name.

For multiple authors, each author name appears right-justified on its own line, followed by that author's organization. When more than one author has the same organization, the organization can be "factored out" and appear only once following the corresponding Author lines. However, such factoring is not necessary if it results in an unacceptable reordering of author lines.

Date

The month and year of the RFC Publication, right-justified on the line after the last Organization line.

The title appears, centered, below the rest of the heading,

preceded and followed by at least one blank line. Periods ("dots") are not allowed in the title.

The title should be carefully chosen to accurately reflect the contents of the document. See also [Section 2.9](#).

4.2. Status of this Memo

Each RFC must include on its first page the "Status of this Memo" section that contains two elements: (1) a paragraph describing the type of the RFC, and (2) the distribution statement.

The required contents of this section will be found in [Appendix B](#).

4.3 Copyright Notice

The Copyright Notice section consists of the statement, "Copyright (C) The Internet Society (date). All Rights Reserved." and is required. The Full Copyright Statement described in [Section 4.12](#) must also appear at the end of the document.

4.4 IESG Note

This optional section will appear only when the IESG requires and specifies a clarifying comment on an RFC.

4.5 Abstract

Every RFC must have an Abstract section following the Copyright notice. An Abstract will typically be 5-10 lines, but an Abstract of more than 20 lines is generally not acceptable.

The Abstract section should provide a concise and comprehensive overview of the purpose and contents of the entire document, to give a technically knowledgeable reader a general overview of the function of the document. In addition to its function in the RFC itself, the Abstract section text will appear in publication announcements and in the online index of RFCs.

Composing a useful Abstract generally requires thought and care.

Usually an Abstract should begin with a phrase like "This memo ..." or "This document ...". A satisfactory abstract can often be constructed in part from material within the Introduction section, but a good abstract will be shorter, less detailed, and perhaps broader in scope than the Introduction. Simply copying and pasting the first few paragraphs of the Introduction is tempting, but it may result in an Abstract that is both incomplete and redundant. Note also that an Abstract is not a substitute for an Introduction; the RFC should be self-contained as if there were no Abstract section.

An Abstract should be complete in itself; it should not contain citations unless they are completely defined within the Abstract. Mnemonics appearing in the Abstract should generally be expanded in parentheses. There is a small set of reasonable exceptions to this rule; for example, readers do not need to be reminded of the meaning of the mnemonics "IP" or "TCP" or "MIB". In the end this is a judgment call, but please err on the side of explicitness.

4.6 Table of Contents

A Table of Contents (TOC) section is required in RFCs longer than 30 pages and recommended for an RFC longer than 15 pages.

A TOC must be positioned after the Abstract and before the Introduction section (i.e., after the "boiler plate" and before the body of the RFC.)

The TOC itself should not be too long or detailed, or it loses value. For example, if many successive TOC entries point to the same pages of the memo, the TOC probably needs to be coarser.

No specific format is required, but the following example illustrates a useful format:

1.	INTRODUCTION	5
1.1	The Internet Architecture	6
1.1.1	Internet Hosts	6
1.1.2	Architectural Assumptions	7
1.1.3	Internet Protocol Suite	8

1.1.4	Embedded Gateway Code	10
1.2	General Considerations	12
1.2.1	Continuing Internet Evolution	12
1.2.2	Robustness Principle	12
1.2.3	Error Logging	13

4.7 Body of Memo

Following the Table of Contents, if any, comes the body of the memo. Depending upon the length of the TOC, a judicious page break can improve readability.

Each RFC should have an Introduction section that (among other things) explains the motivation for the RFC and (if appropriate) describes the applicability of the document, e.g., whether it specifies a protocol, provides a discussion of some problem, is simply of interest to the Internet community, or provides a status report on some activity.

Many RFC documents have appendices, some of which may be very extensive. It is often customary in academic publications to place appendices at the very end, after references. This is permissible in an RFC, but we recommend that an author place any appendices at the end of the body of the text and before the references. This is appropriate because the references of an RFC may be normative and should therefore be clearly accessible at the very end of the document.

4.8 References Section

Nearly all RFCs contain citations to other documents, listed near the end of the RFC. There are many styles for references, and the RFCs have one of their own. Please follow the reference style used in recent RFCs; in particular, see the Reference section of this RFC for an example.

For a reference to an RFC that has been assigned an STD, BCP, or FYI subseries number, that subseries number must be included in the reference.

In many standards track documents several words are used to

signify the requirements in the specification. These words are often capitalized. [BCP 14](#), [RFC 2119](#) [3], defines these words as they should be interpreted in IETF documents.

Reference lists must indicate whether each reference is normative or informative. For example, if both normative and informative references are included, then the reference section should be split into two sections, e.g.:

s. Normative References

xxx
...
xxx

s+1. Informative References

xxx
...
xxx

Non-normative references to Internet-Drafts are allowed, but they must take the following restricted form: the author(s), the title, and the phrase "Work in Progress", for example:

[6] Doe, J., "The Deployment of IPv6", Work in Progress.

The use of URLs in references in RFCs is discouraged, because URLs are often not stable references. Exceptions will be made in certain cases where the World Wide Web is demonstrably the most stable reference available.

4.9 Security Considerations Section

All RFCs must contain a section near the end of the document that discusses the security considerations of the specification that are the main topic of the RFC.

4.10 IANA Considerations Section

See [Section 2.10](#) above.

4.11 Contributors Section

This optional section lists those contributors who deserve significant credit for the document. When a long author list is replaced by a single Editor in the front page header, the displaced authors can be properly and fully acknowledged in the Contributors section.

The Contributors section may include brief statements about the nature of particular contributions ("Sam contributed [section 3](#)") and it may also include affiliations of listed contributors. At the discretion of the author(s), contact addresses (see Authors' Address section below) may also be included in the Contributors section, for those contributors whose knowledge makes them useful future contacts for information about the RFC.

There is no fixed position for a Contributors section or an Acknowledgments section within the body of the RFC. If they appear, they must appear later than the Abstract section and earlier than the Authors' Address section.

4.12 Acknowledgment Section

This optional section may be used instead of, or in addition to, a Contributors section, when appropriate.

4.13 Authors' Address Section

This required section gives the name(s) and contact information for the author(s) listed in the first-page header. Contact information must include at least one, and should ideally include all, of a postal address, a telephone number and/or FAX number, and a long-lived email address. The purpose of this section is to (1) unambiguously define author/contributor identity (e.g., the John Smith who works for FooBar Systems) and to (2) provide contact information for future readers who have questions or comments. Note that some professional societies offer long-lived email addresses for their members.

4.14 Full Copyright Statement

Per [BCP 9](#), [RFC 2026](#) [2], "The following copyright notice and disclaimer shall be included in all ISOC standards-related documentation." This is the "Full Copyright Statement", whose text will be found at the end of this RFC as well as in [RFC 2026](#).

Internet-Draft

Instructions to RFC Authors

23 April 2002

A specific request from the IAB is required before the RFC Editor can include a dual copyright, or for any other variation of the standard ISOC copyright notice.

5. RFC Information and Contacts

```
*****
*
*   RFC Editor Email:  rfc-editor@rfc-editor.org      *
*
*
*   RFC Editor URL:   http://www.rfc-editor.org *
*
*
*****
```

RFC publication announcements are distributed via two mailing lists: the "IETF-Announce" list, and the "RFC-DIST" list. You don't want to be on both lists. To join (or quit) the IETF-Announce list send a message to ietf-request@ietf.org. To join (or quit) the RFC-DIST list send a message to rfc-dist-request@isi.edu.

RFC readers should be aware that the many mirrors of RFCs and RFC indexes that appear on other sites vary a great deal in reliability. Consulting the official RFC-Editor site is recommended.

6. Acknowledgments

This memo includes wording taken from a draft written by Robert W. Shirey of GTE/BBN Technologies, 29 December 1999, with permission. Shirey's deconstruction of the formatting rules was very helpful in writing Sections [3](#) and [4](#) of the present memo.

Internet-Draft

Instructions to RFC Authors

23 April 2002

APPENDIX A: RFC Boilerplate

This Appendix defines standard wording required in every RFC.

Standards Track

"This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited."

Best Current Practice

"This document specifies an Internet Best Current Practices for the Internet Community, and requests discussion and suggestions for improvements. Distribution of this memo is unlimited."

Experimental

"This memo defines an Experimental Protocol for the Internet community. This memo does not specify an Internet standard of any kind. Discussion and suggestions for improvement are requested. Distribution of this memo is unlimited."

Informational

"This memo provides information for the Internet community. This memo does not specify an Internet standard of any kind. Distribution of this memo is unlimited."

APPENDIX B: RFC Preparation Tools

As indicated earlier, the primary submission format for RFCs is ASCII text. Authors have found various tools to be useful for preparing this text in the format required by RFCs and Internet-Drafts. For more complete and up-to-date information, see the RFC Editor Web page.

This Appendix surveys some of the possibilities.

nroff, groff

The nroff program is widely available for Unix systems, while its freeware equivalent groff is available for an even wider range of platforms, including Windows. These programs use directives in the text to control the formatting. The RFC Editor, in particular, uses nroff for final RFC formatting. A template is available as 2-nroff.template.

XML

An XML DTD for RFCs has been developed [\[7\]](#). There is also an XML-to-nroff translator suitable for creating RFC text. RFC Editor experience with this procedure is limited, but it has worked very well.

Microsoft Word

Microsoft Word is an important example of a WYSIWYG editor. RFC xxxx [Hain] describes in detail how to configure Word to produce an ASCII text file in RFC format. A version of this document as a Word file (2-Word.Template.doc) can be used as a template file

to initialize this configuration for entering and displaying RFCs. There is also a DOS executable (crlf.exe) for a post-processor to establish RFC end-of-line conventions in the Word output file.

LaTeX

LaTeX is widely used for text preparation in many academic environments. A convenient LaTeX template is available as 2-latex.template. Latex in general does not produce plain ASCII text in the RFC format, but there are tools that translate LaTeX to nroff; see the RFC Editor web page.

APPENDIX C. ASCII Character Set

The set of 128 ASCII codes includes the 33 control characters shown in Table 1 and the 95 graphic characters shown in Table 2. Decimal values are given.

Table 1. ASCII Control Characters

Dec	Chr	Meaning	Dec	Chr	Meaning
---	---	-----	---	---	-----
000	NUL	null	016	DLE	dev link esc
001	SOH	start header	017	DC1	dev ctrl 1
002	STX	start text	018	DC2	dev ctrl 2
003	ETX	end text	019	DC3	dev ctrl 3
004	EOT	end of transmit	020	DC4	dev ctrl 4
005	ENQ	enquiry	021	NAK	negative ack
006	ACK	acknowledge	022	SYN	sync idle
007	BEL	bell (beep)	023	ETB	end trans block
008	BS	back space	024	CAN	cancel
009	HT	horiz tab	025	EM	end medium
010	LF	line feed	026	SUB	substitute

011 VT	vert tab	027 ESC	escape
012 FF	form feed	028 FS	cursor right
013 CR	carriage ret	029 GS	cursor left
014 SO	shift out	030 RS	cursor up
015 SI	shift in	031 US	cursor down
		127 DEL	delete

Table 2. ASCII Graphic Characters

Dec	Char	Dec	Char	Dec	Char	Dec	Char	Dec	Char	Dec	Char
----	-----	----	-----	----	-----	----	-----	----	-----	----	-----
032	[space]	0 0		064	@	080	P	096	`	112	p
033	!	049	1	065	A	081	Q	097	a	113	q
034	"	050	2	066	B	082	R	098	b	114	r
035	#	051	3	067	C	083	S	099	c	115	s
036	\$	052	4	068	D	084	T	100	d	116	t
037	%	053	5	069	E	085	U	101	e	117	u
038	&	054	6	070	F	086	V	102	f	118	v
039	'	055	7	071	G	087	W	103	g	119	w
040	(	056	8	072	H	088	X	104	h	120	x
041	)	057	9	073	I	089	Y	105	i	121	y
042	*	058	:	074	J	090	Z	106	j	122	z
043	+	059	;	075	K	091	[	107	k	123	{
044	,	060	<	076	L	092	\	108	l	124	|
045	-	061	=	077	M	093	]	109	m	125	}
046	.	062	>	078	N	094	^	110	n	126	~
047	/	063	?	079	O	095	_	111	o		

APPENDIX D: Changes from [RFC 2223](#)

[Section 1](#): Introduction

This section was completely rewritten, using material from several sections of [RFC 2223](#) and bringing the discussion into conformance with [RFC 2026](#).

[Section 2](#): RFC Editorial and Publication Policies

This section combines material from several sections of [RFC 2223](#). New material is included about the RFC Editor errata page, normative references, URLs, titles, RFC number pre-assignment, author lists, and IANA Considerations.

There are three changes of procedure: (1) publication of an RFC in both ASCII and Postscript versions now requires that both be published simultaneously, (2) all listed authors must give approval during the "Authors' 48 Hour" process, and (3) a Contributors section is defined to avoid long author lists on the front page.

Section 3: General Format Rules

This section is expanded with much additional explanatory material. For example:

- (1) The requirement for printable ASCII characters is stated, and the use of CR, LF, and FF is clarified.
- (2) A table of ASCII character codes is included in an Appendix.
- (3) The requirement for page numbers is specified.
- (4) The requirement for running headers and footers is specified.

Section 4: Required Sections in an RFC

This section is reorganized to cover all the required sections of an RFC in order. It adds the current conventions for formatting multiple author names and organizations.

This section describes four major changes in RFC formatting.

- (1) The style and contents of the Abstract section are more completely specified, in order to make RFC abstracts

useful for searching and indexing.

- (2) A Table of Contents section is required or recommended in all but very short RFCs.
- (3) Separate lists are now required for normative references and informative references.

- (4) A new optional section, Contributors, is defined.

Appendixes

Former [Appendix A](#), which contained the source for the fix.pl post-processor Perl script and an nroff RFC template, has been removed. These files are available at the RFC Editor web site.

[Appendix B](#), RFC Preparation Tools, and [Appendix C](#), defining the ASCII character set, are new.

Normative References

- [2] Bradner, S., "The Internet Standards Process -- Revision 3", [BCP 9](#), [RFC 2026](#), October 1996.
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [10] Eastlake, D. and E. Panitz, "Reserved Top Level DNS Names", [RFC 2606](#), June 1999.

Informative References

- [1] RFC Editor et al., "30 Years of RFCs", [RFC 2555](#), 7 April 1999.
- [4] Malkin, G. and J. Reynolds, "F.Y.I. on F.Y.I Introduction to the F.Y.I. Notes", FYI 1, [RFC 1150](#), March 1990.
- [5] Postel, J., Li, T. and Y. Rekhter, "Best Current Practices", [BCP 1](#), [RFC 1818](#), August 1995.
- [6] Postel, J., Editor, "Introduction to the STD Notes", [RFC 1311](#), March 1992.
- [7] Rose, M., "Writing I-Ds and RFCs using XML", [RFC 2629](#), June 1999.
- [8] Cohen, D., "On Holy Wars and a Plea for Peace", Internet Experimental Note (IEN) 137, 1 April 1980.

- [9] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 2434](#), October 1998.

Security Considerations

This RFC describes the Security Considerations sections of an RFC.

Authors' Addresses

Joyce K. Reynolds
RFC Editor
4676 Admiralty Way
Marina del Rey, CA 90292

EMail: rfc-editor@rfc-editor.org

Robert Braden
RFC Editor
4676 Admiralty Way
Marina del Rey, CA 90292

EMail: rfc-editor@rfc-editor.org

Internet-Draft

Instructions to RFC Authors

23 April 2002

Full Copyright Statement

Copyright (C) The Internet Society (2002). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE."

Acknowledgement:

Funding for the RFC Editor function is currently provided by the Internet Society.

