Internet Requests for Comments (RFCs) as Scholarly Publications

Brian E. Carpenter
Department of Computer Science
The University of Auckland
Auckland, New Zealand
brian@cs.auckland.ac.nz

Craig Partridge
BBN Technologies
craig@aland.bbn.com

This article is an editorial note submitted to CCR. It has NOT been peer reviewed. The authors take full responsibility for this article's technical content. Comments can be posted through CCR Online.

ABSTRACT

This note describes the various peer review processes applied to Internet Requests for Comments (RFCs) over a number of years, and suggests that these have been up to normal scholarly standards since at least 1992. The authors believe that these documents should be considered the equivalent of scholarly publications.

Categories and Subject Descriptors

A.m [**Miscellaneous**]

General Terms

Documentation

Keywords

RFC, Request for Comments

1. INTRODUCTION

The first Request for Comments [4] was written in April 1969 as an internal document of the ARPANET project.

The early RFCs were unreviewed technical notes in an era before electronic mail and file transfer were available for communicating such material. However, as the ARPANET matured into the Internet, RFCs became increasingly used as reference documents and were carefully reviewed and edited before publication[10]. In particular, RFC 768 [7], published in August 1980, remains today the official Internet standard for the User Datagram Protocol, and is the oldest RFC with that status. Several other RFCs from 1980 and 1981 are either still official standards, or remained so for many years.

Clearly such documents can only succeed as standards if they are unambiguous and technically correct. This can only be the case if they have been subjected to deep technical review, of at least as searching a nature as academic peer review. As the Internet technical community grew in the years since 1980, the review process for RFCs became more formal and the original use of RFCs for casual communication within a project ceased.

This article describes the review processes currently applied for the various classes of RFC. It also summarises past review practices. We suggest that most RFCs are entirely suitable as scholarly references and we propose a citation format.

2. REVIEW PROCESSES

Currently, RFCs are numbered in a single series but originate from several 'streams', which are defined in [6]. In summary, they are:

- *IETF stream.* Documents reviewed and approved within the Internet Engineering Task Force (IETF).
- *IAB stream.* Documents reviewed and approved by the Internet Architecture Board (IAB).
- *IRTF stream.* Documents reviewed and approved within the Internet Research Task Force (IRTF).
- *Independent Submissions.* Documents submitted directly to, and reviewed under the authority of, the RFC Editor. The RFC Editor is the collective name for the team that carries out quality control, copy-editing and publication of the RFC series.

In addition there are a few 'housekeeping' RFCs such as status summaries, and a tradition of publishing one or two facetious documents on April 1st. Apart from these, there is peer review of all the streams, as described below.

Draft IETF documents may be written by any particpant in the IETF standards process. They are posted in a format known as 'Internet Drafts' and are freely available for public review from the IETF web site, and for comment by means of applicable IETF email lists. Subject to the IETF's rules documented in [2] and elsewhere, anyone may comment. The final stage of the IETF review process includes a public 'Last Call' for comments and a ballot of the members of the Internet Engineering Steering Group (IESG), the IETF's executive body. Members of the IESG with a direct involvement in the draft are expected to recuse themselves from the ballot.

Experience shows that this open review process is tough and effective; it involves more reviewers than any common scholarly publication system. It is normal for drafts to go through multiple revisions prior to approval, and a total of more than ten revisions is not unusual. The IETF's on-line archives include full records of the public comments, of the authors' responses, and of the revisions made.

Draft IAB documents are written either by members of the IAB, or by individuals working on behalf of the IAB.

They are also posted as Internet Drafts and are freely available for public review and comment. The IAB itself conducts a final call for comments from the IETF community before approving publication. Although less rigorous than the IETF review process, this process ensures that IAB documents are at least as well reviewed as most scholarly publications.

Draft IRTF documents are developed by members of the various Research Groups constituting the IRTF. These are intended to be research-oriented documents, so the review process is less broad than for IETF or IAB documents, but they are subject to review and comment by subject-matter experts. They are reviewed first by the research group concerned, and then reviewed and approved by the IRTF's own steering group, acting as an editorial review board [5]. Again, this is at least as strong a review process as for scholarly journals or conferences.

Finally, independent submissions to the RFC Editor are reviewed firstly by the senior members of the RFC Editor team, and then reviewed by one or more members of the associated Editorial Board or a person known by the Board to be competent in the subject matter. This Board was appointed by the RFC Editor, drawing on experienced members of the Internet technical community. It is described in more detail on the RFC Editor web site [9]. This process is directly modeled on those used by academic journals and conferences.

For completeness, we note that at the time of this writing, there is a project underway to reorganize the arrangements for the independent submission stream so that a distinct Independent Submissions Editor will take the Editor's role just described, rather than combining the job with that of editing the RFC Series as a whole. This is expected to further strengthen the review process.

In summary, all RFC streams listed above are now subject to a robust peer review process, directly comparable to normal scholarly publications, but with additional emphasis on openness and transparency.

As mentioned in the Introduction, these review processes have grown up over a number of years. The Internet standards process was first formally documented in 1992 [3], at which time the formal responsibility for the IETF stream was with the IAB, and for all other documents directly with the RFC Editor. After some vigorous debate during the same year, responsibility for the IETF stream was transferred to the IESG, as documented in [1].

It is difficult to give an exact date or exact RFC number after which *all* RFCs can be said to have undergone adequate peer review. Certainly any RFC identified as an Internet standards-track document or as a Best Current Practices document has undergone full review, regardless of its age, i.e., as far back as RFC 768 [7].

Internet Research Groups have reviewed RFCs from their memberships since the early 1980s. By 1984, all RFCs received an editorial review by the RFC Editor, often supplemented by additional reviewer. This process was, therefore, sometimes more rigorous than the typical journal review of the time and sometimes slightly less rigorous. The IESG began reviewing IETF RFCs around 1990 and as the IETF process was formally defined in 1992, ensuring the quality of RFCs authored by IETF members has been a priority. Similarly the review process for the other streams has become more formal [6].

We observe that most RFCs since the start of 1984, so beginning with RFC 888, have been reviewed to a normal scholarly level and all RFCs since RFC 1602 have received this level of review. Any RFC, regardless of publication date, that was part of the Internet standards process has also received high quality review. These documents are identified on the RFC Editor web site [8]. Additionally, this standard, because it is conservative, is certainly unfair to some earlier RFCs that are clearly of scholarly quality.

3. CITATION FORMAT

There are a number of standards for citing documents, including those of the Modern Language Association (MLA) and the IEEE. Also, each publisher and in some cases each individual scholarly journal has its own preferences. Here, we offer a little bit of guidance on some subtle issues and then offer a sample set of citations.

RFCs are published as a numbered series and should be cited as such, much like journal articles. The Internet RFC series has an International Standard Serial Number (ISSN), namely 2070-1721. It should be included in the citation whenever appropriate.

Most formats require that for on-line series, a URL be provided. The proper form for RFCs is:

http://www.rfc-editor.org/rfc/rfc####.txt

where #### is replaced with the four digit RFC number (for numbers below 1000, there is no leading 0).

It should be noted that some RFCs are collective works attributed to editors rather than authors. This should be indicated in the citation, as we show for [6]. Unless the RFC is a collective work by the RFC Editor as such, e.g. [10], the latter is not listed. Also, we do not normally list a publishing organization. If a publisher must be identified, it should be the *RFC Editor*. The publishing institution is *not* the IETF, which is the source of only some RFCs. Nor is it the Internet Society or the IETF Trust, the former and present copyright holders in the RFC series. Nor is it the Information Sciences Institute of the University of Southern California, the long-time host of the RFC Editor. All these mistakes can be found in existing published citations and some of them are to be found in existing bibliographic repositories.

The preferred typography is "RFC 1234", rather than "RFC1234".

We give examples of a suggested citation style in the References below.

A simple example BibTeX entry is:

```
@ARTICLE{rfc1654,
AUTHOR = "Yakov Rekhter and Tony Li",
TITLE = "{A Border Gateway Protocol 4 (BGP-4)}",
JOURNAL = {Internet RFCs, ISSN 2070-1721},
VOLUME = {RFC 1654},
YEAR = {1995},
URL={http://www.rfc-editor.org/rfc/rfc1654.txt} }
```

In this case, we have chosen a straightforward way to display the ISSN number if required. More complex BibTeX entries may of course be constructed, and may be appropriate for journals with specific citation requirements. Some authors may prefer the @MISC or @TECHREPORT constructs, although @ARTICLE is appropriate for a series publication. Some alternative and optional items are:

```
JOURNAL = "{Internet Requests for Comments}"
ISSN = {2070-1721},
PUBLISHER =  "{RFC Editor}",
INSTITUTION =  "{RFC Editor}",
NOTE = "Obsoleted by RFC 1602.
        Status: INFORMATIONAL.",
```

The last item is an example of status information derived from the RFC Editor's on-line index of all RFCs. Of course, standard BibTeX items such as page count and month of publication could also be included if desired.

4. CONCLUSION

We conclude that the review process applied to all RFCs since early 1992, and to older ones that formed part of the Internet standards process or were otherwise subject to community review, is at least equivalent to typical review of scholarly papers. We suggest that RFCs should be considered equivalent to scholarly publications for citation purposes.

5. ACKNOWLEDGMENTS

The authors are both members of the RFC Editorial Board. For many years, the RFC Editor was an individual, the late Jonathan B. Postel. He created the nucleus of the modern RFC Editor team with Joyce K. Reynolds. From 1998 through 2009, this team was ably led by Robert Braden.

We are grateful to Nevil Brownlee and Alice Hagens for useful comments on this article. We also consulted work in progress on BibTeX formats by Ran Atkinson and citation bibliographies posted by Henning Schulzrinne, Miguel Garcia, and Nelson Beebe.

6. REFERENCES

[1] S. Bradner. The Internet Standards Process – Revision 2. *Internet RFCs, ISSN 2070-1721*, RFC 1602, 1994.

[2] S. Bradner. The Internet Standards Process – Revision 3. *Internet RFCs, ISSN 2070-1721*, RFC 2026, 1996.

[3] L. Chapin. The Internet Standards Process. *Internet RFCs, ISSN 2070-1721*, RFC 1310, 1992.

[4] S. Crocker. Host Software. *Internet RFCs, ISSN 2070-1721*, RFC 1, 1969.

[5] A. Falk. Definition of an Internet Research Task Force (IRTF) Document Stream (work in progress), 2008.

[6] Leslie Daigle (ed.). The RFC Series and RFC Editor. *Internet RFCs, ISSN 2070-1721*, RFC 4844, 2007.

[7] J. Postel. User Datagram Protocol. *Internet RFCs, ISSN 2070-1721*, RFC 768.

[8] RFC Editor. http://www.rfc-editor.org/categories/rfc-standard.html/.

[9] RFC Editor. http://www.rfc-editor.org/edboard.html/.

[10] RFC Editor. 40 Years of RFCs. *Internet RFCs, ISSN 2070-1721*, RFC 5540, 2009.