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Proposed Experiment: Normative Format in Addition to ASCII Text

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Abstract

Following RFC 3933, the authors propose an experiment allowing, in addition to ASCII text as a normative input/output format, PDF as an additional normative output format.

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1. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

2. Background

Currently, ASCII text is the only allowed normative input and output format for Internet Drafts and RFCs. While PDF and Postscript are permitted as output formats, only the ASCII text documents can be normative, and must be available.

Problems with using ASCII text as the only normative format have been pointed out and discussed innumerable times. The most prominent among the identified problems are use of 'ASCII art' instead of clearer diagrams, and difficulty in expressing mathematical equations. The problem of providing better illustrations and mathematical equations has been faced in the past, and responded with a PDF and/or PS version, but in every case except one, RFC 1119, the PDF/PS versions must accompany the ASCII version of the RFC.

The one exception to this rule, RFC 1119, which is only available in PDF and Postscript, and not ASCII text, owing to the complexity of the equations contained therein. However, this is generally not allowed for RFCs.

The most recent discussion on ASCII art took place on the IETF discussion list starting in November 2005 and beginning at <http://www1.ietf.org/mail-archive/web/ietf/current/msg38881.html>.

A considerable number of opinions were expressed ranging from those who found ASCII art was too difficult to use to show anything other than a non-trivial diagram, through to those who thought that the restrictions of ASCII performed a useful purpose in requiring that authors simplify their work. There was also considerable debate on the relative merits and costs of tools, archive formats, etc., ranging from support for ASCII as a lowest common denominator to support for moving to the more modern tool suits used by other SDOs.

Good arguments were made on both sides of the ASCII art issue. This topic, has been discussed many times in the past on the IETF discussion list, and, while the discussion may have been enlightening and entertaining, it achieved little and resulted in no change from status quo. That is, the quite thoughtful, extended, and detailed discussion on the IETF discussion list resulted in no change.

It was suggested by several contributors to the thread that formats in addition to ASCII text be permitted as normative text in the IETF for RFCs and BCPs. The authors believe that this is an important IETF issue that should be formally addressed by the IETF as a process change.

Regarding how such a process change should be pursued, it was stated that we could try to approve a BCP using the procedure outlined in RFC 2026. Another suggestion was that RFC 3933 [RFC3933] could be used for process change experiments. Accordingly, the authors propose to do an experiment following RFC 3933 as a gateway to process change.

3. Proposed Experiment

Following RFC 3933, the authors propose an experiment allowing, in addition to ASCII text as a normative input/output format, PDF as an additional normative output format.

The "sunset" timeout for the experiment is one year after adoption.

It is proposed that two suitable working groups be identified as candidates for the experiment, and the agreement of the ADs and WG chairs sought. This is work in progress. It is proposed that current and new working group documents, selected by the working group chairs, be progressed in PDF format and also in ASCII format. The ASCII format version may be limited to text only and not include figures, diagrams, or equations.

It is further proposed that a subset of the selected WG documents, as agreed to by the IESG, be progressed through IESG review and approval in PDF format and also in ASCII format. The ASCII format version may be limited to text only and not include figures, diagrams, or equations.

Finally, it is proposed that a subset of the selected IESG documents, as agreed to by the RFC Editor, be progressed through the RFC publication process in PDF format and also in ASCII format. The ASCII format version may be limited to text only and not include figures, diagrams, or equations.

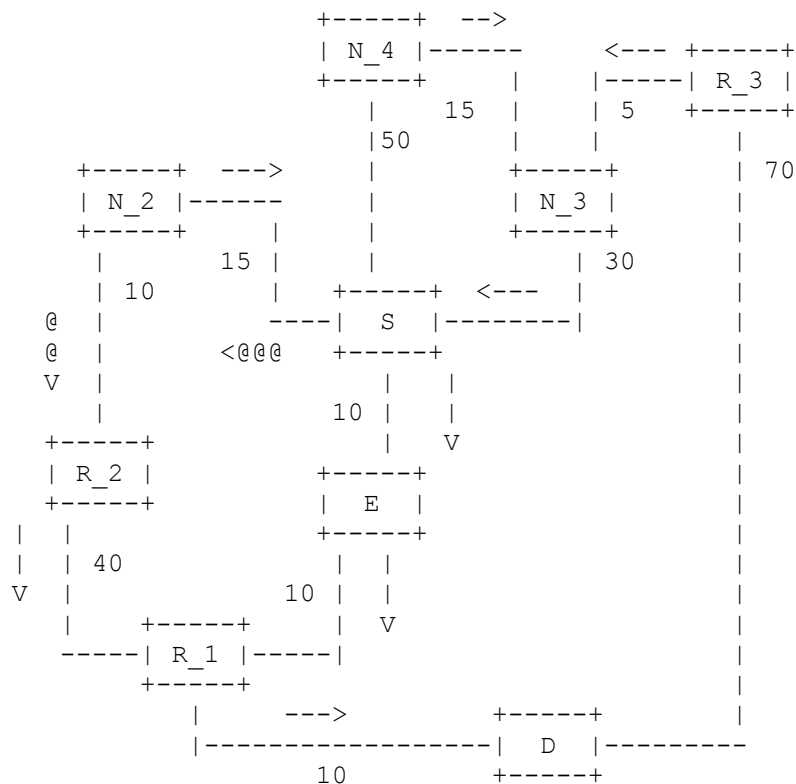
4. Problem to be Solved

The rationale in support of this proposed experiment as a gateway to process change is as follows:

a) fixes diagram issue:

Figures are not just "nice to have" additions to text. There are good reasons to include diagrams that would be impossible to use in the ASCII text input environment. For example, the ITU-T has come up with a diagrammatic technique for describing transport networks [G.805, G.809]. Its use is now required in all new work there, and the technique is not just descriptive, it is genuinely useful for design, catching bugs and as the final word when English language descriptions differ.

Some argue that ASCII art diagrams are sufficient, for example [U-TURN]:



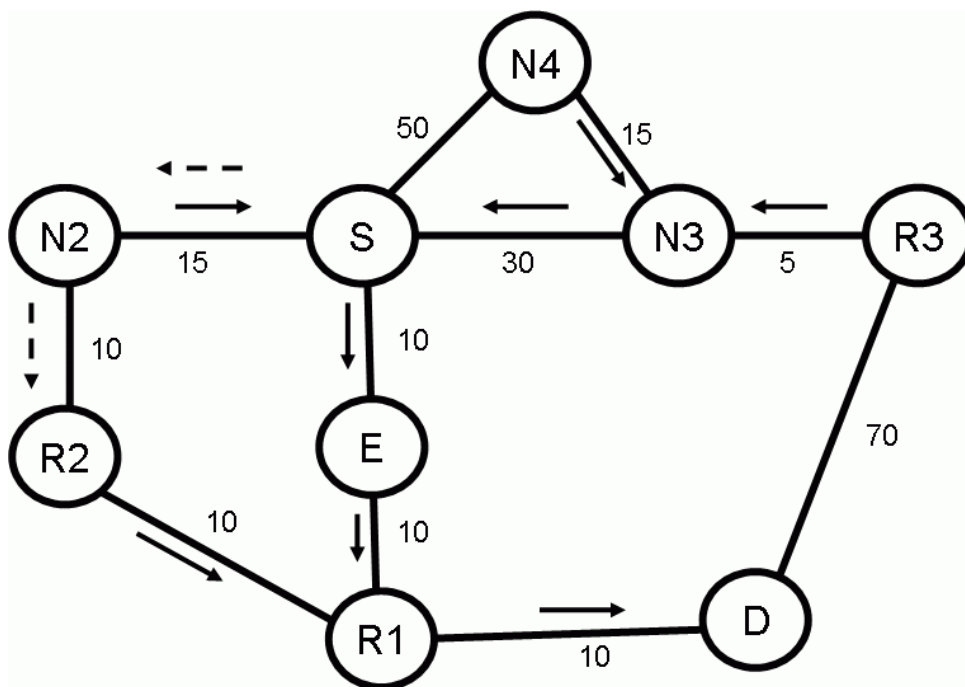
E is primary next-hop of S
 N_2 and N_3 are U-Turn Neighbors of S
 N_4 is a Looping Neighbor of S

Regarding such diagrams, Bob Braden (RFC Editor) commented

<http://www1.ietf.org/mail-archive/web/ietf/current/msg39909.html>:

"the ASCII art diagrams could really use a cleanup. They are unnecessarily ugly, kind of dyslexic."

For those who are able to read the .pdf version of this draft we provide a line graphic version for comparison:



Graphics provide a language that allows us to abstract and describe concepts in a way that is much clearer (to reader and writer) than is possible in words or crude diagrams. A document must stand by itself and clarity is paramount, which requires the use of the best tools available.

Such a technique could not be adopted at the IETF under the present system of ASCII text as the only allowed input format, as there would be no normative method of distributing the diagrams.

b) fixes equations issue:

Complex equations are sometimes difficult to express in ASCII text. Allowing PDF as a normative format allows complex equations to be clearly expressed.

Some argue that reading 'linearized formulas' in ASCII is sufficient, for example [U-TURN]:

$$D_{opt}(N_i, D) < D_{opt}(N_i, S) + D_{opt}(S, D)$$

$$\min_{\text{for all } j \text{ in } J} (D_{!N_i}(R_{i,j}, D) - D_{opt}(R_{i,j}, S))$$

A shortest path from $R_{i,j}$ to D is via N_i and thus S . Therefore, $D_{!N_i}(R_{i,j}, D) \geq D_{opt}(R_{i,j}, D)$.

A shortest path from $R_{i,j}$ to D is not via N_i . Therefore, $D_{!N_i}(R_{i,j}, D) = D_{opt}(R_{i,j}, D)$.

However, if linearized formulas were sufficient, mathematicians would generally use them, but they don't.

Another format for equations, which is essentially ASCII art, is illustrated here:

$$(D7)/T/ \quad \frac{w}{k} + \frac{w x}{k} - \frac{(w k^2 + w^3) x}{6 k} - \frac{(3 w k^2 + w^3) x}{6 k} + \dots$$

Such a format would be difficult to use in general, and lacks generality.

Common mathematical symbols, such as summation and integral signs, are unavailable in ASCII. For those who are able to read the .pdf version of this draft, we provide an example for comparison:

$$D_{opt}(N_i, D) < D_{opt}(N_i, S) + D_{opt}(S, D)$$

$$\min \forall_{j \in J} (D_{\bar{N}_i}(R_{ij}, D) - D_{opt}(S, D))$$

A shortest path from R_{ij} to D is thus via N_i and thus S

$$\therefore D_{\bar{N}_i}(R_{ij}, D) \geq D_{opt}(R_{ij}, D)$$

A shortest path from R_{ij} to D is not via N_i

$$\therefore D_{\bar{N}_i}(R_{ij}, D) = D_{opt}(R_{ij}, D)$$

$$\frac{D_7}{T} = \left(\frac{w}{k^4} + \frac{wx}{k^3} - \frac{wk^2 + w^3}{6k^4} x^2 - \frac{3wk^2 + w^3}{6k^3} x^3 + \dots \right)$$

Translation of complex mathematical formulas to ASCII representation should surely be the final step in implementation, not something imposed during the understanding and description phase.

In one instance, mathematical formulas were sufficiently complex [RFC1119] that an exception was made, and the document is only available in PDF/Postscript, and not in the usual ASCII format.

c) commercially available tools are not optimized for ASCII format: When using pure ASCII files, for example, sometimes one cannot print an I-D directly from a browser without lines becoming broken due to the default font being too large, and as a result the text becomes hard to read. Also, printing an ASCII file directly from a word processor sometimes adds a blank page between every two pages and occasionally places the footer on a page by itself. If one attempts to cut and paste an ASCII text into Word, margins can come out wrong, and ASCII tables containing ++-- strings can become augmented with unprintable characters. Although tools are available to convert ASCII to PDF for printing, these tools raise the question as to why we don't use PDF in the first place.

5. Measures to Determine Experiment Success

Success will be judged as follows:

- a) consensus of the selected WGs as to the effectiveness of progressing documents in PDF and ASCII formats through these working groups.
- b) consensus of the IESG as to the effectiveness of progressing documents in PDF and ASCII formats through the IESG.

- c) consensus of the RFC Editor as to the effectiveness of progressing documents in PDF and ASCII formats through the RFC publication process.
- d) consensus of the IETF as to the effectiveness of progressing documents in PDF and ASCII formats through the entire ID to RFC publication process.

Particular criteria to be applied in judging 'effectiveness' could include, but are not limited to:

- a) clarity of documents, particularly with respect to figures, diagrams, and equations,
- b) ease of drafting, editing, and modifying documents,
- c) ease of reading documents,
- d) ...

6. Security Considerations

No new security considerations.

7. Acknowledgements

The authors sincerely appreciate the guidance and constructive suggestions from Brian Carpenter, Spencer Dawkins, Sam Hartman, and John Klensin.

8. Normative References

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

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3933] Klensin, J., Dawkins, S., " A Model for IETF Process Experiments," RFC 3933, November 2004.

9. Informative References

[U-TURN] Atlas, A., et. al., "U-turn Alternates for IP/LDP Fast-Reroute," work in progress.

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