The Internet Standards Process

Status of this Memo

   This informational memo presents the current procedures for creating
   and documenting Internet Standards. Distribution of this memo is
   unlimited.

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1. INTRODUCTION

   1.1 Internet Standards

      This memo documents the process currently used for the
      standardization of Internet protocols and procedures.

      The Internet, a loosely-organized international collaboration of
      autonomous, interconnected networks, supports host-to-host
      communication through voluntary adherence to open protocols and
      procedures defined by Internet Standards. There are also many
      isolated internets, i.e., sets of interconnected networks, that
      are not connected to the Internet but use the Internet Standards.
      The architecture and technical specifications of the Internet are
      the result of numerous research and development activities
      conducted over a period of two decades, performed by the network
      R&D community, by service and equipment vendors, and by government
      agencies around the world.

      In general, an Internet Standard is a specification that is stable
      and well-understood, is technically competent, has multiple,
      independent, and interoperable implementations with operational
      experience, enjoys significant public support, and is recognizably
      useful in some or all parts of the Internet.

      The principal set of Internet Standards is commonly known as the
      "TCP/IP protocol suite". As the Internet evolves, new protocols
      and services, in particular those for Open Systems Interconnection
      (OSI), have been and will be deployed in traditional TCP/IP
      environments, leading to an Internet that supports multiple
      protocol suites. This document concerns all protocols,
      procedures, and conventions used in the Internet, not just the
      TCP/IP protocols.

      In outline, the process of creating an Internet Standard is
      straightforward: a specification undergoes a period of development
      and several iterations of review by the Internet community and
      perhaps revision based upon experience, is adopted as a Standard
      by the appropriate body (see below), and is published.

      In practice, the process is somewhat more complicated, due to (1)
      the number and type of possible sources for specifications; (2)
      the need to prepare and revise a specification in a manner that
      preserves the interests of all of the affected parties; (3) the
      importance of establishing widespread community agreement on its
      technical content; and (4) the difficulty of evaluating the
      utility of a particular specification for the Internet community.

Some specifications that are candidates for Internet
standardization are the result of organized efforts directly
within the Internet community; others are the result of work that
was not originally organized as an Internet effort, but which was
later adopted by the Internet community.

From its inception, the Internet has been, and is expected to
remain, an evolving system whose participants regularly factor new
requirements and technology into the design and implementation of
the global Internet. Users of the Internet and providers of the
equipment, software, and services that support it should
anticipate and embrace this adaptability as a major tenet of
Internet philosophy.

The procedures described in this document are the result of three
years of evolution, driven both by the needs of the growing and
increasingly diverse Internet community, and by experience.
Comments and suggestions are invited for improvement in these
procedures.

1.2 Organization

The Internet Activities Board (IAB) is the primary coordinating
committee for Internet design, engineering, and management [1].
The IAB has delegated to its Internet Engineering Task Force
(IETF) the primary responsibility for the development and review
of potential Internet Standards from all sources. The IETF forms
Working Groups to pursue specific technical issues, frequently
resulting in the development of one or more specifications that
are proposed for adoption as Internet Standards.

Final decisions on Internet standardization are made by the IAB,
based upon recommendations from the Internet Engineering Steering
Group (IESG), the leadership body of the IETF. IETF Working
Groups are organized into areas, and each area is coordinated by
an Area Director. The Area Directors and the IETF Chairman are
included in the IESG.

Any member of the Internet community with the time and interest is
urged to attend IETF meetings and to participate actively in one
or more IETF Working Groups. Participation is by individual
technical contributors, rather than formal representatives of
organizations. The process works because the IETF Working Groups
display a spirit of cooperation as well as a high degree of
technical maturity; most IETF members agree that the greatest
benefit for all members of the Internet community results from
cooperative development of technically superior protocols and
services.

A second body under the IAB, the Internet Research Task Force
(IRTF), investigates topics considered to be too uncertain, too
advanced, or insufficiently well-understood to be the subject of
Internet standardization. When an IRTF activity generates a
specification that is sufficiently stable to be considered for
Internet standardization, it is processed through the IETF.

Section 2 of this document describes the process and rules for
Internet standardization. Section 3 presents the nomenclature for
different kinds and levels of Internet standard technical
specifications and their applicability. Section 4 defines how
relevant externally-sponsored specifications and practices that
are developed and controlled by other bodies or by vendors are
handled in the Internet standardization process. Section 5
presents the requirement for prior disclosure of the existence of
intellectual property rights. Section 6 describes the rules for
Internet Standards that involve patents.

2. THE INTERNET STANDARDS PROCESS

   2.1. Introduction

      The procedures described in this document are intended to provide
      a clear, open, and objective basis for developing, evaluating, and
      adopting Internet Standards for protocols and services. The
      procedures provide ample opportunity for participation and comment
      by all interested parties. Before an Internet Standard is
      adopted, it is repeatedly discussed (and perhaps debated) in open
      open meetings and/or public electronic mailing lists, and it is
      available for review via world-wide on-line directories.

      These procedures are explicitly aimed at developing and adopting
      generally-accepted practices. Thus, a candidate for Internet
      standardization is implemented and tested for correct operation
      and interoperability by multiple, independent parties, and
      utilized in increasingly demanding environments, before it can be
      adopted as an Internet Standard.

      The procedures that are described here provide a great deal of
      flexibility to adapt to the wide variety of circumstances that
      occur in the Internet standardization process. Experience has
      shown this flexibility to be vital in achieving the following
      goals for Internet standardization:

* high quality,

* prior implementation and testing,

* openness and fairness, and

* timeliness.

2.2. The Internet Standards Track

Specifications that are destined to become Internet Standards
evolve through a set of maturity levels known as the "standards
track". These maturity levels -- "Proposed Standard", "Draft
Standard", and "Standard" -- are defined and discussed below in
Section 3.2.

Even after a specification has been adopted as an Internet
Standard, further evolution often occurs based on experience and
the recognition of new requirements. The nomenclature and
procedures of Internet standardization provide for the replacement
of old Internet Standards with new ones, and the assignment of
descriptive labels to indicate the status of "retired" Internet
Standards. A set of maturity levels is defined in Section 3.3 to
cover these and other "off-track" specifications.

2.3. Requests for Comments (RFCs)

Each distinct version of a specification is published as part of
the "Request for Comments" (RFC) document series.

RFCs form a series of publications of networking technical
documents, begun in 1969 as part of the original DARPA wide-area
networking (ARPANET) project (see Appendix A for glossary of
acronyms). RFCs cover a wide range of topics, from early
discussion of new research concepts to status memos about the
Internet. The IAB views the RFC publication process to be
sufficiently important to warrant including the RFC Editor in the
IAB membership.

The status of specifications on the Internet standards track is
summarized periodically in a summary RFC entitled "IAB Official
Protocol Standards" [2]. This RFC shows the level of maturity and
other helpful information for each Internet protocol or service
specification.

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