

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 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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