                    INTERNET OFFICIAL PROTOCOL STANDARDS

Status of this Memo

   This memo describes the state of standardization of protocols used in
   the Internet as determined by the Internet Architecture Board (IAB).
   This memo is an Internet Standard. Distribution of this memo is
   unlimited.

Table of Contents

Introduction

   A discussion of the standardization process and the RFC document
   series is presented first, followed by an explanation of the terms.
   Sections 6.2 - 6.10 contain the lists of protocols in each stage of
   standardization. Finally are pointers to references and contacts for
   further information.

   This memo is intended to be issued approximately quarterly; please be
   sure the copy you are reading is current. Current copies may be
   obtained from the Network Information Center (INTERNIC) or from the
   Internet Assigned Numbers Authority (IANA) (see the contact
   information at the end of this memo). Do not use this edition after
   16-Jun-97.

   See Section 6.1 for a description of recent changes. In the official
   lists in sections 6.2 - 6.10, an asterisk (*) next to a protocol
   denotes that it is new to this document or has been moved from one
   protocol level to another, or differs from the previous edition of
   this document.

1. The Standardization Process

   The Internet Architecture Board maintains this list of documents that
   define standards for the Internet protocol suite. See RFC-1601 for
   the charter of the IAB and RFC-1160 for an explanation of the role
   and organization of the IAB and its subsidiary groups, the Internet
   Engineering Task Force (IETF) and the Internet Research Task Force
   (IRTF). Each of these groups has a steering group called the IESG
   and IRSG, respectively. The IETF develops these standards with the
   goal of co-ordinating the evolution of the Internet protocols; this
   co-ordination has become quite important as the Internet protocols
   are increasingly in general commercial use. The definitive
   description of the Internet standards process is found in RFC-1602.

   The majority of Internet protocol development and standardization
   activity takes place in the working groups of the IETF.

   Protocols which are to become standards in the Internet go through a
   series of states or maturity levels (proposed standard, draft
   standard, and standard) involving increasing amounts of scrutiny and
   testing. When a protocol completes this process it is assigned a STD
   number (see RFC-1311). At each step, the Internet Engineering
   Steering Group (IESG) of the IETF must make a recommendation for
   advancement of the protocol.

   To allow time for the Internet community to consider and react to
   standardization proposals, a minimum delay of 6 months before a
   proposed standard can be advanced to a draft standard and 4 months
   before a draft standard can be promoted to standard.

   It is general practice that no proposed standard can be promoted to
   draft standard without at least two independent implementations (and
   the recommendation of the IESG). Promotion from draft standard to
   standard generally requires operational experience and demonstrated
   interoperability of two or more implementations (and the
   recommendation of the IESG).

   In cases where there is uncertainty as to the proper decision
   concerning a protocol a special review committee may be appointed
   consisting of experts from the IETF, IRTF and the IAB with the
   purpose of recommending an explicit action.

   Advancement of a protocol to proposed standard is an important step
   since it marks a protocol as a candidate for eventual standardization
   (it puts the protocol "on the standards track"). Advancement to
   draft standard is a major step which warns the community that, unless
   major objections are raised or flaws are discovered, the protocol is
   likely to be advanced to standard in six months.

Some protocols have been superseded by better ones or are otherwise
unused. Such protocols are still documented in this memorandum with
the designation "historic".

Because it is useful to document the results of early protocol
research and development work, some of the RFCs document protocols
which are still in an experimental condition. The protocols are
designated "experimental" in this memorandum. They appear in this
report as a convenience to the community and not as evidence of their
standardization.

Other protocols, such as those developed by other standards
organizations, or by particular vendors, may be of interest or may be
recommended for use in the Internet. The specifications of such
protocols may be published as RFCs for the convenience of the
Internet community. These protocols are labeled "informational" in
this memorandum.

In addition to the working groups of the IETF, protocol development
and experimentation may take place as a result of the work of the
research groups of the Internet Research Task Force, or the work of
other individuals interested in Internet protocol development. The
the documentation of such experimental work in the RFC series is
encouraged, but none of this work is considered to be on the track
for standardization until the IESG has made a recommendation to
advance the protocol to the proposed standard state.

A few protocols have achieved widespread implementation without the
approval of the IESG. For example, some vendor protocols have become
very important to the Internet community even though they have not
been recommended by the IESG. However, the IAB strongly recommends
that the standards process be used in the evolution of the protocol
suite to maximize interoperability (and to prevent incompatible
protocol requirements from arising). The use of the terms
"standard", "draft standard", and "proposed standard" are reserved in
any RFC or other publication of Internet protocols to only those
protocols which the IESG has approved.

In addition to a state (like "Proposed Standard"), a protocol is also
assigned a status, or requirement level, in this document. The
possible requirement levels ("Required", "Recommended", "Elective",
"Limited Use", and "Not Recommended") are defined in Section 4.2.
When a protocol is on the standards track, that is in the proposed
standard, draft standard, or standard state (see Section 5), the
status shown in Section 6 is the current status.

Few protocols are required to be implemented in all systems; this is
because there is such a variety of possible systems, for example,

gateways, routers, terminal servers, workstations, and multi-user
hosts. The requirement level shown in this document is only a one
word label, which may not be sufficient to characterize the
implementation requirements for a protocol in all situations. For
some protocols, this document contains an additional status paragraph
(an applicability statement). In addition, more detailed status
information may be contained in separate requirements documents (see
Section 3).

2. The Request for Comments Documents

The documents called Request for Comments (or RFCs) are the working
notes of the "Network Working Group", that is the Internet research
and development community. A document in this series may be on
essentially any topic related to computer communication, and may be
anything from a meeting report to the specification of a standard.

Notice:

    All standards are published as RFCs, but not all RFCs specify
    standards.

Anyone can submit a document for publication as an RFC. Submissions
must be made via electronic mail to the RFC Editor (see the contact
information at the end of this memo, and see RFC 1543).

While RFCs are not refereed publications, they do receive technical
review from the task forces, individual technical experts, or the RFC
Editor, as appropriate.

The RFC series comprises a wide range of documents, ranging from
informational documents of general interests to specifications of
standard Internet protocols. In cases where submission is intended
to document a proposed standard, draft standard, or standard
protocol, the RFC Editor will publish the document only with the
approval of the IESG. For documents describing experimental work,
the RFC Editor will notify the IESG before publication, allowing for
the possibility of review by the relevant IETF working group or IRTF
research group and provide those comments to the author. See Section
5.1 for more detail.

Once a document is assigned an RFC number and published, that RFC is
never revised or re-issued with the same number. There is never a
question of having the most recent version of a particular RFC.
However, a protocol (such as File Transfer Protocol (FTP)) may be
improved and re-documented many times in several different RFCs. It
is important to verify that you have the most recent RFC on a
particular protocol. This "Internet Official Protocol Standards"

   memo is the reference for determining the correct RFC for the current
   specification of each protocol.

   The RFCs are available from the INTERNIC, and a number of other
   sites. For more information about obtaining RFCs, see Sections 7.4
   and 7.5.

3. Other Reference Documents

   There are three other reference documents of interest in checking the
   current status of protocol specifications and standardization. These
   are the Assigned Numbers, the Gateway Requirements, and the Host
   Requirements. Note that these documents are revised and updated at
   different times; in case of differences between these documents, the
   most recent must prevail.

   Also, one should be aware of the MIL-STD publications on IP, TCP,
   Telnet, FTP, and SMTP. These are described in Section 3.4.

3.1. Assigned Numbers

   The "Assigned Numbers" document lists the assigned values of the
   parameters used in the various protocols. For example, IP protocol
   codes, TCP port numbers, Telnet Option Codes, ARP hardware types, and
   Terminal Type names. Assigned Numbers was most recently issued as
   RFC-1700.

3.2. Requirements for IP Version 4 Routers

   This document reviews the specifications that apply to gateways and
   supplies guidance and clarification for any ambiguities.
   Requirements for IP Version 4 Routers is RFC-1812.

3.3. Host Requirements

   This pair of documents reviews and updates the specifications that
   apply to hosts, and it supplies guidance and clarification for any
   ambiguities. Host Requirements was issued as RFC-1122 and RFC-1123.

3.4. The MIL-STD Documents

   The DoD MIL-STD Internet specifications are out of date and have been
   discontinued. The DoD's Joint Technical Architecture (JTA) lists the
   current set of IETF STDs and RFCs that the DoD intends to use in all
   new and upgraded Command, Control, Communications, Computers, and
   Intelligence (C4I) acquisitions. A copy of the JTA can be obtained
   from http://www-jta.itsi.disa.mil.

4. Explanation of Terms

   There are two independent categorization of protocols. The first is
   the "maturity level" or STATE of standardization, one of "standard",
   "draft standard", "proposed standard", "experimental",
   "informational" or "historic". The second is the "requirement level"
   or STATUS of this protocol, one of "required", "recommended",
   "elective", "limited use", or "not recommended".

   The status or requirement level is difficult to portray in a one word
   label. These status labels should be considered only as an
   indication, and a further description, or applicability statement,
   should be consulted.

   When a protocol is advanced to proposed standard or draft standard,
   it is labeled with a current status.

   At any given time a protocol occupies a cell of the following matrix.
   Protocols are likely to be in cells in about the following
   proportions (indicated by the relative number of Xs). A new protocol
   is most likely to start in the (proposed standard, elective) cell, or
   the (experimental, limited use) cell.

```
                               S T A T U S
                      Req    Rec    Ele    Lim    Not
                   +-----+-----+-----+-----+-----+
           Std     |  X  | XXX | XXX |     |     |
      S            +-----+-----+-----+-----+-----+
           Draft   |  X  |  X  | XXX |     |     |
      T            +-----+-----+-----+-----+-----+
           Prop    |     |  X  | XXX |     |     |
      A            +-----+-----+-----+-----+-----+
           Info    |     |     |     |     |     |
      T            +-----+-----+-----+-----+-----+
           Expr    |     |     |     | XXX |     |
      E            +-----+-----+-----+-----+-----+
           Hist    |     |     |     |     | XXX |
                   +-----+-----+-----+-----+-----+
```

   What is a "system"?

      Some protocols are particular to hosts and some to gateways; a few
      protocols are used in both. The definitions of the terms below
      will refer to a "system" which is either a host or a gateway (or
      both). It should be clear from the context of the particular
      protocol which types of systems are intended.

4.1. Definitions of Protocol State

Every protocol listed in this document is assigned to a "maturity
level" or STATE of standardization: "standard", "draft standard",
"proposed standard", "experimental", or "historic".

4.1.1. Standard Protocol

The IESG has established this as an official standard protocol for
the Internet. These protocols are assigned STD numbers (see RFC-
1311). These are separated into two groups: (1) IP protocol and
above, protocols that apply to the whole Internet; and (2)
network-specific protocols, generally specifications of how to do
IP on particular types of networks.

4.1.2. Draft Standard Protocol

The IESG is actively considering this protocol as a possible
Standard Protocol. Substantial and widespread testing and comment
are desired. Comments and test results should be submitted to the
IESG. There is a possibility that changes will be made in a Draft
Standard Protocol before it becomes a Standard Protocol.

4.1.3. Proposed Standard Protocol

These are protocol proposals that may be considered by the IESG
for standardization in the future. Implementation and testing by
several groups is desirable. Revision of the protocol
specification is likely.

4.1.4. Experimental Protocol

A system should not implement an experimental protocol unless it
is participating in the experiment and has coordinated its use of
the protocol with the developer of the protocol.

Typically, experimental protocols are those that are developed as
part of an ongoing research project not related to an operational
service offering. While they may be proposed as a service
protocol at a later stage, and thus become proposed standard,
draft standard, and then standard protocols, the designation of a
protocol as experimental may sometimes be meant to suggest that
the protocol, although perhaps mature, is not intended for
operational use.

   4.1.5. Informational Protocol

      Protocols developed by other standard organizations, or vendors,
      or that are for other reasons outside the purview of the IESG, may
      be published as RFCs for the convenience of the Internet community
      as informational protocols.

   4.1.6. Historic Protocol

      These are protocols that are unlikely to ever become standards in
      the Internet either because they have been superseded by later
      developments or due to lack of interest.

4.2. Definitions of Protocol Status

      This document lists a "requirement level" or STATUS for each
      protocol. The status is one of "required", "recommended",
      "elective", "limited use", or "not recommended".

   4.2.1. Required Protocol

      A system must implement the required protocols.

   4.2.2. Recommended Protocol

      A system should implement the recommended protocols.

   4.2.3. Elective Protocol

      A system may or may not implement an elective protocol. The
      general notion is that if you are going to do something like this,
      you must do exactly this. There may be several elective protocols
      in a general area, for example, there are several electronic mail
      protocols, and several routing protocols.

   4.2.4. Limited Use Protocol

      These protocols are for use in limited circumstances. This may be
      because of their experimental state, specialized nature, limited
      functionality, or historic state.

   4.2.5. Not Recommended Protocol

      These protocols are not recommended for general use. This may be
      because of their limited functionality, specialized nature, or
      experimental or historic state.

5. The Standards Track

   This section discusses in more detail the procedures used by the RFC
   Editor and the IESG in making decisions about the labeling and
   publishing of protocols as standards.

5.1. The RFC Processing Decision Table

   Here is the current decision table for processing submissions by the
   RFC Editor. The processing depends on who submitted it, and the
   status they want it to have.

```
+================================================================+
|**************|                  S O U R C E                    |
+================================================================+
| Desired      |   IAB    |   IESG   |   IRSG   |   Other   |
| Status       |          |          |          |           |
+================================================================+
|              |          |          |          |           |
| Standard     |  Bogus   | Publish  |  Bogus   |  Bogus    |
| or           |   (2)    |   (1)    |   (2)    |   (2)     |
| Draft        |          |          |          |           |
| Standard     |          |          |          |           |
+--------------+----------+----------+----------+----------+
|              |          |          |          |           |
|              |  Refer   | Publish  |  Refer   |  Refer    |
| Proposed     |   (3)    |   (1)    |   (3)    |   (3)     |
| Standard     |          |          |          |           |
|              |          |          |          |           |
+--------------+----------+----------+----------+----------+
|              |          |          |          |           |
|              |  Notify  | Publish  |  Notify  |  Notify   |
| Experimental |   (4)    |   (1)    |   (4)    |   (4)     |
| Protocol     |          |          |          |           |
|              |          |          |          |           |
+--------------+----------+----------+----------+----------+
|              |          |          |          |           |
| Information  | Publish  | Publish  |Discretion|Discretion|
| or Opinion   |   (1)    |   (1)    |   (5)    |   (5)     |
| Paper        |          |          |          |           |
|              |          |          |          |           |
+================================================================+
```

   (1) Publish.

   (2) Bogus. Inform the source of the rules. RFCs specifying
       Standard, or Draft Standard must come from the IESG, only.

        (3) Refer to an Area Director for review by a WG. Expect to see
            the document again only after approval by the IESG.

        (4) Notify both the IESG and IRSG. If no concerns are raised in
            two weeks then do Discretion (5), else RFC Editor to resolve
            the concerns or do Refer (3).

        (5) RFC Editor's discretion. The RFC Editor decides if a review
            is needed and if so by whom. RFC Editor decides to publish or
            not.

   Of course, in all cases the RFC Editor can request or make minor
   changes for style, format, and presentation purposes.

   The IESG has designated the IESG Secretary as its agent for
   forwarding documents with IESG approval and for registering concerns
   in response to notifications (4) to the RFC Editor. Documents from
   Area Directors or Working Group Chairs may be considered in the same
   way as documents from "other".

5.2. The Standards Track Diagram

   There is a part of the STATUS and STATE categorization that is called
   the standards track. Actually, only the changes of state are
   significant to the progression along the standards track, though the
   status assignments may change as well.

   The states illustrated by single line boxes are temporary states,
   those illustrated by double line boxes are long term states. A
   protocol will normally be expected to remain in a temporary state for
   several months (minimum six months for proposed standard, minimum
   four months for draft standard). A protocol may be in a long term
   state for many years.

   A protocol may enter the standards track only on the recommendation
   of the IESG; and may move from one state to another along the track
   only on the recommendation of the IESG. That is, it takes action by
   the IESG to either start a protocol on the track or to move it along.

   Generally, as the protocol enters the standards track a decision is
   made as to the eventual STATUS, requirement level or applicability
   (elective, recommended, or required) the protocol will have, although
   a somewhat less stringent current status may be assigned, and it then
   is placed in the the proposed standard STATE with that status. So
   the initial placement of a protocol is into state 1. At any time the
   STATUS decision may be revisited.

```
            |
        +<----------------------------------------------+
        |                                               ^
        V    0                                          |    4
    +----------+                             +===========+
    |   enter  |-->---------------+--------------->|experiment |
    +----------+                  |             +=====+=====+
                                  |                   |
                            V    1                    |
                         +----------+                 |
                         | proposed |-------------->+
                     +--->+-----+-----+               |
                     |         |                      |
                     |         V    2                 |
                     +<---+-----+-----+               V
                         | draft std |-------------->+
                     +--->+-----+-----+               |
                     |         |                      |
                     |         V    3                 |
                     +<---+=====+=====+               V
                         | standard  |-------------->+
                         +=====+=====+               |
                                                     |
                                               V    5
                                          +=====+=====+
                                          | historic |
                                          +===========+
```

The transition from proposed standard (1) to draft standard (2) can
only be by action of the IESG and only after the protocol has been
proposed standard (1) for at least six months.

The transition from draft standard (2) to standard (3) can only be by
action of the IESG and only after the protocol has been draft
standard (2) for at least four months.

Occasionally, the decision may be that the protocol is not ready for
standardization and will be assigned to the experimental state (4).
This is off the standards track, and the protocol may be resubmitted
to enter the standards track after further work. There are other
paths into the experimental and historic states that do not involve
IESG action.

Sometimes one protocol is replaced by another and thus becomes
historic, or it may happen that a protocol on the standards track is
in a sense overtaken by another protocol (or other events) and
becomes historic (state 5).

6. The Protocols

    Subsection 6.1 lists recent RFCs and other changes. Subsections 6.2
    - 6.10 list the standards in groups by protocol state.

6.1. Recent Changes

6.1.1. New RFCs:

        2109 - HTTP State Management Mechanism

               A Proposed Standard protocol.

        2108 - Definitions of Managed Objects for IEEE 802.3 Repeater
               Devices using SMIv2

               A Proposed Standard protocol.

        2107 - Ascend Tunnel Management Protocol - ATMP

               This is an information document and does not specify any
               level of standard.

        2106 - Data Link Switching Remote Access Protocol

               This is an information document and does not specify any
               level of standard.

        2105 - Cisco Systems' Tag Switching Architecture Overview

               This is an information document and does not specify any
               level of standard.

        2104 - HMAC: Keyed-Hashing for Message Authentication

               This is an information document and does not specify any
               level of standard.

        2103 - Mobility Support for Nimrod : Challenges and Solution
               Approaches

               This is an information document and does not specify any
               level of standard.

        2102 - Multicast Support for Nimrod : Requirements and Solution
               Approaches

               This is an information document and does not specify any

level of standard.

2101 - IPv4 Address Behaviour Today

This is an information document and does not specify any
level of standard.

2100 - not yet issued.

2099 - not yet issued.

2098 - Toshiba's Router Architecture Extensions for ATM : Overview

This is an information document and does not specify any
level of standard.

2097 - The PPP NetBIOS Frames Control Protocol (NBFCP)

A Proposed Standard protocol.

2096 - IP Forwarding Table MIB

A Proposed Standard protocol.

2095 - IMAP/POP AUTHorize Extension for Simple Challenge/Response

A Proposed Standard protocol.

2094 - not yet issued.

2093 - not yet issued.

2092 - Protocol Analysis for Triggered RIP

This is an information document and does not specify any
level of standard.

2091 - Triggered Extensions to RIP to Support Demand Circuits

A Proposed Standard protocol.

2090 - TFTP Multicast Option

An Experimental protocol.

2089 - V2ToV1 Mapping SNMPv2 onto SNMPv1 within a bi-lingual SNMP
agent

This is an information document and does not specify any
level of standard.

2088 - IMAP4 non-synchronizing literals

A Proposed Standard protocol.

2087 - IMAP4 QUOTA extension

A Proposed Standard protocol.

2086 - IMAP4 ACL extension

A Proposed Standard protocol.

2085 - HMAC-MD5 IP Authentication with Replay Prevention

A Proposed Standard protocol.

2084 - Considerations for Web Transaction Security

This is an information document and does not specify any
level of standard.

2083 - PNG (Portable Network Graphics) Specification Version 1.0

This is an information document and does not specify any
level of standard.

2082 - RIP-2 MD5 Authentication

A Proposed Standard protocol.

2081 - RIPng Protocol Applicability Statement

This is an information document and does not specify any
level of standard.

2080 - RIPng for IPv6

A Proposed Standard protocol.

2079 - Definition of an X.500 Attribute Type and an Object Class
       to Hold Uniform Resource Identifiers (URIs)

A Proposed Standard protocol.

2078 - Generic Security Service Application Program Interface,
       Version 2

       A Proposed Standard protocol.

2077 - The Model Primary Content Type for Multipurpose Internet
       Mail Extension

       A Proposed Standard protocol.

2076 - not yet issued.

2075 - IP Echo Host Service

       An Experimental protocol.

2074 - Remote Network Monitoring MIB Protocol Identifiers

       A Proposed Standard protocol.

2073 - An IPv6 Provider-Based Unicast Address Format

       A Proposed Standard protocol.

2072 - Router Renumbering Guide

       This is an information document and does not specify any
       level of standard.

2071 - Network Renumbering Overview: Why would I want it and what
       is it anyway?

       This is an information document and does not specify any
       level of standard.

2070 - Internationalization of the Hypertext Markup Language

       A Proposed Standard protocol.

2069 - An Extension to HTTP : Digest Access Authentication

       A Proposed Standard protocol.

2068 - Hypertext Transfer Protocol -- HTTP/1.1

       A Proposed Standard protocol.

   2067 - IP over HIPPI

         A Draft Standard protocol.

   2066 - TELNET CHARSET Option

         An Experimental protocol.

   2065 - Domain Name System Security Extensions

         A Proposed Standard protocol.

   2064 - Traffic Flow Measurement: Meter MIB

         An Experimental protocol.

   2063 - Traffic Flow Measurement: Architecture

         An Experimental protocol.

   2062 - Internet Message Access Protocol - Obsolete Syntax

         This is an information document and does not specify any
         level of standard.

   2061 - IMAP4 Compatibility with IMAP2BIS

         This is an information document and does not specify any
         level of standard.

   2060 - Internet Message Access Protocol - Version 4rev1

         A Proposed Standard protocol.

   2059 - RADIUS Accounting

         This is an information document and does not specify any
         level of standard.

   2058 - Remote Authentication Dial In User Service (RADIUS)

         A Proposed Standard protocol.

   2057 - Source Directed Access Control on the Internet

         This is an information document and does not specify any
         level of standard.

2056 - Uniform Resource Locators for Z39.50

     A Proposed Standard protocol.

2055 - WebNFS Server Specification

     This is an information document and does not specify any
     level of standard.

2054 - WebNFS Client Specification

     This is an information document and does not specify any
     level of standard.

2053 - The AM (Armenia) Domain

     This is an information document and does not specify any
     level of standard.

2052 - A DNS RR for specifying the location of services (DNS SRV)

     An Experimental protocol.

2051 - Definitions of Managed Objects for APPC using SMIv2

     A Proposed Standard protocol.

2050 - Internet Registry IP Allocation Guidelines

     This is a Best Current Practices document and does not
     specify any level of standard.

2049 - Multipurpose Internet Mail Extensions (MIME) Part Five:
       Conformance Criteria and Examples

     A Draft Standard protocol.

2048 - Multipurpose Internet Mail Extensions (MIME) Part Four:
       Registration Procedures

     This is a Best Current Practices document and does not
     specify any level of standard.

2047 - MIME (Multipurpose Internet Mail Extensions) Part Three:
       Message Header Extensions for Non-ASCII Text

     A Draft Standard protocol.

2046 - Multipurpose Internet Mail Extensions (MIME) Part Two:
       Media Types

       A Draft Standard protocol.

2045 - Multipurpose Internet Mail Extensions (MIME) Part One:
       Format of Internet Message Bodies

       A Draft Standard protocol.

2044 - UTF-8, a transformation format of Unicode and ISO 10646

       This is an information document and does not specify any
       level of standard.

2043 - The PPP SNA Control Protocol (SNACP)

       A Proposed Standard protocol.

2042 - Registering New BGP Attribute Types

       This is an information document and does not specify any
       level of standard.

2041 - Mobile Network Tracing

       This is an information document and does not specify any
       level of standard.

2040 - The RC5, RC5-CBC, RC5-CBC-Pad, and RC5-CTS Algorithms

       This is an information document and does not specify any
       level of standard.

2039 - Applicablity of Standards Track MIBs to Management of World
       Wide Web Servers

       This is an information document and does not specify any
       level of standard.

2038 - RTP Payload Format for MPEG1/MPEG2 Video

       A Proposed Standard protocol.

2037 - Entity MIB using SMIv2

       A Proposed Standard protocol.

     2036 - Observations on the use of Components of the Class A
            Address Space within the Internet

            This is an information document and does not specify any
            level of standard.

     2035 - RTP Payload Format for JPEG-compressed Video

            A Proposed Standard protocol.

     2034 - SMTP Service Extension for Returning Enhanced Error Codes

            A Proposed Standard protocol.

     2033 - Local Mail Transfer Protocol

            This is an information document and does not specify any
            level of standard.

     2032 - RTP Payload Format for H.261 Video Streams

            A Proposed Standard protocol.

     2031 - IETF-ISOC relationship

            This is an information document and does not specify any
            level of standard.

     2030 - Simple Network Time Protocol (SNTP) Version 4 for IPv4,
            IPv6 and OSI

            This is an information document and does not specify any
            level of standard.

     2029 - RTP Payload Format of Sun's CellB Video Encoding

            A Proposed Standard protocol.

     2028 - The Organizations Involved in the IETF Standards Process

            This is a Best Current Practices document and does not
            specify any level of standard.

     2027 - IAB and IESG Selection, Confirmation, and Recall Process:
            Operation of the Nominating and Recall Committees

            This is a Best Current Practices document and does not
            specify any level of standard.

     2026 - The Internet Standards Process -- Revision 3

          This is a Best Current Practices document and does not
          specify any level of standard.

     2025 - The Simple Public-Key GSS-API Mechanism (SPKM)

          A Proposed Standard protocol.

     2024 - Definitions of Managed Objects for Data Link Switching
            using SMIv2

          A Proposed Standard protocol.

     2023 - IP Version 6 over PPP

          A Proposed Standard protocol.

     2022 - Support for Multicast over UNI 3.0/3.1 based ATM Networks

          A Proposed Standard protocol.

     2021 - Remote Network Monitoring Management Information Base
            Version 2 using SMIv2

          A Proposed Standard protocol.

     2020 - IEEE 802.12 Interface MIB

          A Proposed Standard protocol.

     2019 - Transmission of IPv6 Packets Over FDDI

          A Proposed Standard protocol.

     2018 - TCP Selective Acknowledgement Options

          A Proposed Standard protocol.

     2017 - Definition of the URL MIME External-Body Access-Type

          A Proposed Standard protocol.

     2016 - Uniform Resource Agents (URAs)

          An Experimental protocol.

2015 - MIME Security with Pretty Good Privacy (PGP)

         A Proposed Standard protocol.

2014 - IRTF Research Group Guidelines and Procedures

         This is a Best Current Practices document and does not
         specify any level of standard.

2013 - SNMPv2 Management Information Base for the User Datagram
       Protocol using SMIv2

         A Proposed Standard protocol.

2012 - SNMPv2 Management Information Base for the Transmission
       Control Protocol using SMIv2

         A Proposed Standard protocol.

2011 - SNMPv2 Management Information Base for the Internet
       Protocol using SMIv2

         A Proposed Standard protocol.

2010 - Operational Criteria for Root Name Servers

         This is an information document and does not specify any
         level of standard.

2009 - GPS-Based Addressing and Routing

         An Experimental protocol.

2008 - Implications of Various Address Allocation Policies for
       Internet Routing

         This is a Best Current Practices document and does not
         specify any level of standard.

2007 - Catalogue of Network Training Materials

         This is an information document and does not specify any
         level of standard.

2006 - The Definitions of Managed Objects for IP Mobility Support
       using SMIv2

         A Proposed Standard protocol.

2005 - Applicability Statement for IP Mobility Support

        A Proposed Standard protocol.

2004 - Minimal Encapsulation within IP

        A Proposed Standard protocol.

2003 - IP Encapsulation within IP

        A Proposed Standard protocol.

2002 - IP Mobility Support

        A Proposed Standard protocol.

2001 - TCP Slow Start, Congestion Avoidance, Fast Retransmit, and
        Fast Recovery Algorithms

        A Proposed Standard protocol.

2000 - Internet Official Protocol Standards

        This memo.

1999 - Request for Comments Summary RFC Numbers 1900-1999

        This is an information document and does not specify any
        level of standard.

1998 - An Application of the BGP Community Attribute in Multi-home
        Routing

        This is an information document and does not specify any
        level of standard.

1997 - BGP Communities Attribute

        A Proposed Standard protocol.

1996 - A Mechanism for Prompt Notification of Zone Changes (DNS
        NOTIFY)

        A Proposed Standard protocol.

1995 - Incremental Zone Transfer in DNS

        A Proposed Standard protocol.

1994 - PPP Challenge Handshake Authentication Protocol (CHAP)

        A Draft Standard protocol.

1993 - PPP Gandalf FZA Compression Protocol

        This is an information document and does not specify any
        level of standard.

1992 - The Nimrod Routing Architecture

        This is an information document and does not specify any
        level of standard.

1991 - PGP Message Exchange Formats

        This is an information document and does not specify any
        level of standard.

1990 - The PPP Multilink Protocol (MP)

        A Draft Standard protocol.

1989 - PPP Link Quality Monitoring

        A Draft Standard protocol.

1988 - Conditional Grant of Rights to Specific Hewlett-Packard
        Patents In Conjunction With the Internet Engineering Task
        Force's Internet-Standard Network Management Framework

        This is an information document and does not specify any
        level of standard.

1987 - Ipsilon's General Switch Management Protocol Specification
        Version 1.1

        This is an information document and does not specify any
        level of standard.

1986 - Experiments with a Simple File Transfer Protocol for Radio
        Links using Enhanced Trivial File Transfer Protocol (ETFTP)

        An Experimental protocol.

1985 - SMTP Service Extension for Remote Message Queue Starting

        A Proposed Standard protocol.

1984 - IAB and IESG Statement on Cryptographic Technology and the
       Internet

       This is an information document and does not specify any
       level of standard.

1983 - Internet Users' Glossary

       This is an information document and does not specify any
       level of standard.

1982 - Serial Number Arithmetic

       A Proposed Standard protocol.

1981 - Path MTU Discovery for IP version 6

       A Proposed Standard protocol.

1980 - A Proposed Extension to HTML : Client-Side Image Maps

       This is an information document and does not specify any
       level of standard.

1979 - PPP Deflate Protocol

       This is an information document and does not specify any
       level of standard.

1978 - PPP Predictor Compression Protocol

       This is an information document and does not specify any
       level of standard.

1977 - PPP BSD Compression Protocol

       This is an information document and does not specify any
       level of standard.

1976 - PPP for Data Compression in Data Circuit-Terminating
       Equipment (DCE)

       This is an information document and does not specify any
       level of standard.

1975 - PPP Magnalink Variable Resource Compression

       This is an information document and does not specify any

level of standard.

1974 - PPP Stac LZS Compression Protocol

This is an information document and does not specify any
level of standard.

1973 - PPP in Frame Relay

A Proposed Standard protocol.

1972 - A Method for the Transmission of IPv6 Packets over Ethernet
Networks

A Proposed Standard protocol.

1971 - IPv6 Stateless Address Autoconfiguration

A Proposed Standard protocol.

1970 - Neighbor Discovery for IP Version 6 (IPv6)

A Proposed Standard protocol.

1969 - The PPP DES Encryption Protocol (DESE)

This is an information document and does not specify any
level of standard.

1968 - The PPP Encryption Control Protocol (ECP)

A Proposed Standard protocol.

1967 - PPP LZS-DCP Compression Protocol (LZS-DCP)

This is an information document and does not specify any
level of standard.

1966 - BGP Route Reflection An alternative to full mesh IBGP

An Experimental protocol.

1965 - Autonomous System Confederations for BGP

An Experimental protocol.

1964 - The Kerberos Version 5 GSS-API Mechanism

       A Proposed Standard protocol.

1963 - PPP Serial Data Transport Protocol (SDTP)

       This is an information document and does not specify any
       level of standard.

1962 - The PPP Compression Control Protocol (CCP)

       A Proposed Standard protocol.

1961 - GSS-API Authentication Method for SOCKS Version 5

       A Proposed Standard protocol.

1960 - A String Representation of LDAP Search Filters

       A Proposed Standard protocol.

1959 - An LDAP URL Format

       A Proposed Standard protocol.

1958 - Architectural Principles of the Internet

       This is an information document and does not specify any
       level of standard.

1957 - Some Observations on Implementations of the Post Office
       Protocol (POP3)

       This is an information document and does not specify any
       level of standard.

1956 - Registration in the MIL Domain

       This is an information document and does not specify any
       level of standard.

1955 - New Scheme for Internet Routing and Addressing (ENCAPS) for
       IPNG

       This is an information document and does not specify any
       level of standard.

     1954 - Transmission of Flow Labelled IPv4 on ATM Data Links
            Ipsilon Version 1.0

            This is an information document and does not specify any
            level of standard.

     1953 - Ipsilon Flow Management Protocol Specification for IPv4
            Version 1.0

            This is an information document and does not specify any
            level of standard.

     1952 - GZIP file format specification version 4.3

            This is an information document and does not specify any
            level of standard.

     1951 - DEFLATE Compressed Data Format Specification version 1.3

            This is an information document and does not specify any
            level of standard.

     1950 - ZLIB Compressed Data Format Specification version 3.3

            This is an information document and does not specify any
            level of standard.

     1949 - Scalable Multicast Key Distribution

            An Experimental protocol.

     1948 - Defending Against Sequence Number Attacks

            This is an information document and does not specify any
            level of standard.

     1947 - Greek Character Encoding for Electronic Mail Messages

            This is an information document and does not specify any
            level of standard.

     1946 - Native ATM Support for ST2+

            This is an information document and does not specify any
            level of standard.

1945 - Hypertext Transfer Protocol -- HTTP/1.0

        This is an information document and does not specify any
        level of standard.

1944 - Benchmarking Methodology for Network Interconnect Devices

        This is an information document and does not specify any
        level of standard.

1943 - Building an X.500 Directory Service in the US

        This is an information document and does not specify any
        level of standard.

1942 - HTML Tables

        An Experimental protocol.

1941 - Frequently Asked Questions for Schools

        This is an information document and does not specify any
        level of standard.

1940 - Source Demand Routing: Packet Format and Forwarding
        Specification

        This is an information document and does not specify any
        level of standard.

1939 - Post Office Protocol - Version 3

        A Standard protocol.

1938 - A One-Time Password System

        A Proposed Standard protocol.

1937 - "Local/Remote" Forwarding Decision in Switched Data Link
        Subnetworks

        This is an information document and does not specify any
        level of standard.

1936 - Implementing the Internet Checksum in Hardware

        This is an information document and does not specify any
        level of standard.

1935 - What is the Internet, Anyway?

        This is an information document and does not specify any
        level of standard.

1934 - Ascend's Multilink Protocol Plus (MP+)

        This is an information document and does not specify any
        level of standard.

1933 - Transition Mechanisms for IPv6 Hosts and Routers

        A Proposed Standard protocol.

1932 - IP over ATM: A Framework Document

        This is an information document and does not specify any
        level of standard.

1931 - Dynamic RARP Extensions for Automatic Network Address
        Acquisition

        This is an information document and does not specify any
        level of standard.

1930 - Guidelines for creation, selection, and registration of an
        Autonomous System (AS)

        This is a Best Current Practices document and does not
        specify any level of standard.

1929 - Username/Password Authentication for SOCKS V5

        A Proposed Standard protocol.

1928 - SOCKS Protocol Version 5

        A Proposed Standard protocol.

1927 - Suggested Additional MIME Types for Associating Documents

        This is an information document and does not specify any
        level of standard.

1926 - An Experimental Encapsulation of IP Datagrams on Top of ATM

        This is an information document and does not specify any
        level of standard.

     1925 - The Twelve Networking Truths

          This is an information document and does not specify any
          level of standard.

     1924 - A Compact Representation of IPv6 Addresses

          This is an information document and does not specify any
          level of standard.

     1923 - RIPv1 Applicability Statement for Historic Status

          This is an information document and does not specify any
          level of standard.

     1922 - Chinese Character Encoding for Internet Messages

          This is an information document and does not specify any
          level of standard.

     1921 - TNVIP Protocol

          This is an information document and does not specify any
          level of standard.

     1919 - Classical versus Transparent IP Proxies

          This is an information document and does not specify any
          level of standard.

     1899 - Request for Comments Summary RFC Numbers 1800-1899

          This is an information document and does not specify any
          level of standard.

     1799 - Request for Comments Summary RFC Numbers 1700-1799

          This is an information document and does not specify any
          level of standard.

     1699 - Request for Comments Summary RFC Numbers 1600-1699

          This is an information document and does not specify any
          level of standard.

     1599 - Request for Comments Summary RFC Numbers 1500-1599

          This is an information document and does not specify any

                 level of standard.

        1499 - Request for Comments Summary RFC Numbers 1400-1499

                 This is an information document and does not specify any
                 level of standard.

        1399 - Request for Comments Summary RFC Numbers 1300-1399

                 This is an information document and does not specify any
                 level of standard.

        1299 - Request for Comments Summary RFC Numbers 1200-1299

                 This is an information document and does not specify any
                 level of standard.

6.1.2. Other Changes:

   The following are changes to protocols listed in the previous
   edition.

        2067 - IP over HIPPI

                 Elevated to Draft Standard.

        2049 - Multipurpose Internet Mail Extensions (MIME) Part Five:
                 Conformance Criteria and Examples

                 Elevated to Draft Standard.

        2047 - MIME (Multipurpose Internet Mail Extensions) Part Three:
                 Message Header Extensions for Non-ASCII Text

                 Elevated to Draft Standard.

        2046 - Multipurpose Internet Mail Extensions (MIME) Part Two:
                 Media Types

                 Elevated to Draft Standard.

        2045 - Multipurpose Internet Mail Extensions (MIME) Part One:
                 Format of Internet Message Bodies

                 Elevated to Draft Standard.

     1994 - PPP Challenge Handshake Authentication Protocol (CHAP)

            Elevated to Draft Standard.

     1990 - The PPP Multilink Protocol (MP)

            Elevated to Draft Standard.

     1989 - PPP Link Quality Monitoring

            Elevated to Draft Standard.

     1939 - Post Office Protocol - Version 3

            Elevated to Standard.

     1108 - U.S. Department of Defense Security Options for the
            Internet Protocol

            Moved to Historic.

6.2. Standard Protocols

```
Protocol   Name                                   Status      RFC STD *
========   ====================================   ======== ==== === =
--------   Internet Official Protocol Standards    Req       2000   1
--------   Assigned Numbers                        Req       1700   2
--------   Host Requirements - Communications      Req       1122   3
--------   Host Requirements - Applications        Req       1123   3
IP         Internet Protocol                       Req        791   5
            as amended by:--------
--------     IP Subnet Extension                   Req        950   5
--------     IP Broadcast Datagrams                Req        919   5
--------     IP Broadcast Datagrams with Subnets   Req        922   5
ICMP       Internet Control Message Protocol       Req        792   5
IGMP       Internet Group Multicast Protocol       Rec       1112   5
UDP        User Datagram Protocol                  Rec        768   6
TCP        Transmission Control Protocol           Rec        793   7
TELNET     Telnet Protocol                         Rec    854,855   8
FTP        File Transfer Protocol                  Rec        959   9
SMTP       Simple Mail Transfer Protocol           Rec        821  10
SMTP-SIZE  SMTP Service Ext for Message Size       Rec       1870  10
SMTP-EXT   SMTP Service Extensions                 Rec       1869  10
MAIL       Format of Electronic Mail Messages      Rec        822  11
CONTENT    Content Type Header Field               Rec       1049  11
NTPV2      Network Time Protocol (Version 2)       Rec       1119  12
DOMAIN     Domain Name System                      Rec 1034,1035  13
DNS-MX     Mail Routing and the Domain System      Rec        974  14
SNMP       Simple Network Management Protocol      Rec       1157  15
SMI        Structure of Management Information     Rec       1155  16
Concise-MIB Concise MIB Definitions                Rec       1212  16
MIB-II     Management Information Base-II           Rec       1213  17
NETBIOS    NetBIOS Service Protocols               Ele 1001,1002  19
ECHO       Echo Protocol                           Rec        862  20
DISCARD    Discard Protocol                        Ele        863  21
CHARGEN    Character Generator Protocol            Ele        864  22
QUOTE      Quote of the Day Protocol               Ele        865  23
USERS      Active Users Protocol                   Ele        866  24
DAYTIME    Daytime Protocol                        Ele        867  25
TIME       Time Server Protocol                    Ele        868  26
TFTP       Trivial File Transfer Protocol          Ele       1350  33
TP-TCP     ISO Transport Service on top of the TCP Ele       1006  35
ETHER-MIB  Ethernet MIB                            Ele       1643  50
PPP        Point-to-Point Protocol (PPP)           Ele       1661  51
PPP-HDLC   PPP in HDLC Framing                     Ele       1662  51
IP-SMDS    IP Datagrams over the SMDS Service      Ele       1209  52
POP3       Post Office Protocol, Version 3         Ele       1939  53 *
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

Applicability Statements:

   IGMP -- The Internet Architecture Board intends to move towards
   general adoption of IP multicasting, as a more efficient solution
   than broadcasting for many applications. The host interface has been
   standardized in RFC-1112; however, multicast-routing gateways are in
   the experimental stage and are not widely available. An Internet
   host should support all of RFC-1112, except for the IGMP protocol
   itself which is optional; see RFC-1122 for more details. Even
   without IGMP, implementation of RFC-1112 will provide an important
   advance: IP-layer access to local network multicast addressing. It
   is expected that IGMP will become recommended for all hosts and
   gateways at some future date.

   SMI, MIB-II SNMP -- The Internet Architecture Board recommends that
   all IP and TCP implementations be network manageable. At the current
   time, this implies implementation of the Internet MIB-II (RFC-1213),
   and at least the recommended management protocol SNMP (RFC-1157).

   RIP -- The Routing Information Protocol (RIP) is widely implemented
   and used in the Internet. However, both implementors and users
   should be aware that RIP has some serious technical limitations as a
   routing protocol. The IETF is currently devpeloping several
   candidates for a new standard "open" routing protocol with better
   properties than RIP. The IAB urges the Internet community to track
   these developments, and to implement the new protocol when it is
   standardized; improved Internet service will result for many users.

   TP-TCP -- As OSI protocols become more widely implemented and used,
   there will be an increasing need to support interoperation with the
   TCP/IP protocols. The Internet Engineering Task Force is formulating
   strategies for interoperation. RFC-1006 provides one interoperation
   mode, in which TCP/IP is used to emulate TP0 in order to support OSI
   applications. Hosts that wish to run OSI connection-oriented
   applications in this mode should use the procedure described in RFC-
   1006. In the future, the IAB expects that a major portion of the
   Internet will support both TCP/IP and OSI (inter-)network protocols
   in parallel, and it will then be possible to run OSI applications
   across the Internet using full OSI protocol "stacks".

6.3. Network-Specific Standard Protocols

All Network-Specific Standards have Elective status.

```
Protocol   Name                                 State   RFC   STD *
========   ===================================  =====   =====  === =
IP-ATM     Classical IP and ARP over ATM        Prop    1577
IP-FR      Multiprotocol over Frame Relay       Draft   1490
ATM-ENCAP  Multiprotocol Encapsulation over ATM Prop    1483
IP-TR-MC   IP Multicast over Token-Ring LANs    Prop    1469
IP-FDDI    Transmission of IP and ARP over FDDI Net Std  1390    36
IP-X.25    X.25 and ISDN in the Packet Mode     Draft   1356
IP-FDDI    Internet Protocol on FDDI Networks   Draft   1188
ARP        Address Resolution Protocol          Std      826    37
RARP       A Reverse Address Resolution Protocol Std     903    38
IP-ARPA    Internet Protocol on ARPANET         Std BBN1822     39
IP-WB      Internet Protocol on Wideband Network Std     907    40
IP-E       Internet Protocol on Ethernet Networks Std    894    41
IP-EE      Internet Protocol on Exp. Ethernet Nets Std   895    42
IP-IEEE    Internet Protocol on IEEE 802        Std     1042    43
IP-DC      Internet Protocol on DC Networks     Std      891    44
IP-HC      Internet Protocol on Hyperchannel    Std     1044    45
IP-ARC     Transmitting IP Traffic over ARCNET Nets Std 1201    46
IP-SLIP    Transmission of IP over Serial Lines Std     1055    47
IP-NETBIOS Transmission of IP over NETBIOS      Std     1088    48
IP-IPX     Transmission of 802.2 over IPX Networks Std  1132    49
IP-HIPPI   IP over HIPPI                        Draft   2067        *
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

Applicability Statements:

   It is expected that a system will support one or more physical
   networks and for each physical network supported the appropriate
   protocols from the above list must be supported. That is, it is
   elective to support any particular type of physical network, and for
   the physical networks actually supported it is required that they be
   supported exactly according to the protocols in the above list. See
   also the Host and Gateway Requirements RFCs for more specific
   information on network-specific ("link layer") protocols.

6.4. Draft Standard Protocols

```
Protocol   Name                                   Status          RFC
========   ===================================    ==============  =====
MIME-CONF  MIME Conformance Criteria              Elective        2049*
MIME-MSG   MIME Msg Header Ext for Non-ASCII      Elective        2047*
MIME-MEDIA MIME Media Types                       Elective        2046*
MIME       Multipurpose Internet Mail Extensions  Elective        2045*
PPP-CHAP   PPP Challenge Handshake Authentication Elective        1994*
PPP-MP     PPP Multilink Protocol                 Elective        1990*
PPP-LINK   PPP Link Quality Monitoring            Elective        1989*
COEX-MIB   Coexistence between SNMPV1 & SNMPV2    Elective        1908
SNMPv2-MIB MIB for SNMPv2                         Elective        1907
TRANS-MIB  Transport Mappings for SNMPv2          Elective        1906
OPS-MIB    Protocol Operations for SNMPv2         Elective        1905
CONF-MIB   Conformance Statements for SNMPv2      Elective        1904
CONV-MIB   Textual Conventions for SNMPv2         Elective        1903
SMIV2      SMI for SNMPv2                         Elective        1902
CON-MD5    Content-MD5 Header Field               Elective        1864
OSPF-MIB   OSPF Version 2 MIB                     Elective        1850
STR-REP    String Representation ...              Elective        1779
X.500syn   X.500 String Representation ...        Elective        1778
X.500lite  X.500 Lightweight ...                  Elective        1777
BGP-4-APP  Application of BGP-4                   Elective        1772
BGP-4      Border Gateway Protocol 4             Elective        1771
PPP-DNCP   PPP DECnet Phase IV Control Protocol   Elective        1762
RMON-MIB   Remote Network Monitoring MIB          Elective        1757
802.5-MIB  IEEE 802.5 Token Ring MIB             Elective        1748
BGP-4-MIB  BGP-4 MIB                             Elective        1657
RIP2-MIB   RIP Version 2 MIB Extension            Elective        1724
RIP2       RIP Version 2-Carrying Additional Info. Elective       1723
RIP2-APP   RIP Version 2 Protocol App. Statement  Elective        1722
SIP-MIB    SIP Interface Type MIB                 Elective        1694
-------    Def Man Objs Parallel-printer-like     Elective        1660
-------    Def Man Objs RS-232-like               Elective        1659
-------    Def Man Objs Character Stream          Elective        1658
SMTP-8BIT  SMTP Service Ext or 8bit-MIMEtransport Elective        1652
OSI-NSAP   Guidelines for OSI NSAP Allocation     Elective        1629
OSPF2      Open Shortest Path First Routing V2    Elective        1583
ISO-TS-ECHO Echo for ISO-8473                     Elective        1575
DECNET-MIB DECNET MIB                             Elective        1559
802.3-MIB  IEEE 802.3 Repeater MIB               Elective        1516
BRIDGE-MIB BRIDGE-MIB                             Elective        1493
NTPV3      Network Time Protocol (Version 3)      Elective        1305
IP-MTU     Path MTU Discovery                     Elective        1191
FINGER     Finger Protocol                        Elective        1288
BOOTP      Bootstrap Protocol                     Recommended 951,1533
NICNAME    WhoIs Protocol                         Elective         954
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

Applicability Statements:

   PPP -- Point to Point Protocol is a method of sending IP over serial
   lines, which are a type of physical network. It is anticipated that
   PPP will be advanced to the network-specifics standard protocol state
   in the future.

6.5. Proposed Standard Protocols

```
Protocol    Name                                  Status         RFC
========    ===================================   ============== =====
HTTP-STATE  HTTP State Management Mechanism       Elective       2109*
802.3-MIB   802.3 Repeater MIB using SMIv2        Elective       2108*
PPP-NBFCP   PPP NetBIOS Frames Control Protocol   Elective       2097*
TABLE-MIB   IP Forwarding Table MIB               Elective       2096*
IMAPPOPAU   IMAP/POP AUTHorize Extension          Elective       2095*
RIP-TRIG    Trigger RIP                           Elective       2091*
IMAP4-LIT   IMAP4 non-synchronizing literals      Elective       2088*
IMAP4-QUO   IMAP4 QUOTA extension                 Elective       2087*
IMAP4-ACL   IMAP4 ACL Extension                   Elective       2086*
HMAC-MD5    HMAC-MD5 IP Auth. with Replay Prevention Elective     2085*
RIP2-MD5    RIP-2 MD5 Authentication              Elective       2082*
RIPNG-IPV6  RIPng for IPv6                        Elective       2080*
URI-ATT     URI Attribute Type and Object Class   Elective       2079*
GSSAP       Generic Security Service Application  Elective       2078*
MIME-MODEL  Model Primary MIME Types              Elective       2077*
RMON-MIB    Remote Network Monitoring MIB         Elective       2074*
IPV6-UNI    IPv6 Provider-Based Unicast Address   Elective       2073*
HTML-INT    HTML Internationalization             Elective       2070*
DAA         Digest Access Authentication          Elective       2069*
HTTP-1.1    Hypertext Transfer Protocol -- HTTP/1.1 Elective      2068*
DNS-SEC     Domain Name System Security Extensions Elective      2065*
IMAPV4      Internet Message Access Protocol v4rev1 Elective      2060*
RADIUS      Remote Authentication Dial In User Serv Elective      2058*
URLZ39.50   Uniform Resource Locators for Z39.50  Elective       2056*
SNANAU-APP  SNANAU APPC MIB using SMIv2           Elective       2051*
PPP-SNACP   PPP SNA Control Protocol              Elective       2043*
RTP-MPEG    RTP Payload Format for MPEG1/MPEG2    Elective       2038*
ENTITY-MIB  Entity MIB using SMIv2                Elective       2037*
RTP-JPEG    RTP Payload Format for JPEG-compressed Elective      2035*
SMTP-ENH    SMTP Enhanced Error Codes             Elective       2034*
RTP-H.261   RTP Payload Format for H.261          Elective       2032*
RTP-CELLB   RTP Payload Format of Sun's CellB     Elective       2029*
SPKM        Simple Public-Key GSS-API Mechanism   Elective       2025*
DLSW-MIB    DLSw MIB using SMIv2                  Elective       2024*
```

```
IPV6-PPP    IP Version 6 over PPP                   Elective      2023*
MULTI-UNI   Multicast over UNI 3.0/3.1 based ATM    Elective      2022*
RMON-MIB    RMON MIB using SMIv2                     Elective      2021*
802.12-MIB  IEEE 802.12 Interface MIB               Elective      2020*
IPV6-FDDI   Transmission of IPv6 Packets Over FDDI   Elective      2019*
TCP-ACK     TCP Selective Acknowledgement Options    Elective      2018*
URL-ACC     URL Access-Type                          Elective      2017*
MIME-PGP    MIME Security with PGP                    Elective      2015*
MIB-UDP     SNMPv2 MIB for UDP                        Elective      2013*
MIB-TCP     SNMPv2 MIB for TCP                        Elective      2012*
MIB-IP      SNMPv2 MIB for IP                         Elective      2011*
MOBILEIPMIBMobile IP MIB Definition using SMIv2      Elective      2006*
MOBILEIPAPPApplicability Statement for IP Mobility   Elective      2005*
MINI-IP     Minimal Encapsulation within IP          Elective      2004*
IPENCAPIP   IP Encapsulation within IP               Elective      2003*
MOBILEIPSUPIP Mobility Support                       Elective      2002*
TCPSLOWSRT  TCP Slow Start, Congestion Avoidance...  Elective      2001*
BGP-COMM    BGP Communities Attribute                Elective      1997*
DNS-NOTIFY  Mech. for Notification of Zone Changes    Elective      1996*
DNS-IZT     Incremental Zone Transfer in DNS          Elective      1995*
SMTP-ETRN   SMTP Service Extension ETRN               Elective      1985*
SNA         Serial Number Arithmetic                  Elective      1982*
MTU-IPV6    Path MTU Discovery for IP version 6       Elective      1981*
PPP-FRAME   PPP in Frame Relay                        Elective      1973*
IPV6-ETHER  Transmission IPv6 Packets Over Ethernet   Elective      1972*
IPV6-AUTO   IPv6 Stateless Address Autoconfiguation   Elective      1971*
IPV6-ND     Neighbor Discovery for IP Version 6       Elective      1970*
PPP-ECP     PPP Encryption Control Protocol           Elective      1968*
GSSAPI-KER  Kerberos Version 5 GSS-API Mechanism      Elective      1964*
PPP-CCP     PPP Compression Control Protocol          Elective      1962*
GSSAPI-SOC  GSS-API Auth for SOCKS Version 5          Elective      1961*
LDAP-STR    String Rep. of LDAP Search Filters        Elective      1960*
LDAP-URL    LDAP URL Format                           Elective      1959*
ONE-PASS    One-Time Password System                  Elective      1938*
TRANS-IPV6  Transition Mechanisms IPv6 Hosts/Routers Elective      1933*
AUTH-SOCKS  Username Authentication for SOCKS V5      Elective      1929*
SOCKSV5     SOCKS Protocol Version 5                  Elective      1928*
WHOIS++M    How to Interact with a Whois++ Mesh       Elective      1914
WHOIS++A    Architecture of Whois++ Index Service     Elective      1913
DSN         Delivery Status Notifications             Elective      1894
EMS-CODE    Enhanced Mail System Status Codes         Elective      1893
MIME-RPT    Multipart/Report                          Elective      1892
SMTP-DSN    SMTP Delivery Status Notifications        Elective      1891
RTP-AV      RTP Audio/Video Profile                   Elective      1890
RTP         Transport Protocol for Real-Time Apps     Elective      1889
DNS-IPV6    DNS Extensions to support IPv6            Elective      1886
ICMPv6      ICMPv6 for IPv6                           Elective      1885
IPV6-Addr   IPv6 Addressing Architecture             Elective      1884
```

```
IPV6        IPv6 Specification                  Elective      1883
HTML        Hypertext Markup Language - 2.0     Elective      1866
SMTP-Pipe   SMTP Serv. Ext. for Command Pipelining  Elective  1854
MIME-Sec    MIME Object Security Services       Elective      1848
MIME-Encyp  MIME: Signed and Encrypted          Elective      1847
WHOIS++     Architecture of the WHOIS++ service Elective      1835
--------    Binding Protocols for ONC RPC Version 2  Elective  1833
XDR         External Data Representation Standard  Elective    1832
RPC         Remote Procedure Call Protocol V. 2  Elective     1831
--------    ESP DES-CBC Transform               Ele/Req       1829
--------    IP Authentication using Keyed MD5   Ele/Req       1828
ESP         IP Encapsulating Security Payload   Ele/Req       1827
IPV6-AH     IP Authentication Header            Ele/Req       1826
--------    Security Architecture for IP        Ele/Req       1825
RREQ        Requirements for IP Version 4 Routers  Elective   1812
URL         Relative Uniform Resource Locators  Elective      1808
CLDAP       Connection-less LDAP                Elective      1798
OSPF-DC     Ext. OSPF to Support Demand Circuits  Elective    1793
TMUX        Transport Multiplexing Protocol     Elective      1692
TFTP-Opt    TFTP Options                        Elective      1784
TFTP-Blk    TFTP Blocksize Option               Elective      1783
TFTP-Ext    TFTP Option Extension               Elective      1782
OSI-Dir     OSI User Friendly Naming ...        Elective      1781
MIME-EDI    MIME Encapsulation of EDI Objects   Elective      1767
Lang-Tag    Tags for Identification of Languages  Elective    1766
XNSCP       PPP XNS IDP Control Protocol        Elective      1764
BVCP        PPP Banyan Vines Control Protocol   Elective      1763
Print-MIB   Printer MIB                         Elective      1759
ATM-SIG     ATM Signaling Support for IP over ATM  Elective   1755
IPNG        Recommendation for IP Next Generation  Elective   1752
802.5-SSR   802.5 SSR MIB using SMIv2           Elective      1749
SDLCSMIv2   SNADLC SDLC MIB using SMIv2         Elective      1747
BGP4/IDRP   BGP4/IDRP for IP/OSPF Interaction   Elective      1745
AT-MIB      Appletalk MIB                       Elective      1742
MacMIME     MIME Encapsulation of Macintosh files  Elective   1740
URL         Uniform Resource Locators           Elective      1738
POP3-AUTH   POP3 AUTHentication command         Elective      1734
IMAP4-AUTH  IMAP4 Authentication Mechanisms     Elective      1731
IMAP4       Internet Message Access Protocol V4  Elective     1730
RDBMS-MIB   RDMS MIB - using SMIv2              Elective      1697
MODEM-MIB   Modem MIB - using SMIv2            Elective      1696
ATM-MIB     ATM Management Version 8.0 using SMIv2  Elective   1695
SNANAU-MIB  SNA NAUs MIB using SMIv2            Elective      1665
PPP-TRANS   PPP Reliable Transmission           Elective      1663
BGP-4-IMP   BGP-4 Roadmap and Implementation    Elective      1656
--------    Postmaster Convention X.400 Operations  Elective   1648
TN3270-En   TN3270 Enhancements                 Elective      1647
PPP-BCP     PPP Bridging Control Protocol       Elective      1638
```

```
UPS-MIB     UPS Management Information Base        Elective        1628
AAL5-MTU    Default IP MTU for use over ATM AAL5   Elective        1626
PPP-SONET   PPP over SONET/SDH                     Elective        1619
PPP-ISDN    PPP over ISDN                          Elective        1618
DNS-R-MIB   DNS Resolver MIB Extensions            Elective        1612
DNS-S-MIB   DNS Server MIB Extensions              Elective        1611
FR-MIB      Frame Relay Service MIB                Elective        1604
PPP-X25     PPP in X.25                            Elective        1598
OSPF-NSSA   The OSPF NSSA Option                   Elective        1587
OSPF-Multi  Multicast Extensions to OSPF           Elective        1584
SONET-MIB   MIB SONET/SDH Interface Type           Elective        1595
RIP-DC      Extensions to RIP to Support Demand Cir. Elective      1582
--------    Evolution of the Interfaces Group of MIB-II Elective   1573
PPP-LCP     PPP LCP Extensions                     Elective        1570
X500-MIB    X.500 Directory Monitoring MIB         Elective        1567
MAIL-MIB    Mail Monitoring MIB                    Elective        1566
NSM-MIB     Network Services Monitoring MIB        Elective        1565
CIPX        Compressing IPX Headers Over WAM Media Elective        1553
IPXCP       PPP Internetworking Packet Exchange Control Elective   1552
DHCP-BOOTP  Interoperation Between DHCP and BOOTP  Elective        1534
DHCP-BOOTP  DHCP Options and BOOTP Vendor Extensions Elective      1533
BOOTP       Clarifications and Extensions BOOTP    Elective        1542
DHCP        Dynamic Host Configuration Protocol    Elective        1541
SRB-MIB     Source Routing Bridge MIB              Elective        1525
CIDR-STRA   CIDR Address Assignment...             Elective        1519
CIDR-ARCH   CIDR Architecture...                   Elective        1518
CIDR-APP    CIDR Applicability Statement           Elective        1517
--------    802.3 MAU MIB                          Elective        1515
HOST-MIB    Host Resources MIB                     Elective        1514
--------    Token Ring Extensions to RMON MIB      Elective        1513
FDDI-MIB    FDDI Management Information Base        Elective        1512
KERBEROS    Kerberos Network Authentication Ser (V5) Elective      1510
GSSAPI      Generic Security Service API: C-bindings Elective      1509
GSSAPI      Generic Security Service Application... Elective       1508
DASS        Distributed Authentication Security... Elective        1507
--------    X.400 Use of Extended Character Sets   Elective        1502
HARPOON     Rules for Downgrading Messages...      Elective        1496
Mapping     MHS/RFC-822 Message Body Mapping       Elective        1495
Equiv       X.400/MIME Body Equivalences           Elective        1494
IDPR        Inter-Domain Policy Routing Protocol   Elective        1479
IDPR-ARCH   Architecture for IDPR                  Elective        1478
PPP/Bridge MIB Bridge PPP MIB                      Elective        1474
PPP/IP MIB  IP Network Control Protocol of PPP MIB Elective        1473
PPP/SEC MIB Security Protocols of PPP MIB          Elective        1472
PPP/LCP MIB Link Control Protocol of PPP MIB       Elective        1471
X25-MIB     Multiprotocol Interconnect on X.25 MIB Elective        1461
SNMPv2      Coexistence between SNMPv1 and SNMPv2  Elective        1452
SNMPv2      Management Information Base for SNMPv2 Elective        1450
```

```
SNMPv2     Transport Mappings for SNMPv2           Elective       1449
SNMPv2     Protocol Operations for SNMPv2          Elective       1448
SNMPv2     Conformance Statements for SNMPv2       Elective       1444
SNMPv2     Textual Conventions for SNMPv2          Elective       1443
SNMPv2     SMI for SNMPv2                          Elective       1442
SNMPv2     Introduction to SNMPv2                  Elective       1441
PEM-KEY    PEM - Key Certification                 Elective       1424
PEM-ALG    PEM - Algorithms, Modes, and Identifiers Elective      1423
PEM-CKM    PEM - Certificate-Based Key Management   Elective      1422
PEM-ENC    PEM - Message Encryption and Auth       Elective       1421
SNMP-IPX   SNMP over IPX                           Elective       1420
SNMP-AT    SNMP over AppleTalk                     Elective       1419
SNMP-OSI   SNMP over OSI                           Elective       1418
FTP-FTAM   FTP-FTAM Gateway Specification          Elective       1415
IDENT-MIB  Identification MIB                      Elective       1414
IDENT      Identification Protocol                 Elective       1413
DS3/E3-MIB DS3/E3 Interface Type                   Elective       1407
DS1/E1-MIB DS1/E1 Interface Type                   Elective       1406
BGP-OSPF   BGP OSPF Interaction                    Elective       1403
--------   Route Advertisement In BGP2 And BGP3    Elective       1397
SNMP-X.25  SNMP MIB Extension for X.25 Packet Layer Elective      1382
SNMP-LAPB  SNMP MIB Extension for X.25 LAPB        Elective       1381
PPP-ATCP   PPP AppleTalk Control Protocol          Elective       1378
PPP-OSINLCP PPP OSI Network Layer Control Protocol  Elective      1377
SNMP-PARTY-MIB Administration of SNMP              Elective       1353
SNMP-SEC   SNMP Security Protocols                 Elective       1352
SNMP-ADMIN SNMP Administrative Model               Elective       1351
TOS        Type of Service in the Internet         Elective       1349
PPP-IPCP   PPP Control Protocol                    Elective       1332
-------    X.400 1988 to 1984 downgrading          Elective       1328
-------    Mapping between X.400(1988)             Elective       1327
TCP-EXT    TCP Extensions for High Performance     Elective       1323
FRAME-MIB  Management Information Base for Frame    Elective       1315
NETFAX     File Format for the Exchange of Images  Elective       1314
IARP       Inverse Address Resolution Protocol     Elective       1293
FDDI-MIB   FDDI-MIB                                Elective       1285
-------    Encoding Network Addresses              Elective       1277
-------    Replication and Distributed Operations  Elective       1276
-------    COSINE and Internet X.500 Schema        Elective       1274
BGP-MIB    Border Gateway Protocol MIB (Version 3) Elective       1269
ICMP-ROUT  ICMP Router Discovery Messages          Elective       1256
OSI-UDP    OSI TS on UDP                           Elective       1240
STD-MIBs   Reassignment of Exp MIBs to Std MIBs    Elective       1239
IPX-IP     Tunneling IPX Traffic through IP Nets   Elective       1234
GINT-MIB   Extensions to the Generic-Interface MIB Elective       1229
IS-IS      OSI IS-IS for TCP/IP Dual Environments  Elective       1195
IP-CMPRS   Compressing TCP/IP Headers              Elective       1144
NNTP       Network News Transfer Protocol          Elective        977
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

[Note: Ele/Req indicates elective for use with IPv4 and required for use
with IPv6.]

Applicability Statements:

   OSPF - RFC 1370 is an applicability statement for OSPF.

6.6. Telnet Options

For convenience, all the Telnet Options are collected here with both
their state and status.

Protocol	Name	Number	State	Status	RFC	STD
========	==================================	=====	=====	======	====	===
TOPT-BIN	Binary Transmission	0	Std	Rec	856	27
TOPT-ECHO	Echo	1	Std	Rec	857	28
TOPT-RECN	Reconnection	2	Prop	Ele	...	
TOPT-SUPP	Suppress Go Ahead	3	Std	Rec	858	29
TOPT-APRX	Approx Message Size Negotiation	4	Prop	Ele	...	
TOPT-STAT	Status	5	Std	Rec	859	30
TOPT-TIM	Timing Mark	6	Std	Rec	860	31
TOPT-REM	Remote Controlled Trans and Echo	7	Prop	Ele	726	
TOPT-OLW	Output Line Width	8	Prop	Ele	...	
TOPT-OPS	Output Page Size	9	Prop	Ele	...	
TOPT-OCRD	Output Carriage-Return Disposition	10	Prop	Ele	652	
TOPT-OHT	Output Horizontal Tabstops	11	Prop	Ele	653	
TOPT-OHTD	Output Horizontal Tab Disposition	12	Prop	Ele	654	
TOPT-OFD	Output Formfeed Disposition	13	Prop	Ele	655	
TOPT-OVT	Output Vertical Tabstops	14	Prop	Ele	656	
TOPT-OVTD	Output Vertical Tab Disposition	15	Prop	Ele	657	
TOPT-OLD	Output Linefeed Disposition	16	Prop	Ele	658	
TOPT-EXT	Extended ASCII	17	Prop	Ele	698	
TOPT-LOGO	Logout	18	Prop	Ele	727	
TOPT-BYTE	Byte Macro	19	Prop	Ele	735	
TOPT-DATA	Data Entry Terminal	20	Prop	Ele	1043	
TOPT-SUP	SUPDUP	21	Prop	Ele	736	
TOPT-SUPO	SUPDUP Output	22	Prop	Ele	749	
TOPT-SNDL	Send Location	23	Prop	Ele	779	
TOPT-TERM	Terminal Type	24	Prop	Ele	1091	
TOPT-EOR	End of Record	25	Prop	Ele	885	
TOPT-TACACS	TACACS User Identification	26	Prop	Ele	927	
TOPT-OM	Output Marking	27	Prop	Ele	933	
TOPT-TLN	Terminal Location Number	28	Prop	Ele	946	
TOPT-3270	Telnet 3270 Regime	29	Prop	Ele	1041	
TOPT-X.3	X.3 PAD	30	Prop	Ele	1053	
TOPT-NAWS	Negotiate About Window Size	31	Prop	Ele	1073	
TOPT-TS	Terminal Speed	32	Prop	Ele	1079	
TOPT-RFC	Remote Flow Control	33	Prop	Ele	1372	
TOPT-LINE	Linemode	34	Draft	Ele	1184	
TOPT-XDL	X Display Location	35	Prop	Ele	1096	
TOPT-ENVIR	Telnet Environment Option	36	Hist	Not	1408	
TOPT-AUTH	Telnet Authentication Option	37	Exp	Ele	1416	
TOPT-ENVIR	Telnet Environment Option	39	Prop	Ele	1572	
TOPT-TN3270E	TN3270 Enhancements	40	Prop	Ele	1647*	
TOPT-AUTH	Telnet XAUTH	41	Exp		*	

```
TOPT-CHARSET Telnet CHARSET                      42  Exp          2066*
TOPT-EXTOP Extended-Options-List                255  Std   Rec    861  32
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

6.7. Experimental Protocols

All Experimental protocols have the Limited Use status.


```
Protocol   Name                                               RFC
========   ====================================               =====
TFTP-MULTI TFTP Multicast Option                              2090*
IP-Echo    IP Echo Host Service                               2075*
METER-MIB  Traffic Flow Measurement Meter MIB                 2064*
TFM-ARCH   Traffic Flow Measurement Architecture              2063*
DNS-SRV    Location of Services in the DNS                    2052*
URAS       Uniform Resource Agents                            2016*
GPS-AR     GPS-Based Addressing and Routing                   2009*
ETFTP      Enhanced Trivial File Transfer Protocol            1986*
BGP-RR     BGP Route Reflection                               1966*
BGP-ASC    Autonomous System Confederations for BGP           1965*
SMKD       Scalable Multicast Key Distribution                1949*
HTML-TBL   HTML Tables                                        1942*
MIME-VP    Voice Profile for Internet Mail                    1911
SNMPV2SM   User-based Security Model for SNMPv2               1910
SNMPV2AI   SNMPv2 Administrative Infrastructure               1909
SNMPV2CB   Introduction to Community-based SNMPv2             1901
-------    IPv6 Testing Address Allocation                    1897
DNS-LOC    Location Information in the DNS                     1876
SGML-MT    SGML Media Types                                   1874
CONT-MT    Access Type Content-ID                             1873
RELAT-MT   Multipart/Related                                  1872
UNARP      ARP Extension - UNARP                              1868
-------    Form-based File Upload in HTML                     1867
-------    BGP/IDRP Route Server Alternative                  1863
-------    IP Authentication using Keyed SHA                  1852
ESP3DES    ESP Triple DES Transform                           1851
-------    SMTP 521 Reply Code                                1846
-------    SMTP Serv. Ext. for Checkpoint/Restart             1845
-------    X.500 Mapping X.400 and RFC 822 Addresses          1838
-------    Tables and Subtrees in the X.500 Directory         1837
-------    O/R Address hierarchy in X.500                     1836
-------    SMTP Serv. Ext. Large and Binary MIME Msgs.        1830
ST2        Stream Protocol Version 2                          1819
-------    Content-Disposition Header                         1806
-------    Schema Publishing in X.500 Directory               1804
-------    X.400-MHS use X.500 to support X.400-MHS Routing   1801
```

```
SNMP-BULK   Bulk Table Retrieval with the SNMP               1187
DNS-RR      New DNS RR Definitions                           1183
IMAP2       Interactive Mail Access Protocol                 1176
NTP-OSI     NTP over OSI Remote Operations                   1165
DMF-MAIL    Digest Message Format for Mail                   1153
RDP         Reliable Data Protocol                       908,1151
TCP-ACO     TCP Alternate Checksum Option                    1146
IP-DVMRP    IP Distance Vector Multicast Routing             1075
VMTP        Versatile Message Transaction Protocol           1045
COOKIE-JAR  Authentication Scheme                            1004
NETBLT      Bulk Data Transfer Protocol                       998
IRTP        Internet Reliable Transaction Protocol            938
LDP         Loader Debugger Protocol                          909
RLP         Resource Location Protocol                        887
NVP-II      Network Voice Protocol                       ISI-memo
PVP         Packet Video Protocol                        ISI-memo
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

6.8. Informational Protocols

Information protocols have no status.

```
Protocol    Name                                               RFC
=======     ===================================                =====
ATMP        Ascend Tunnel Management Protocol                  2107*
DLSRAP      Data Link Switching Remote Access Protocol         2106*
PNG         Portable Network Graphics Version 1.0              2083*
RC5         RC5, RC5-CBC, RC5-CBC-Pad, and RC5-CTS Algorithms  2040*
SNTPv4      Simple Network Time Protocol v4 for IPv4, IPv6 and OSI  2030*
PGP-MEF     PGP Message Exchange Formats                       1991*
GSMP        Ipsilon's General Switch Management Protocol       1987*
PPP-DEFL    PPP Deflate Protocol                               1979*
PPP-PRED    PPP Predictor Compression Protocol                 1978*
PPP-BSD     PPP BSD Compression Protocol                       1977*
PPP-DCE     PPP for Data Compression in DCE                    1976*
PPP-MAG     PPP Magnalink Variable Resource Compression        1975*
PPP-STAC    PPP Stac LZS Compression Protocol                  1974*
GZIP        GZIP File Format Specification Version 4.3         1952*
DEFLATE     DEFLATE Compressed Data Format Specification V. 1.3  1951*
ZLIB        ZLIB Compressed Data Format Specification V. 3.3   1950*
HTTP-1.0    Hypertext Transfer Protocol -- HTTP/1.0            1945*
MP+         Ascend's Multilink Protocol Plus (MP+)             1934*
CYBERCASH   CyberCash Credit Card Protocol Version 0.8         1898
--------    text/enriched MIME Content-type                    1896
--------    Application/CALS-1840 Content-type                 1895
--------    PPP IPCP Extensions for Name Server Addresses      1877
SNPP        Simple Network Paging Protocol - Version 2         1861
--------    ISO Transport Class 2 Non-use Explicit Flow Control  1859
            over TCP RFC1006 extension
--------    IP in IP Tunneling                                 1853
--------    PPP Network Control Protocol for LAN Extension     1841
TESS        The Exponential Security System                    1824
NFSV3       NFS Version 3 Protocol Specification               1813
--------    A Format for Bibliographic Records                 1807
SDMD        IPv4 Option for Sender Directed MD Delivery        1770
SNTP        Simple Network Time Protocol                       1769
SNOOP       Snoop Version 2 Packet Capture File Format         1761
BINHEX      MIME Content Type for BinHex Encoded Files         1741
RWHOIS      Referral Whois Protocol                            1714
DNS-NSAP    DNS NSAP Resource Records                          1706
RADIO-PAGE  TPC.INT Subdomain: Radio Paging -- Technical Procedures  1703
GRE-IPv4    Generic Routing Encapsulation over IPv4            1702
GRE         Generic Routing Encapsulatio                       1701
IPXWAN      Novell IPX Over Various WAN Media                  1634
ADSNA-IP    Advanced SNA/IP: A Simple SNA Transport Protocol   1538
AUBR        Appletalk Update-Based Routing Protocol...         1504
```

```
TACACS      Terminal Access Control Protocol                  1492
SUN-NFS     Network File System Protocol                      1094
SUN-RPC     Remote Procedure Call Protocol Version 2          1057
GOPHER      The Internet Gopher Protocol                      1436
-------     Data Link Switching: Switch-to-Switch Protocol    1434
LISTSERV    Listserv Distribute Protocol                      1429
-------     Replication Requirements                          1275
PCMAIL      Pcmail Transport Protocol                         1056
MTP         Multicast Transport Protocol                      1301
BSD Login   BSD Login                                         1282
DIXIE       DIXIE Protocol Specification                      1249
IP-X.121    IP to X.121 Address Mapping for DDN               1236
OSI-HYPER   OSI and LLC1 on HYPERchannel                      1223
HAP2        Host Access Protocol                              1221
SUBNETASGN  On the Assignment of Subnet Numbers               1219
SNMP-TRAPS  Defining Traps for use with SNMP                  1215
DAS         Directory Assistance Service                      1202
MD4         MD4 Message Digest Algorithm                      1186
LPDP        Line Printer Daemon Protocol                      1179
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

6.9. Historic Protocols

All Historic protocols have Not Recommended status.

```
Protocol    Name                                         RFC   STD
========    ===================================          =====  ===
IPSO        DoD Security Options for IP      Elective     1108      *
SNMPv2      Manager-to-Manager MIB           Elective     1451
SNMPv2      Party MIB for SNMPv2             Elective     1447
SNMPv2      Security Protocols for SNMPv2    Elective     1446
SNMPv2      Administrative Model for SNMPv2  Elective     1445
RIP         Routing Information Protocol     Ele          1058   34
--------    Mapping full 822 to Restricted 822            1137
BGP3        Border Gateway Protocol 3 (BGP-3)        1267,1268
--------    Gateway Requirements             Req          1009    4
EGP         Exterior Gateway Protocol        Rec           904   18
SNMP-MUX    SNMP MUX Protocol and MIB                     1227
OIM-MIB-II  OSI Internet Management: MIB-II               1214
IMAP3       Interactive Mail Access Protocol Version 3    1203
SUN-RPC     Remote Procedure Call Protocol Version 1      1050
802.4-MIP   IEEE 802.4 Token Bus MIB                      1230
CMOT        Common Management Information Services        1189
--------    Mail Privacy: Procedures                      1113
--------    Mail Privacy: Key Management                  1114
--------    Mail Privacy: Algorithms                      1115
```

```
NFILE       A File Access Protocol                        1037
HOSTNAME    HOSTNAME Protocol                              953
SFTP        Simple File Transfer Protocol                  913
SUPDUP      SUPDUP Protocol                                734
BGP         Border Gateway Protocol                  1163,1164
MIB-I       MIB-I                                         1156
SGMP        Simple Gateway Monitoring Protocol           1028
HEMS        High Level Entity Management Protocol        1021
STATSRV     Statistics Server                             996
POP2        Post Office Protocol, Version 2               937
RATP        Reliable Asynchronous Transfer Protocol       916
HFEP        Host - Front End Protocol                     929
THINWIRE    Thinwire Protocol                             914
HMP         Host Monitoring Protocol                      869
GGP         Gateway Gateway Protocol                      823
RTELNET     Remote Telnet Service                         818
CLOCK       DCNET Time Server Protocol                    778
MPM         Internet Message Protocol                     759
NETRJS      Remote Job Service                            740
NETED       Network Standard Text Editor                  569
RJE         Remote Job Entry                              407
XNET        Cross Net Debugger                        IEN-158
NAMESERVER Host Name Server Protocol                  IEN-116
MUX         Multiplexing Protocol                      IEN-90
GRAPHICS    Graphics Protocol                       NIC-24308
```

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

6.10. Obsolete Protocols

Some of the protocols listed in this memo are described in RFCs that are
obsoleted by newer RFCs. "Obsolete" or "obsoleted" is not an official
state or status of protocols. This subsection is for information only.

While it may seem to be obviously wrong to have an obsoleted RFC in the
list of standards, there may be cases when an older standard is in the
process of being replaced. This process may take a year or two.

Many obsoleted protocols are of little interest and are dropped from
this memo altogether. Some obsoleted protocols have received enough
recognition that it seems appropriate to list them under their current
status and with the following reference to their current replacement.


```
RFC            RFC    Status      Title                                *
====           ====   =========   ================================== =
1305 obsoletes 1119 Stan/Rec    Network Time Protocol version 2
1533 obsoletes 1497 Draf/Rec    BOOTP Vendor Information Extensions
2045 obsoletes 1522 Draf/Ele    MIME Part Two                        *
2045 obsoletes 1521 Draf/Ele    MIME Part One                        *
1939 obsoletes 1725 Draf/Ele    Post Office Protocol - Version 3    *
1390 obsoletes 1188 Draf/Elec   Transmission of IP and ARP over FDDI
2096 obsoletes 1354 Prop/Ele    IP Forwarding Table MIB              *
2078 obsoletes 1508 Prop/Ele    GSSAP Interface                      *
2067 obsoletes 1374 Prop/Ele    IP and ARP on HIPPI                  *
2060 obsoletes 1730 Prop/Ele    IMAP4rev1                            *
1994 obsoletes 1334 Prop/Ele    PPP Authentication Protocols         *
1990 obsoletes 1717 Prop/Ele    PPP Multilink Protocol (MP)          *
1989 obsoletes 1333 Prop/Ele    PPP Link Quality Monitoring          *
1908 obsoletes 1452 Prop/Elec   Coexistence between SNMPv1 & SNMPv2
1907 obsoletes 1450 Prop/Elec   MIB for SNMPv2
1906 obsoletes 1449 Prop/Elec   Transport Mappings for SNMPv2
1905 obsoletes 1448 Prop/Elec   Protocol Operations for SNMPv2
1904 obsoletes 1444 Prop/Elec   Conformance Statements for SNMPv2
1903 obsoletes 1443 Prop/Elec   Textual Conventions for SNMPv2
1902 obsoletes 1442 Prop/Elec   SMI for SNMPv2
1773 obsoletes 1656 Prop/Elec   BGP-4 Protocol Document
1666 obsoletes 1665 Prop/Ele    SNANAU MIB
1573 obsoletes 1229 Prop/Elec   Ext. to the Generic-Interface MIB
1542 obsoletes 1532 Prop/Elec   Extensions for Bootstrap Protocol
2030 obsoletes 1769 Info/       Simple Network Time Protocol      *
1795 obsoletes 1434 Info/       Data Link Switching               *
1320 obsoletes 1186 Info/       The MD4 Message Digest Algorithm
1592 obsoletes 1228 Expe/Limi   SNMP Distributed Protocol Interface
1528 obsoletes 1486 Expe/Lim    An Experiment in Remote Printing  *
```

Thanks to Lynn Wheeler for compiling the information in this
subsection.

[Note: an asterisk at the end of a line indicates a change from the
previous edition of this document.]

7.   Contacts

7.1.   IAB, IETF, and IRTF Contacts

   7.1.1.   Internet Architecture Board (IAB) Contact

   Please send your comments about this list of protocols and especially
   about the Draft Standard Protocols to the Internet Architecture Board
   care of Abel Winerib, IAB Executive Director.

      Contacts:

         Abel Winerib
         Executive Director of the IAB
         Intel, JF2-64
         2111 NE 25th Avenue
         Hillsboro, OR 97124

         1-503-696-8972

         AWeinrib@ibeam.jf.intel.com

         Brian E. Carpenter
         Chair of the IAB
         IBM United Kingdon Laboratories
         Hursley Park
         Winchester
         Hampshire SO21 2JN

         +44 1962 816833

         brian@hursley.ibm.com

   7.1.2. Internet Engineering Task Force (IETF) Contact

      Contacts:

         Fred Baker
         Chair of the IETF
         cisco Systems, Inc.
         519 Lado Drive
         Santa Barbara, CA 93111

         1-805-681-0115

         fred@cisco.com

         Steve Coya
         IESG Secretary
         Corporation for National Research Initiatives
         1895 Preston White Drive, Suite 100
         Reston, VA 22091

         1-703-620-8990

         scoya@IETF.ORG

         Steve Coya
         Executive Director of the IETF
         Corporation for National Research Initiatives
         1895 Preston White Drive, Suite 100
         Reston, VA 22091

         1-703-620-8990

         scoya@IETF.ORG

   7.1.3. Internet Research Task Force (IRTF) Contact

      Contact:

         Abel Winerib
         Chair of the IRTF
         Intel, JF2-64
         2111 NE 25th Avenue
         Hillsboro, OR 97124

         1-503-696-8972

         AWeinrib@ibeam.jf.intel.com

   7.2. Internet Assigned Numbers Authority Contact

      Contact:

         Joyce K. Reynolds
         Internet Assigned Numbers Authority
         USC/Information Sciences Institute
         4676 Admiralty Way
         Marina del Rey, CA 90292-6695

         1-310-822-1511

         IANA@IANA.ORG

   The protocol standards are managed by the Internet Assigned Numbers
   Authority.

   Please refer to the document "Assigned Numbers" (RFC-1700) for
   further information about the status of protocol documents. There
   are two documents that summarize the requirements for host and
   gateways in the Internet, "Host Requirements" (RFC-1122 and RFC-1123)
   and "Requirements for IP Version 4 Routers" (RFC-1812).

      How to obtain the most recent edition of this "Internet Official
      Protocol Standards" memo:

         The file "in-notes/std/std1.txt" may be copied via FTP from the
         FTP.ISI.EDU computer using the FTP username "anonymous" and FTP
         password "guest".

7.3.   Request for Comments Editor Contact

       Contact:

           Jon Postel
           RFC Editor
           USC/Information Sciences Institute
           4676 Admiralty Way
           Marina del Rey, CA 90292-6695

           1-310-822-1511

           RFC-Editor@ISI.EDU

     Documents may be submitted via electronic mail to the RFC Editor for
     consideration for publication as RFC. If you are not familiar with
     the format or style requirements please request the "Instructions for
     RFC Authors". In general, the style of any recent RFC may be used as
     a guide.

7.4.   The Network Information Center and
       Requests for Comments Distribution Contact

       RFC's may be obtained from DS.INTERNIC.NET via FTP, WAIS, and
       electronic mail. Through FTP, RFC's are stored as rfc/rfcnnnn.txt
       or rfc/rfcnnnn.ps where 'nnnn' is the RFC number. Login as
       "anonymous" and provide your e-mail address as the password.
       Through WAIS, you may use either your local WAIS client or telnet
       to DS.INTERNIC.NET and login as "wais" (no password required) to
       access a WAIS client. Help information and a tutorial for using
       WAIS are available online. The WAIS database to search is "rfcs".

       Directory and Database Services also provides a mail server
       interface. Send a mail message to mailserv@ds.internic.net and
       include any of the following commands in the message body:

           document-by-name rfcnnnn   where 'nnnn' is the RFC number
                                         The text version is sent.

           file /ftp/rfc/rfcnnnn.yyy   where 'nnnn' is the RFC number.
                                         and 'yyy' is 'txt' or 'ps'.

           help   to get information on how to use
                                         the mailserver.

       The InterNIC directory and database services collection of
       resource listings, internet documents such as RFCs, FYIs, STDs,
       and Internet Drafts, and publicly accessible databases are also

      now available via Gopher. All our collections are WAIS indexed
      and can be searched from the Gopher menu.

      To access the InterNIC Gopher Servers, please connect to
      "internic.net" port 70.

      Contact: admin@ds.internic.net

7.5. Sources for Requests for Comments

   Details on many sources of RFCs via FTP or EMAIL may be obtained by
   sending an EMAIL message to "rfc-info@ISI.EDU" with the message body
   "help: ways_to_get_rfcs". For example:

          To: rfc-info@ISI.EDU
          Subject: getting rfcs

          help: ways_to_get_rfcs

8. Security Considerations

   Security issues are not addressed in this memo.

9. Author's Address

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