                 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            |
                            +-----------+           V
                            | proposed  |-------------->+
                       +--->+-----+-----+           |
                       |          |                 |
                       |          V    2            |
                       +<---+-----+-----+           V
                            | draft std |-------------->+
                       +--->+-----+-----+           |
                       |          |                 |
                       |          V    3            |
                       +<---+=====+=====+           V
                            | standard  |-------------->+
                            +=====+=====+           |
                                                    |
                                                    V    5
                                              +=====+=====+
                                              | historic  |
                                              +===========+
```
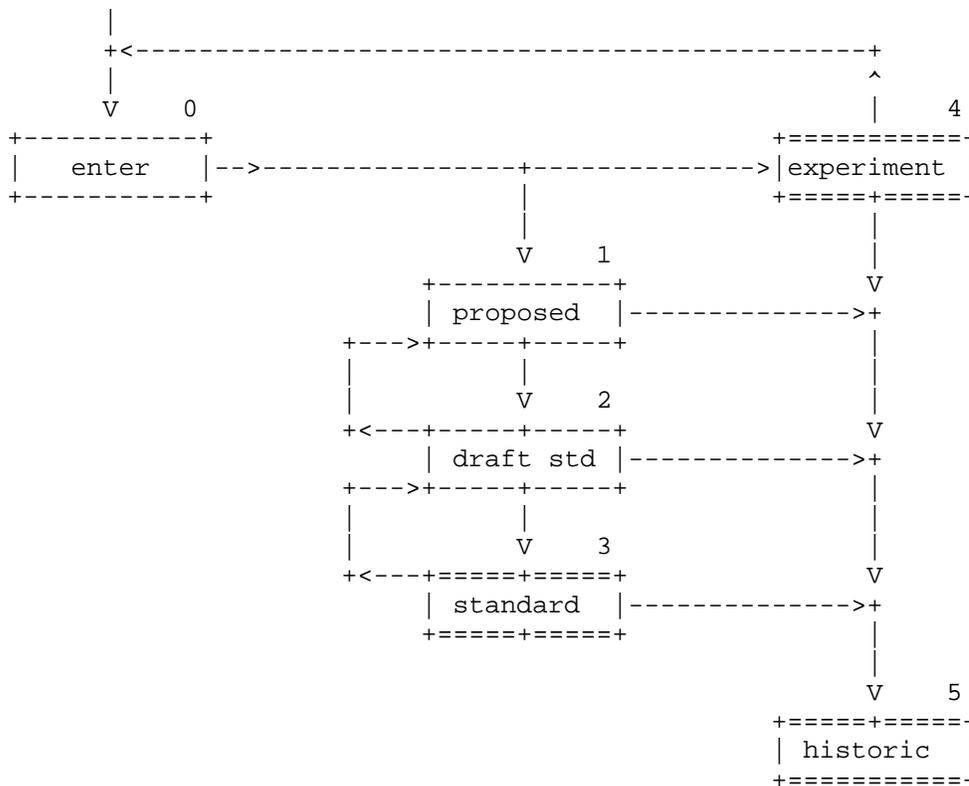
   The transition from proposed standard (1) to draft standard (2) can
   only be by action of the IESG and only after the protocol has been
   proposed standard (1) for at least six months.

   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 devveloping 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 Autoconfiguration 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
```

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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
```

```
-------     Class A Subnet Experiment                        1797
TCP/IPXMIB  TCP/IPX Connection Mib Specification             1792
-------     TCP And UDP Over IPX Networks With Fixed Path MTU 1791
ICMP-DM     ICMP Domain Name Messages                        1788
CLNP-MULT   Host Group Extensions for CLNP Multicasting      1768
OSPF-OVFL   OSPF Database Overflow                           1765
RWP         Remote Write ProtocolL - Version 1.0             1756
NARP        NBMA Address Resolution Protocol                 1735
DNS-DEBUG   Tools for DNS debugging                          1713
DNS-ENCODE  DNS Encoding of Geographical Location            1712
TCP-POS     An Extension to TCP: Partial Order Service       1693
-------     DNS to Distribute RFC1327 Mail Address Mapping Tables 1664
T/TCP       TCP Extensions for Transactions                  1644
UTF-7       A Mail-Safe Transformation Format of Unicode     1642
MIME-UNI    Using Unicode with MIME                          1641
FOOBAR      FTP Operation Over Big Address Records           1639
X500-CHART  Charting Networks in the X.500 Directory         1609
X500-DIR    Representing IP Information in the X.500 Directory 1608
SNMP-DPI    SNMP Distributed Protocol Interface              1592
CLNP-TUBA   Use of ISO CLNP in TUBA Environments             1561
REM-PRINT   TPC.INT Subdomain Remote Printing - Technical    1528
EHF-MAIL    Encoding Header Field for Internet Messages      1505
REM-PRT     An Experiment in Remote Printing                 1486
RAP         Internet Route Access Protocol                   1476
TP/IX       TP/IX: The Next Internet                         1475
X400        Routing Coordination for X.400 Services          1465
DNS         Storing Arbitrary Attributes in DNS              1464
IRCP        Internet Relay Chat Protocol                     1459
TOS-LS      Link Security TOS                                1455
SIFT/UFT    Sender-Initiated/Unsolicited File Transfer       1440
DIR-ARP     Directed ARP                                     1433
TEL-SPX     Telnet Authentication: SPX                       1412
TEL-KER     Telnet Authentication: Kerberos V4               1411
MAP-MAIL    X.400 Mapping and Mail-11                         1405
TRACE-IP    Traceroute Using an IP Option                    1393
DNS-IP      Experiment in DNS Based IP Routing               1383
RMCP        Remote Mail Checking Protocol                    1339
TCP-HIPER   TCP Extensions for High Performance              1323
MSP2        Message Send Protocol 2                          1312
DSLCP       Dynamically Switched Link Control                1307
--------    X.500 and Domains                                1279
IN-ENCAP    Internet Encapsulation Protocol                  1241
CLNS-MIB    CLNS-MIB                                         1238
CFDP        Coherent File Distribution Protocol              1235
SNMP-DPI    SNMP Distributed Program Interface               1228
IP-AX.25    IP Encapsulation of AX.25 Frames                 1226
ALERTS      Managing Asynchronously Generated Alerts         1224
MPP         Message Posting Protocol                         1204
```

```
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
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            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

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         Steve Coya
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         Corporation for National Research Initiatives
         1895 Preston White Drive, Suite 100
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         scoya@IETF.ORG

7.1.3. Internet Research Task Force (IRTF) Contact

   Contact:

      Abel Winerib
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      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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