

Network Working Group  
Request for Comments: 2500  
Obsoletes: 2400, 2300, 2200, 2000, 1920, 1880,  
1800, 1780, 1720, 1610, 1600, 1540, 1500, 1410,  
1360, 1280, 1250, 1200, 1140, 1130, 1100, 1083  
STD: 1  
Category: Standards Track

Internet Engineering Task Force  
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June 1999

## 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 Engineering Task Force (IETF). This memo is an Internet Standard. Distribution of this memo is unlimited.

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## 1. Introduction

This memo summarizes the status of Internet protocols and specifications. It is published by the RFC Editor in accordance with Section 2.1 of "The Internet Standards Process -- Revision 3", RFC 2026, which specifies the rules and procedures by which all Internet standards are set. This memo is prepared by the RFC Editor for the IESG and IAB. It is a member of a series of summary memos that are published approximately every one hundred RFCs; please see [www.rfc-editor.org](http://www.rfc-editor.org).

This memo lists the level and status of the archival documents known as RFCs (Request for Comments) within the Internet standards process. The reader is urged to review RFC 2026 for essential context for interpreting this memo.

The following introductory text is quoted directly from RFC 2026:

"The Internet, a loosely-organized international collaboration of autonomous, interconnected networks, supports host-to-host communication through voluntary adherence to open protocols and procedures defined by Internet Standards. There are also many isolated interconnected networks, which are not connected to the global Internet but use the Internet Standards.

The Internet Standards Process described in this document is concerned with all protocols, procedures, and conventions that are used in or by the Internet, whether or not they are part of the TCP/IP protocol suite. In the case of protocols developed and/or standardized by non-Internet organizations, however, the Internet Standards Process normally applies to the application of the protocol or procedure in the Internet context, not to the specification of the protocol itself.

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

Each distinct version of an Internet standards-related specification is published as part of the "Request for Comments" (RFC) document series. This archival series is the official publication channel for Internet standards documents and other publications of the IESG, IAB, and Internet community. RFCs can be obtained from a number of Internet hosts using anonymous FTP, gopher, World Wide Web, and other Internet document-retrieval systems.

The rules for formatting and submitting an RFC are defined in [5]. Every RFC is available in ASCII text. Some RFCs are also available in other formats. The other versions of an RFC may contain material (such as diagrams and figures) that is not present in the ASCII version, and it may be formatted differently.

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* A stricter requirement applies to standards-track
* specifications: the ASCII text version is the
* definitive reference, and therefore it must be a
* complete and accurate specification of the standard,
* including all necessary diagrams and illustrations.
*
*****

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The status of Internet protocol and service specifications is summarized periodically in an RFC entitled "Internet Official Protocol Standards" [1]. This RFC shows the level of maturity and other helpful information for each Internet protocol or service specification (see section 3).

Specifications subject to the Internet Standards Process fall into one of two categories: Technical Specification (TS) and Applicability Statement (AS).

Some RFCs document Internet Standards. These RFCs form the "STD" subseries of the RFC series [4]. When a specification has been adopted as an Internet Standard, it is given the additional label "STDxxx", but it keeps its RFC number and its place in the RFC series. (see section 4.1.3)

Some RFCs standardize the results of community deliberations about statements of principle or conclusions about what is the best way to perform some operations or IETF process function. These RFCs form the specification has been adopted as a BCP, it is given the additional label "BCPxxx", but it keeps its RFC number and its place in the RFC series. (see section 5)

Not all specifications of protocols or services for the Internet should or will become Internet Standards or BCPs. Such non-standards track specifications are not subject to the rules for Internet standardization. Non-standards track specifications may be published directly as "Experimental" or "Informational" RFCs at the discretion of the RFC Editor in consultation with the IESG (see section 4.2)."

Section 2 of this memo lists all Technical Specification RFCs that are in the standards track, and Section 3 lists Applicability Statement RFCs in the standards track. Section 4 lists those protocol specification RFCs that are off the standards track (Informational and Historic status). This memo does not list Informational RFCs that may be of general interest to the community but do not specify protocols for the Internet. It also does not list BCP RFCs. Telnet options have been added into the lists.

## 2. Current Technical Specifications

Subsections 2.1-2.5 list the standards in groups by protocol state. In the following lists, shorthand nicknames have been shown for many of the major protocols. These names are commonly used in discourse on Internet mailing lists.

## 2.1. Standard Protocols

| Protocol    | Name                                    | RFC       | STD   | *     |
|-------------|---|-----------|-------|-------|
| =====       | =====                                   | =====     | ===== | ===== |
| -----       | Internet Official Protocol Standards    | 2500      | 1     |       |
| -----       | Assigned Numbers                        | 1700      | 2     |       |
| IP          | Internet Protocol                       | 791       | 5     |       |
|             | as amended by:-----                     |           |       |       |
| -----       | IP Subnet Extension                     | 950       | 5     |       |
| -----       | IP Broadcast Datagrams                  | 919       | 5     |       |
| -----       | IP Broadcast Datagrams with Subnets     | 922       | 5     |       |
| ICMP        | Internet Control Message Protocol       | 792       | 5     |       |
| IGMP        | Internet Group Multicast Protocol       | 1112      | 5     |       |
| UDP         | User Datagram Protocol                  | 768       | 6     |       |
| TCP         | Transmission Control Protocol           | 793       | 7     |       |
| TELNET      | Telnet Protocol                         | 854,855   | 8     |       |
| FTP         | File Transfer Protocol                  | 959       | 9     |       |
| SMTP        | Simple Mail Transfer Protocol           | 821       | 10    |       |
| SMTP-SIZE   | SMTP Service Ext for Message Size       | 1870      | 10    |       |
| SMTP-EXT    | SMTP Service Extensions                 | 1869      | 10    |       |
| MAIL        | Format of Electronic Mail Messages      | 822       | 11    |       |
| NTPV2       | Network Time Protocol (Version 2)       | 1119      | 12    |       |
| DOMAIN      | Domain Name System                      | 1034,1035 | 13    |       |
| DNS-MX      | Mail Routing and the Domain System      | 974       | 14    |       |
| SNMP        | Simple Network Management Protocol      | 1157      | 15    |       |
| SMI         | Structure of Management Information     | 1155      | 16    |       |
| Concise-MIB | Concise MIB Definitions                 | 1212      | 16    |       |
| MIB-II      | Management Information Base-II          | 1213      | 17    |       |
| NETBIOS     | NetBIOS Service Protocols               | 1001,1002 | 19    |       |
| ECHO        | Echo Protocol                           | 862       | 20    |       |
| DISCARD     | Discard Protocol                        | 863       | 21    |       |
| CHARGEN     | Character Generator Protocol            | 864       | 22    |       |
| QUOTE       | Quote of the Day Protocol               | 865       | 23    |       |
| USERS       | Active Users Protocol                   | 866       | 24    |       |
| DAYTIME     | Daytime Protocol                        | 867       | 25    |       |
| TIME        | Time Server Protocol                    | 868       | 26    |       |
| TOPT-BIN    | Binary Transmission                     | 856       | 27    |       |
| TOPT-ECHO   | Echo                                    | 857       | 28    |       |
| TOPT-SUPP   | Suppress Go Ahead                       | 858       | 29    |       |
| TOPT-STAT   | Status                                  | 859       | 30    |       |
| TOPT-TIM    | Timing Mark                             | 860       | 31    |       |
| TOPT-EXTOP  | Extended-Options-List                   | 861       | 32    |       |
| TFTP        | Trivial File Transfer Protocol          | 1350      | 33    |       |
| TP-TCP      | ISO Transport Service on top of the TCP | 1006      | 35    |       |
| ETHER-MIB   | Ethernet MIB                            | 1643      | 50    |       |
| PPP         | Point-to-Point Protocol (PPP)           | 1661      | 51    |       |
| PPP-HDLC    | PPP in HDLC Framing                     | 1662      | 51    |       |
| IP-SMDS     | IP Datagrams over the SMDS Service      | 1209      | 52    |       |

|          |   |      |     |
|----------|---|------|-----|
| POP3     | Post Office Protocol, Version 3         | 1939 | 53  |
| OSPF2    | Open Shortest Path First Routing V2     | 2328 | 54  |
| IP-FR    | Multiprotocol over Frame Relay          | 2427 | 55* |
| RIP2     | RIP Version 2-Carrying Additional Info. | 2453 | 56* |
| RIP2-APP | RIP Version 2 Protocol App. Statement   | 1722 | 57* |
| SMIv2    | Structure of Management Information v2  | 2578 | 58* |
| CONV-MIB | Textual Conventions for SNMPv2          | 2579 | 58* |
| CONF-MIB | Conformance Statements for SNMPv2       | 2580 | 58* |

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

## 2.2. Network-Specific Standard Protocols

| Protocol   | Name                                     | RFC     | STD * |
|------------|--|---------|-------|
| =====      | =====                                    | =====   | === = |
| IP-ATM     | Classical IP and ARP over ATM            | 2225    |       |
| ATM-ENCAP  | Multiprotocol Encapsulation over ATM     | 1483    |       |
| IP-TR-MC   | IP Multicast over Token-Ring LANs        | 1469    |       |
| IP-FDDI    | Transmission of IP and ARP over FDDI Net | 1390    | 36    |
| IP-X.25    | X.25 and ISDN in the Packet Mode         | 1356    |       |
| ARP        | Address Resolution Protocol              | 826     | 37    |
| RARP       | A Reverse Address Resolution Protocol    | 903     | 38    |
| IP-ARPA    | Internet Protocol on ARPANET             | BBN1822 | 39    |
| IP-WB      | Internet Protocol on Wideband Network    | 907     | 40    |
| IP-E       | Internet Protocol on Ethernet Networks   | 894     | 41    |
| IP-EE      | Internet Protocol on Exp. Ethernet Nets  | 895     | 42    |
| IP-IEEE    | Internet Protocol on IEEE 802            | 1042    | 43    |
| IP-DC      | Internet Protocol on DC Networks         | 891     | 44    |
| IP-HC      | Internet Protocol on Hyperchannel        | 1044    | 45    |
| IP-ARC     | Transmitting IP Traffic over ARCNET Nets | 1201    | 46    |
| IP-SLIP    | Transmission of IP over Serial Lines     | 1055    | 47    |
| IP-NETBIOS | Transmission of IP over NETBIOS          | 1088    | 48    |
| IP-IPX     | Transmission of 802.2 over IPX Networks  | 1132    | 49    |
| IP-HIPPI   | IP over HIPPI                            | 2067    |       |

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

## 2.3. Draft Standard Protocols

| Protocol   | Name   | RFC       |
|------------|--|-----------|
| =====      | =====  | =====     |
| VACM-SNMP  | View-based Access Control Model for SMMP           | 2575*     |
| USM-SNMPV3 | User-based Security Model for SNMPv3               | 2574*     |
| SNMP-APP   | SNMP Applications                                  | 2573*     |
| MPD-SNMP   | Message Processing & Dispatching SNMP              | 2572*     |
| ARCH-SNMP  | Architecture Describing SNMP Management Frameworks | 2571*     |
| ICMPv6     | ICMPv6 for IPv6                                    | 2463*     |
| IPV6-AUTO  | IPv6 Stateless Address Autoconfiguration           | 2462*     |
| IPV6-ND    | Neighbor Discovery for IP Version 6                | 2461*     |
| IPV6       | IPv6 Specification                                 | 2460*     |
| URI-GEN    | URI: Generic Syntax                                | 2396      |
| IARP       | Inverse Address Resolution Protocol                | 2390      |
| TN3270E    | Telnet Option - TN3270 Enhancements                | 2355*     |
| TFTP-Opt   | TFTP Options                                       | 2349      |
| TFTP-Blk   | TFTP Blocksize Option                              | 2348      |
| TFTP-Ext   | TFTP Option Extension                              | 2347      |
| ONE-PASS   | One-Time Password System                           | 2289      |
| SMTP-Pipe  | SMTP Serv. Ext. for Command Pipelining             | 2197      |
| DHCP-BOOTP | DHCP Options and BOOTP Extensions                  | 2132      |
| DHCP       | Dynamic Host Configuration Protocol                | 2131      |
| FRAME-MIB  | Management Information Base for Frame              | 2115      |
| -----      | Clarifications and Extensions BOOTP                | 1542      |
| DHCP-BOOTP | Interoperation Between DHCP and BOOTP              | 1534      |
| BOOTP      | Bootstrap Protocol                                 | 951, 2132 |
| MIME-CONF  | MIME Conformance Criteria                          | 2049      |
| MIME-MSG   | MIME Msg Header Ext for Non-ASCII                  | 2047      |
| MIME-MEDIA | MIME Media Types                                   | 2046      |
| MIME       | Multipurpose Internet Mail Extensions              | 2045      |
| PPP-CHAP   | PPP Challenge Handshake Authentication             | 1994      |
| PPP-MP     | PPP Multilink Protocol                             | 1990      |
| PPP-LINK   | PPP Link Quality Monitoring                        | 1989      |
| COEX-MIB   | Coexistence between SNMPV1 & SNMPV2                | 1908      |
| SNMPv2-MIB | MIB for SNMPv2                                     | 1907      |
| TRANS-MIB  | Transport Mappings for SNMPv2                      | 1906      |
| OPS-MIB    | Protocol Operations for SNMPv2                     | 1905      |
| CON-MD5    | Content-MD5 Header Field                           | 1864      |
| OSPF-MIB   | OSPF Version 2 MIB                                 | 1850      |
| STR-REP    | String Representation ...                          | 1779      |
| X.500syn   | X.500 String Representation ...                    | 1778      |
| X.500lite  | X.500 Lightweight ...                              | 1777      |
| BGP-4-APP  | Application of BGP-4                               | 1772      |
| BGP-4      | Border Gateway Protocol 4                          | 1771      |
| PPP-DNCP   | PPP DECnet Phase IV Control Protocol               | 1762      |
| RMON-MIB   | Remote Network Monitoring MIB                      | 1757      |
| 802.5-MIB  | IEEE 802.5 Token Ring MIB                          | 1748      |

|             |  |      |
|-------------|--|------|
| RIP2-MIB    | RIP Version 2 MIB Extension            | 1724 |
| SIP-MIB     | SIP Interface Type MIB                 | 1694 |
| -----       | Def Man Objs Parallel-printer-like     | 1660 |
| -----       | Def Man Objs RS-232-like               | 1659 |
| -----       | Def Man Objs Character Stream          | 1658 |
| BGP-4-MIB   | BGP-4 MIB                              | 1657 |
| SMTP-8BIT   | SMTP Service Ext or 8bit-MIMEtransport | 1652 |
| OSI-NSAP    | Guidelines for OSI NSAP Allocation     | 1629 |
| ISO-TS-ECHO | Echo for ISO-8473                      | 1575 |
| DECNET-MIB  | DECNET MIB                             | 1559 |
| BRIDGE-MIB  | BRIDGE-MIB                             | 1493 |
| NTPV3       | Network Time Protocol (Version 3)      | 1305 |
| FINGER      | Finger Protocol                        | 1288 |
| IP-MTU      | Path MTU Discovery                     | 1191 |
| TOPT-LINE   | Linemode                               | 1184 |
| NICNAME     | WhoIs Protocol                         | 954  |

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



## 2.4. Proposed Standard Protocols

| Protocol   | Name   | RFC   |
|------------|--|-------|
| =====      | =====  | ===== |
| -----      | PKIX Operational Protocols: FTP and HTTP           | 2585* |
| -----      | APPN/HPR in IP Networks MIB                        | 2584* |
| TCP-CC     | TCP Congestion Control                             | 2581* |
| APP-MIB    | Application Management MIB                         | 2564* |
| -----      | DHCP Auto-Configuration Option                     | 2563* |
| -----      | TN3270E-RT-MIB                                     | 2562* |
| -----      | TN3270E Using SMiv2 MIB                            | 2561* |
| -----      | Internet X.509 Public Key Infra. Op. Proto. LDAPv2 | 2559* |
| -----      | SONET/SDH Interface Type MIB                       | 2558* |
| MHTML      | MIME Encap. of Aggregate Documents, such as HTML   | 2557* |
| -----      | SMTP Service Extension for Authentication          | 2554* |
| -----      | Use of BGP-4 Multipro. Ext. for IPv6 IDR           | 2545* |
| SIP        | Session Initiation Protocol                        | 2543* |
| DHK-DNS    | Storage of Diffie-Hellman Keys in DNS              | 2539* |
| SC-DNS     | Storing Certificates in the DNS                    | 2538* |
| -----      | RSA/MD5 KEYS and SIGs in the DNS                   | 2537* |
| -----      | DSA KEYS and SIGs in the DNS                       | 2536* |
| DNS-SECEXT | Domain Name System Security Extensions             | 2535* |
| -----      | Media Features for Display, Print, Fax             | 2534* |
| -----      | Transmission of IPv6 Packets over IPv4             | 2529* |
| -----      | Reserved IPv6 Subnet Anycast Addresses             | 2526* |
| WEBDAV     | HTTP Ext. for Distributed Authoring                | 2518* |
| ATM-MIBMAN | MIB for ATM Management                             | 2515* |
| ATM-TC-OID | ATM Textual Conventions and OIDs                   | 2514* |
| -----      | Connection-Oriented Accounting MIB                 | 2513* |
| -----      | Accounting Information for ATM Networks            | 2512* |
| X.509-CRMF | Internet X.509 CRMF                                | 2511* |
| PKICMP     | Internet X.509 PKI CMP                             | 2510* |
| IPCOM-PPP  | IP Header Compression over PPP                     | 2509* |
| -----      | Compressing IP/UDP/RTP Headers                     | 2508* |
| -----      | IP Header Compression                              | 2507* |
| -----      | IPv6 Datagrams on ARCnet                           | 2497* |
| DS3-E3-MIB | DS3/E3 Interface Type MIB                          | 2496* |
| -----      | DS1/E1/DS2/E2 MIB                                  | 2495* |
| -----      | DSO MIB / DSOBUNDLE MIB                            | 2494* |
| -----      | 15 Minute Based Performance History TCs            | 2493* |
| IPv6ATMNET | IPv6 over ATM Networks                             | 2492* |
| IPv6-NBMA  | IPv6 over Non-Broadcast Multiple Access            | 2491* |
| -----      | SMTP Serv. Ext. for Secure SMTP over TLS           | 2487* |
| NAI        | Network Access Identifier                          | 2486* |
| -----      | DCHP Option for the Open Group's UAP               | 2485* |
| -----      | PPP LCP Internationalization Option                | 2484* |
| -----      | Gateways and MIME Security Multiparts              | 2480* |
| -----      | GSS-API Negotiation Mechanism                      | 2478* |

|            |   |       |
|------------|---|-------|
| -----      | Message Submission                                    | 2476* |
| DIFFSRV    | Architecture for Differentiated Service               | 2475* |
| -----      | Differentiated Services Field                         | 2474* |
| -----      | Generic Packet Tunneling in IPv6                      | 2473* |
| IPv6-PPP   | IP Version 6 over PPP                                 | 2472* |
| -----      | IPv6 Packets over Token Ring Networks                 | 2470* |
| -----      | IPv6 Packets over FDDI Networks                       | 2467* |
| ICMPv6-MIB | ICMPv6 Group MIB                                      | 2466* |
| -----      | Textual Conventions, General Group MIB                | 2465* |
| -----      | IPv6 Packets over Ethernet Networks                   | 2464* |
| -----      | Internet X.509 Public Key Infrastructure              | 2459* |
| EBN-MIB    | Extended Border Node MIB                              | 2457* |
| -----      | APPN TRAPS MIB  | 2456* |
| APPN-MIB   | APPN MIB  | 2455* |
| -----      | UDP MIB for IPv6                                      | 2454* |
| -----      | TCP MIB for IPv6                                      | 2452* |
| -----      | ESP CBC-Mode Cipher Algorithms                        | 2451* |
| POP3-EXT   | POP3 Extension Mechanism                              | 2449* |
| IMIP       | iCalendar Message-Based Interoperability              | 2447* |
| ITIP       | iCalendar Message-Based Interoperability              | 2446* |
| ICALNDAR   | Internet Calendaring, Scheduling Core..               | 2445* |
| OTP-SASL   | OTP SASL Mechanism                                    | 2444* |
| -----      | OpenPGP Message Format                                | 2440* |
| -----      | BGP Route Flap Damping                                | 2439* |
| -----      | RTP Payload Format for JPEG-compressed Video          | 2435* |
| -----      | RTP Payload Format for BT.656 Video Encoding          | 2431* |
| -----      | RTP Payload Format for H.263+                         | 2429* |
| -----      | FTP Extensions for IPv6 and NATs                      | 2428  |
| MIME-VCARD | vCard MIME Directory Profile                          | 2426  |
| TXT-DIR    | MIME Content-Type for Directory Info                  | 2425  |
| CONT-DUR   | Content-Duration MIME Header                          | 2424  |
| MIME-VPIM  | VPIM Voice Message                                    | 2423  |
| MIME-ADPCM | Toll Quality Voice - 32 kbit/s ADPC                   | 2422  |
| MIME-VP2   | Voice Profile for Internet Mail V2                    | 2421  |
| -----      | Multicast/UNI 3.0/3.1 based ATM MIB                   | 2417  |
| -----      | NULL Encryption Algorithm and Its Use With IPsec      | 2410* |
| IKE        | The Internet Key Exchange                             | 2409* |
| ISAKMP     | Internet Security Association and Key Management Pro. | 2408* |
| ISAKMPSEC  | IP Security Domain of Interpretation for ISAKMP       | 2407* |
| ESP        | IP Encapsulating Security Payload                     | 2406* |
| ESPDES-CBC | ESP DES-CBC Cipher Algorithm With Explicit IV         | 2405* |
| -----      | Use of HMAC-SHA-1-96 within ESP and AH                | 2404* |
| -----      | Use of HMAC-MD5-96 within ESP and AH                  | 2403* |
| IP-AUTH    | IP Authentication Header                              | 2402* |
| IPSEC      | Security Architecture for the Internet Protocol       | 2401* |
| DATA-URL   | "data" URL scheme                                     | 2397  |
| CIDMID-URL | Content-ID and Message-ID URLs                        | 2392  |
| IPCOMP     | IP Payload Compression Protocol                       | 2393* |

|            |  |      |
|------------|--|------|
| FTP-FNEGO  | Feature negotiation mechanism for FTP    | 2389 |
| -----      | MIME Multipart/form-data                 | 2388 |
| MIME-RELAT | MIME Multipart/Related Content-type      | 2387 |
| -----      | Protection of BGP Sessions via TCP MD5   | 2385 |
| POP-URL    | POP URL Scheme                           | 2384 |
| -----      | Interoperation of CLS and GS with ATM    | 2381 |
| -----      | RSVP over ATM Imple. Requirements        | 2380 |
| -----      | IPv6 Aggreg. Global Unicast Addr. Format | 2374 |
| -----      | IPv6 Addressing Architecture             | 2373 |
| TIPV3      | Transaction Internet Protocol V3         | 2371 |
| OSPF-LSA   | OSPF Opaque LSA Option                   | 2370 |
| -----      | Use of URLs as Meta-Syntax...            | 2369 |
| URLMAILTO  | mailto URL scheme                        | 2368 |
| PPP-AAL    | PPP Over AAL                             | 2364 |
| PPP-FUNI   | PPP Over FUNI                            | 2363 |
| IMAP4UIDPL | IMAP4 UIDPLUS Extension                  | 2359 |
| -----      | Ethernet-like Interface Types MIB        | 2358 |
| MOBILIPREV | Reverse Tunneling for Mobile IP          | 2344 |
| IMAP4NAME  | IMAP4 Namespace                          | 2342 |
| VRRP       | Virtual Router Redundancy Protocol       | 2338 |
| NHRP-SCSP  | Distributed NHRP Service Using SCSP      | 2335 |
| SCSP       | Server Cache Synchronization Protocol    | 2334 |
| NHRP       | NBMA Next Hop Resolution Protocol        | 2332 |
| UNI-SIG    | ATM Sig Support (IPOA) UNI Signalling    | 2331 |
| SDP        | Session Description Protocol             | 2327 |
| RTSP       | Real Time Streaming Protocol             | 2326 |
| IPOA-MIB   | Classical IP and ARP Over ATM MIB        | 2320 |
| DNS-NCACHE | Negative Caching of DNS Queries          | 2308 |
| SMFAX-IM   | Simple Mode of FAX Using Internet Mail   | 2305 |
| MINFAX-IM  | Minimal FAX addr format in Internet Mail | 2304 |
| MIN-PSTN   | Min. PSTN addr format in Internet Mail   | 2303 |
| TIFF       | Tag Image File Format                    | 2302 |
| FFIF       | File Format for Internet Fax             | 2301 |
| EMF-MDN    | Extensible Message Format for MDN        | 2298 |
| OR-ADD     | O/R Address hierarchy in X.500           | 2294 |
| SUBTABLE   | Tables and Subtrees in X.500             | 2293 |
| -----      | Mobile-IPv4 Config Opt for PPP IPCP      | 2290 |
| SLM-APP    | System-Level Managed Objects for Apps    | 2287 |
| PPP-EAP    | PPP Extensible Authentication Protocol   | 2284 |
| MEXT-BGP4  | Multiprotocol Extensions for BGP-4       | 2283 |
| RPSL       | Routing Policy Specification Language    | 2280 |
| UTF-8      | UTF-8 transformation format of ISO 10646 | 2279 |
| -----      | IEEE 802.12 Repeater MIB                 | 2266 |
| AGENTX     | Agent Extensibility Protocol             | 2257 |
| -----      | Summary of the X.500(96) with LDAPv3     | 2256 |
| LDAP-URL   | LDAP URL Format                          | 2255 |
| STR-LDAP   | String Rep of LDAP Search Filters        | 2254 |
| LDAP3-UTF8 | LDAPv3: UTF-8 String Rep                 | 2253 |

|            |  |      |
|------------|--|------|
| LDAP3-ATD  | LDAP3-: Attribute Syntax Definitions     | 2252 |
| LDAPV3     | Lightweight Directory Access Protocol    | 2251 |
| RTP-MPEG   | RTP Payload Format for MPEG1/MPEG2       | 2250 |
| MAIL-MIB   | Mail Monitoring MIB                      | 2249 |
| NSM-MIB    | Network Services Monitoring MIB          | 2248 |
| -----      | Using Domains LDAP/X.500 Dist. Names     | 2247 |
| SASL-ANON  | Anonymous SASL Mechanism                 | 2245 |
| ACAP       | Application Configuration Access         | 2244 |
| OTP-ER     | OTP Extended Responses                   | 2243 |
| NETWAREIP  | NetWare/IP Domain Name and Information   | 2242 |
| DHCP-NDS   | DHCP Options for Novell Directory Serv.  | 2241 |
| MAUS-MIB   | IEEE 802.3 Medium Attachment Units MIB   | 2239 |
| HPR-MIB    | Definitions of Managed Objects for HPR   | 2238 |
| IGMP       | Internet Group Management Protocol V2    | 2236 |
| ABNF       | Augmented BNF for Syntax Specifications  | 2234 |
| INTERGRMIB | Interfaces Group MIB                     | 2233 |
| DLUR-MIB   | Definitions of Managed Objects for DLUR  | 2232 |
| MIME-EXT   | MIME Parameter Value & Encoded Word Ext  | 2231 |
| FTPSECEXT  | FTP Security Extensions                  | 2228 |
| -----      | Simple Hit-Metering, Usage-Limiting HTTP | 2227 |
| -----      | IP Broadcast over ATM Networks           | 2226 |
| SASL       | Simple Authentication and Security Layer | 2222 |
| IMAP4LOGIN | IMAP4 Login Referrals                    | 2221 |
| -----      | Schema for Internet White Pages Service  | 2218 |
| -----      | Characterization Parameters for ISNE     | 2215 |
| -----      | Integrated Services MIB Guar Serv Ext    | 2214 |
| -----      | Integrated Services MIB using SMIV2      | 2213 |
| GQOS       | Spec. of Guaranteed Quality of Service   | 2212 |
| -----      | Spec. of Controlled-Load Net Ele Serv    | 2211 |
| RSVP-IS    | Use of RSVP with IETF Integrated Serv    | 2210 |
| RSVP-MPR   | RSVP Messaging Processing Rules          | 2209 |
| RSVP-IPSEC | RSVP Extensions for IPSEC Data Flows     | 2207 |
| RSVP-MIB   | RSVP Management Information Base         | 2206 |
| RSVP       | Resource ReSerVation Protocol V1         | 2205 |
| RPCSEC-GSS | RPCSEC_GSS Protocol Specification        | 2203 |
| RTP-RAD    | RTP Payload for Redundant Audio Data     | 2198 |
| IMAPPOPAU  | IMAP/POP AUTHorize Extension             | 2195 |
| IMAP4MAIL  | IMAP4 Mailbox Referrals                  | 2193 |
| IMAP-URL   | IMAP URL Scheme                          | 2192 |
| -----      | RTP Payload Format for H.263 Video ST    | 2190 |
| -----      | The Content-Disposition Header Field     | 2183 |
| DNS-CLAR   | Clarifications to the DNS Specification  | 2181 |
| IMAP4-IDLE | IMAP4 IDLE command                       | 2177 |
| SLP        | Service Location Protocol                | 2165 |
| -----      | X.500/LDAP Directory/MIXER Address Map.  | 2164 |
| DNS-MCGAM  | Using DNS to Distribute MCGAM            | 2163 |
| -----      | Carrying PostScript in X.400 and MIME    | 2160 |
| -----      | A MIME Body Part for FAX                 | 2159 |

|            |  |      |
|------------|--|------|
| -----      | X.400 Image Body Parts                   | 2158 |
| -----      | Mapping between X.400 and RFC-822/MIME   | 2157 |
| MIXER      | Mime Internet X.400 Enhanced Relay       | 2156 |
| APPN-MIB   | Definitions of Managed Objects for APPN  | 2155 |
| IPv6-Jumbo | TCP and UDP over IPv6 Jumbograms         | 2147 |
| MAIL-SERV  | Mailbox Names for Common Services        | 2142 |
| URN-SYNTAX | URN Syntax                               | 2141 |
| RADIUS     | Remote Authentication Dial In Service    | 2138 |
| SDNSDU     | Secure Domain Name System Dynamic Update | 2137 |
| DNS-UPDATE | Dynamic Updates in the DNS               | 2136 |
| DC-MIB     | Dial Control MIB using SMIV2             | 2128 |
| ISDN-MIB   | ISDN MIB using SMIV2                     | 2127 |
| ITOT       | ISO Transport Service on top of TCP      | 2126 |
| BAP-BACP   | PPP-BAP, PPP-BACP                        | 2125 |
| VEMMI-URL  | VEMMI URL Specification                  | 2122 |
| ROUT-ALERT | IP Router Alert Option                   | 2113 |
| MHTML      | MIME E-mail Encapsulation                | 2110 |
| HTTP-STATE | HTTP State Management Mechanism          | 2109 |
| 802.3-MIB  | 802.3 Repeater MIB using SMIV2           | 2108 |
| PPP-NBFCP  | PPP NetBIOS Frames Control Protocol      | 2097 |
| TABLE-MIB  | IP Forwarding Table MIB                  | 2096 |
| RIP-TRIG   | Trigger RIP                              | 2091 |
| IMAP4-LIT  | IMAP4 non-synchronizing literals         | 2088 |
| IMAP4-QUO  | IMAP4 QUOTA extension                    | 2087 |
| IMAP4-ACL  | IMAP4 ACL Extension                      | 2086 |
| HMAC-MD5   | HMAC-MD5 IP Auth. with Replay Prevention | 2085 |
| RIP2-MD5   | RIP-2 MD5 Authentication                 | 2082 |
| RIPNG-IPV6 | RIPng for IPv6                           | 2080 |
| URI-ATT    | URI Attribute Type and Object Class      | 2079 |
| GSSAP      | Generic Security Service Application     | 2078 |
| MIME-MODEL | Model Primary MIME Types                 | 2077 |
| RMON-MIB   | Remote Network Monitoring MIB            | 2074 |
| HTML-INT   | HTML Internationalization                | 2070 |
| DAA        | Digest Access Authentication             | 2069 |
| HTTP-1.1   | Hypertext Transfer Protocol -- HTTP/1.1  | 2068 |
| DNS-SEC    | Domain Name System Security Extensions   | 2065 |
| IMAPV4     | Internet Message Access Protocol v4rev1  | 2060 |
| URLZ39.50  | Uniform Resource Locators for Z39.50     | 2056 |
| SNANAU-APP | SNANAU APPC MIB using SMIV2              | 2051 |
| PPP-SNACP  | PPP SNA Control Protocol                 | 2043 |
| ENTITY-MIB | Entity MIB using SMIV2                   | 2037 |
| RTP-JPEG   | RTP Payload Format for JPEG-compressed   | 2035 |
| SMTP-ENH   | SMTP Enhanced Error Codes                | 2034 |
| RTP-H.261  | RTP Payload Format for H.261             | 2032 |
| RTP-CELLB  | RTP Payload Format of Sun's CellB        | 2029 |
| SPKM       | Simple Public-Key GSS-API Mechanism      | 2025 |
| DLSW-MIB   | DLSw MIB using SMIV2                     | 2024 |
| IPV6-PPP   | IP Version 6 over PPP                    | 2023 |

|               |  |      |
|---------------|--|------|
| MULTI-UNI     | Multicast over UNI 3.0/3.1 based ATM     | 2022 |
| RMON-MIB      | RMON MIB using SMIV2                     | 2021 |
| 802.12-MIB    | IEEE 802.12 Interface MIB                | 2020 |
| IPV6-FDDI     | Transmission of IPv6 Packets Over FDDI   | 2019 |
| TCP-ACK       | TCP Selective Acknowledgement Options    | 2018 |
| URL-ACC       | URL Access-Type                          | 2017 |
| MIME-PGP      | MIME Security with PGP                   | 2015 |
| MIB-UDP       | SNMPv2 MIB for UDP                       | 2013 |
| MIB-TCP       | SNMPv2 MIB for TCP                       | 2012 |
| MIB-IP        | SNMPv2 MIB for IP                        | 2011 |
| MOBILEIPMIB   | Mobile IP MIB Definition using SMIV2     | 2006 |
| MINI-IP       | Minimal Encapsulation within IP          | 2004 |
| IPENCAPIP     | IP Encapsulation within IP               | 2003 |
| MOBILEIPSUP   | IP Mobility Support                      | 2002 |
| TCP-SLOWSTART | TCP Slow Start, Congestion Avoidance...  | 2001 |
| BGP-COMM      | BGP Communities Attribute                | 1997 |
| DNS-NOTIFY    | Mech. for Notification of Zone Changes   | 1996 |
| DNS-IZT       | Incremental Zone Transfer in DNS         | 1995 |
| SMTP-ETRN     | SMTP Service Extension ETRN              | 1985 |
| SNA           | Serial Number Arithmetic                 | 1982 |
| MTU-IPV6      | Path MTU Discovery for IP version 6      | 1981 |
| PPP-FRAME     | PPP in Frame Relay                       | 1973 |
| IPV6-ETHER    | Transmission IPv6 Packets Over Ethernet  | 1972 |
| PPP-ECP       | PPP Encryption Control Protocol          | 1968 |
| GSSAPI-KER    | Kerberos Version 5 GSS-API Mechanism     | 1964 |
| PPP-CCP       | PPP Compression Control Protocol         | 1962 |
| GSSAPI-SOC    | GSS-API Auth for SOCKS Version 5         | 1961 |
| LDAP-STR      | String Rep. of LDAP Search Filters       | 1960 |
| LDAP-URL      | LDAP URL Format                          | 1959 |
| TRANS-IPV6    | Transition Mechanisms IPv6 Hosts/Routers | 1933 |
| AUTH-SOCKS    | Username Authentication for SOCKS V5     | 1929 |
| SOCKSV5       | SOCKS Protocol Version 5                 | 1928 |
| WHOIS++M      | How to Interact with a Whois++ Mesh      | 1914 |
| WHOIS++A      | Architecture of Whois++ Index Service    | 1913 |
| DSN           | Delivery Status Notifications            | 1894 |
| EMS-CODE      | Enhanced Mail System Status Codes        | 1893 |
| MIME-RPT      | Multipart/Report                         | 1892 |
| SMTP-DSN      | SMTP Delivery Status Notifications       | 1891 |
| RTP-AV        | RTP Audio/Video Profile                  | 1890 |
| RTP           | Transport Protocol for Real-Time Apps    | 1889 |
| DNS-IPV6      | DNS Extensions to support IPv6           | 1886 |
| HTML          | Hypertext Markup Language - 2.0          | 1866 |
| MIME-Sec      | MIME Object Security Services            | 1848 |
| MIME-Encyp    | MIME: Signed and Encrypted               | 1847 |
| WHOIS++       | Architecture of the WHOIS++ service      | 1835 |
| -----         | Binding Protocols for ONC RPC Version 2  | 1833 |
| XDR           | External Data Representation Standard    | 1832 |
| RPC           | Remote Procedure Call Protocol V. 2      | 1831 |

|            |  |      |
|------------|--|------|
| -----      | ESP DES-CBC Transform                                | 1829 |
| -----      | IP Authentication using Keyed MD5                    | 1828 |
| ESP        | IP Encapsulating Security Payload                    | 1827 |
| IPV6-AH    | IP Authentication Header                             | 1826 |
| -----      | Security Architecture for IP                         | 1825 |
| R          | Requirements for IP Version 4 Routers                | 1812 |
| URL        | Relative Uniform Resource Locators                   | 1808 |
| CLDAP      | Connection-less LDAP                                 | 1798 |
| OSPF-DC    | Ext. OSPF to Support Demand Circuits                 | 1793 |
| OSI-Dir    | OSI User Friendly Naming ...                         | 1781 |
| MIME-EDI   | MIME Encapsulation of EDI Objects                    | 1767 |
| Lang-Tag   | Tags for Identification of Languages                 | 1766 |
| XNSCP      | PPP XNS IDP Control Protocol                         | 1764 |
| BVCP       | PPP Banyan Vines Control Protocol                    | 1763 |
| Print-MIB  | Printer MIB  | 1759 |
| ATM-SIG    | ATM Signaling Support for IP over ATM                | 1755 |
| IPNG       | Recommendation for IP Next Generation                | 1752 |
| 802.5-SSR  | 802.5 SSR MIB using SMiv2                            | 1749 |
| SDLC-SMiv2 | SNADLC SDLC MIB using SMiv2                          | 1747 |
| BGP4/IDRP  | BGP4/IDRP for IP/OSPF Interaction                    | 1745 |
| AT-MIB     | Appletalk MIB  | 1742 |
| MacMIME    | MIME Encapsulation of Macintosh files                | 1740 |
| URL        | Uniform Resource Locators                            | 1738 |
| POP3-AUTH  | POP3 AUTHentication command                          | 1734 |
| IMAP4-AUTH | IMAP4 Authentication Mechanisms                      | 1731 |
| RDBMS-MIB  | RDMS MIB - using SMiv2                               | 1697 |
| MODEM-MIB  | Modem MIB - using SMiv2                              | 1696 |
| ATM-MIB    | ATM Management Version 8.0 using SMiv2               | 1695 |
| TMUX       | Transport Multiplexing Protocol                      | 1692 |
| SNANAU-MIB | SNA NAUs MIB using SMiv2                             | 1666 |
| PPP-TRANS  | PPP Reliable Transmission                            | 1663 |
| -----      | Postmaster Convention X.400 Operations               | 1648 |
| PPP-BCP    | PPP Bridging Control Protocol                        | 1638 |
| UPS-MIB    | UPS Management Information Base                      | 1628 |
| PPP-SONET  | PPP over SONET/SDH                                   | 1619 |
| PPP-ISDN   | PPP over ISDN  | 1618 |
| DNS-R-MIB  | DNS Resolver MIB Extensions                          | 1612 |
| DNS-S-MIB  | DNS Server MIB Extensions                            | 1611 |
| FR-MIB     | Frame Relay Service MIB                              | 1604 |
| PPP-X25    | PPP in X.25  | 1598 |
| OSPF-NSSA  | The OSPF NSSA Option                                 | 1587 |
| OSPF-Multi | Multicast Extensions to OSPF                         | 1584 |
| SONET-MIB  | MIB SONET/SDH Interface Type                         | 1595 |
| RIP-DC     | Extensions to RIP to Support Demand Cir.             | 1582 |
| -----      | Evolution of the Interfaces Group of MIB-II Elective | 1573 |
| TOPT-ENVIR | Telnet Environment Option                            | 1572 |
| PPP-LCP    | PPP LCP Extensions                                   | 1570 |
| X500-MIB   | X.500 Directory Monitoring MIB                       | 1567 |

|                |  |      |
|----------------|--|------|
| CIPX           | Compressing IPX Headers Over WAM Media               | 1553 |
| IPXCP          | PPP Internetworking Packet Exchange Control Elective | 1552 |
| SRB-MIB        | Source Routing Bridge MIB                            | 1525 |
| CIDR-STRA      | CIDR Address Assignment...                           | 1519 |
| CIDR-ARCH      | CIDR Architecture...                                 | 1518 |
| -----          | 802.3 MAU MIB  | 1515 |
| HOST-MIB       | Host Resources MIB                                   | 1514 |
| -----          | Token Ring Extensions to RMON MIB                    | 1513 |
| FDDI-MIB       | FDDI Management Information Base                     | 1512 |
| KERBEROS       | Kerberos Network Authentication Ser (V5)             | 1510 |
| GSSAPI         | Generic Security Service API: C-bindings             | 1509 |
| DASS           | Distributed Authentication Security...               | 1507 |
| -----          | X.400 Use of Extended Character Sets                 | 1502 |
| HARPOON        | Rules for Downgrading Messages...                    | 1496 |
| Equiv          | X.400/MIME Body Equivalences                         | 1494 |
| IDPR           | Inter-Domain Policy Routing Protocol                 | 1479 |
| IDPR-ARCH      | Architecture for IDPR                                | 1478 |
| PPP/Bridge     | MIB Bridge PPP MIB                                   | 1474 |
| PPP/IP MIB     | IP Network Control Protocol of PPP MIB               | 1473 |
| PPP/SEC MIB    | Security Protocols of PPP MIB                        | 1472 |
| PPP/LCP MIB    | Link Control Protocol of PPP MIB                     | 1471 |
| X25-MIB        | Multiprotocol Interconnect on X.25 MIB               | 1461 |
| SNMPv2         | Introduction to SNMPv2                               | 1441 |
| PEM-KEY        | PEM - Key Certification                              | 1424 |
| PEM-ALG        | PEM - Algorithms, Modes, and Identifiers             | 1423 |
| PEM-CKM        | PEM - Certificate-Based Key Management               | 1422 |
| PEM-ENC        | PEM - Message Encryption and Auth                    | 1421 |
| SNMP-IPX       | SNMP over IPX  | 1420 |
| SNMP-AT        | SNMP over AppleTalk                                  | 1419 |
| SNMP-OSI       | SNMP over OSI  | 1418 |
| FTP-FTAM       | FTP-FTAM Gateway Specification                       | 1415 |
| IDENT-MIB      | Identification MIB                                   | 1414 |
| IDENT          | Identification Protocol                              | 1413 |
| DS3/E3-MIB     | DS3/E3 Interface Type                                | 1407 |
| DS1/E1-MIB     | DS1/E1 Interface Type                                | 1406 |
| BGP-OSPF       | BGP OSPF Interaction                                 | 1403 |
| -----          | Route Advertisement In BGP2 And BGP3                 | 1397 |
| SNMP-X.25      | SNMP MIB Extension for X.25 Packet Layer             | 1382 |
| SNMP-LAPB      | SNMP MIB Extension for X.25 LAPB                     | 1381 |
| PPP-ATCP       | PPP AppleTalk Control Protocol                       | 1378 |
| PPP-OSINLCP    | PPP OSI Network Layer Control Protocol               | 1377 |
| TOPT-RFC       | Remote Flow Control                                  | 1372 |
| SNMP-PARTY-MIB | Administration of SNMP                               | 1353 |
| SNMP-SEC       | SNMP Security Protocols                              | 1352 |
| SNMP-ADMIN     | SNMP Administrative Model                            | 1351 |
| TOS            | Type of Service in the Internet                      | 1349 |
| PPP-IPCP       | PPP Control Protocol                                 | 1332 |
| -----          | X.400 1988 to 1984 downgrading                       | 1328 |



|             |   |      |
|-------------|---|------|
| TCP-EXT     | TCP Extensions for High Performance     | 1323 |
| NETFAX      | File Format for the Exchange of Images  | 1314 |
| FDDI-MIB    | FDDI-MIB                                | 1285 |
| -----       | Encoding Network Addresses              | 1277 |
| -----       | Replication and Distributed Operations  | 1276 |
| -----       | COSINE and Internet X.500 Schema        | 1274 |
| BGP-MIB     | Border Gateway Protocol MIB (Version 3) | 1269 |
| ICMP-ROUT   | ICMP Router Discovery Messages          | 1256 |
| OSI-UDP     | OSI TS on UDP                           | 1240 |
| STD-MIBs    | Reassignment of Exp MIBs to Std MIBs    | 1239 |
| IPX-IP      | Tunneling IPX Traffic through IP Nets   | 1234 |
| IS-IS       | OSI IS-IS for TCP/IP Dual Environments  | 1195 |
| IP-CMPRS    | Compressing TCP/IP Headers              | 1144 |
| TOPT-XDL    | X Display Location                      | 1096 |
| TOPT-TERM   | Terminal Type                           | 1091 |
| TOPT-TS     | Terminal Speed                          | 1079 |
| TOPT-NAWS   | Negotiate About Window Size             | 1073 |
| TOPT-X.3    | X.3 PAD                                 | 1053 |
| TOPT-DATA   | Data Entry Terminal                     | 1043 |
| TOPT-3270   | Telnet 3270 Regime                      | 1041 |
| NNTP        | Network News Transfer Protocol          | 977  |
| TOPT-TLN    | Terminal Location Number                | 946  |
| TOPT-OM     | Output Marking                          | 933  |
| TOPT-TACACS | TACACS User Identification              | 927  |
| TOPT-EOR    | End of Record                           | 885  |
| TOPT-SNDL   | Send Location                           | 779  |
| TOPT-SUPO   | SUPDUP Output                           | 749  |
| TOPT-SUP    | SUPDUP                                  | 736  |
| TOPT-BYTE   | Byte Macro                              | 735  |
| TOPT-REM    | Remote Controlled Trans and Echo        | 726  |
| TOPT-LOGO   | Logout                                  | 727  |
| TOPT-EXT    | Extended ASCII                          | 698  |

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

## 2.5. Experimental Protocols

| Protocol     | Name   | RFC   |
|--------------|--|-------|
| =====        | =====  | ===== |
| -----        | NewReno Modification to TCP's Fast Recovery Algorithm  | 2582* |
| -----        | Mapping between LPD and IPP Protocols                  | 2569* |
| IPP-RAT      | Rationale for the Structure of IPP                     | 2568* |
| IPP-DG       | Design Goals for an Internet Printing Protocol         | 2567* |
| IPP-M-S      | Internet Printing Protocol/1.0: Model and Semantics    | 2566* |
| IPP-E-T      | Internet Printing Protocol/1.0: Encoding and Transport | 2565* |
| DNS-INFO     | Detached Domain Name System (DNS) Information          | 2540* |
| PHOTURIS-E   | Photuris: Extended Schemes and Attributes              | 2523* |
| PHOTURIS-S   | Photuris: Session-Key Management Protocol              | 2522* |
| ICMP-SEC     | ICMP Security Failures Messages                        | 2521* |
| NHRP-MNHCS   | NHRP with Mobile NHCs                                  | 2520* |
| IPPM-MET     | IPPM Metrics for Measuring Connectivity                | 2498* |
| -----        | URI Resolution Services                                | 2483* |
| ECN-IP       | Explicit Congestion Notification (ECN) to IP           | 2481* |
| -----        | IPv6 Testing Address Allocation                        | 2471* |
| TCP-WIN      | Increasing TCP's Initial Window                        | 2414  |
| PIM-SM       | Protocol Independent Multicast-Sparse Mode             | 2362  |
| -----        | Domain Names and Company Name Retrieval                | 2345  |
| RTP-MPEG     | RTP Payload Format for Bundled MPEG                    | 2343  |
| -----        | Intra-LIS IP Multicast/Routers over ATM using PIM      | 2337  |
| -----        | Safe Response Header Field                             | 2310  |
| LDAP-NIS     | Approach Using LDAP as a Network Information Service   | 2307  |
| HTTP-RVSA    | HTTP Remote Variant Selection Algorithm                | 2296  |
| TCN-HTTP     | Transparent Content Negotiation in HTTP                | 2295  |
| TOPT-COMPORT | Telnet Com Port Control                                | 2217  |
| -----        | Core Based Trees (CBT) Multicast Routing Architecture  | 2201  |
| -----        | Core Based Trees (CBT version 2) Multicast Routing     | 2189  |
| -----        | Trivial Convention using HTTP in URN Resolution        | 2169  |
| -----        | Resolution of URIs using DNS                           | 2168  |
| MAP-MAIL     | X.400 Mapping and Mail-11                              | 2162  |
| MIME-ODA     | A MIME Body Part for ODA                               | 2161  |
| OSPF-DIG     | OSPF with Digital Signature                            | 2154  |
| GKMP-ARCH    | Group Key Management Protocol (GKMP) Architecture      | 2094  |
| GKMP-SPEC    | Group Key Management Protocol (GKMP) Specification     | 2093  |
| TOPT-CHARSET | Telnet CHARSET   | 2066  |
| IP-SCSI      | Encapsulating IP with the SCSI                         | 2143  |
| X.500-NAME   | Managing the X.500 Root Naming Context                 | 2120  |
| 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 |
| 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 |
| 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 |
| -----      | 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-ENCODE | DNS Encoding of Geographical Location              | 1712 |
| TCP-POS    | An Extension to TCP: Partial Order Service         | 1693 |
| T/TCP      | TCP Extensions for Transactions                    | 1644 |
| 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 |
| 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 |

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|------------|--|-----------|
| TOS-LS     | Link Security TOS                          | 1455      |
| SIFT/UFT   | Sender-Initiated/Unsolicited File Transfer | 1440      |
| DIR-ARP    | Directed ARP                               | 1433      |
| TOPT-AUTH  | Telnet Authentication Option               | 1416      |
| TEL-SPX    | Telnet Authentication: SPX                 | 1412      |
| TEL-KER    | Telnet Authentication: Kerberos V4         | 1411      |
| 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      |
| 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.]

### 3. Current Applicability Statements

- RFC1122 - Requirements for Internet hosts - communication layers (STD 3)
- RFC1123 - Requirements for Internet hosts - application and support (STD 3)
- RFC1370 - Applicability Statement for OSPF
- RFC1517 - Applicability Statement for the Implementation of Classless Inter-Domain Routing (CIDR)
- RFC1722 - RIP Version 2 Protocol Applicability Statement
- RFC1923 - RIPv1 Applicability Statement for Historic Status
- RFC2005 - Applicability Statement for IP Mobility Support
- RFC2039 - Applicability of Standards Track MIBs to Management of World Wide Web Servers
- RFC2081 - RIPng Protocol Applicability Statement
- RFC2208 - Resource ReSerVation Protocol (RSVP) -- Version 1 Applicability Statement - Some Guidelines on Deployment
- RFC2333 - NHRP Protocol Applicability Statement
- RFC2556 - OSI connectionless transport services on top of UDP Applicability Statement for Historic Status

## 4. Non-Standard Protocols

### 4.1. Informational Protocols

Please note that there are informational RFCs that do not specify protocols and are not listed here.

| Protocol    | Name   | RFC   |
|-------------|--|-------|
| =====       | =====  | ===== |
| AUDIO/L16   | Audio/L16 MIME content type                            | 2586* |
| FTP-SEC     | FTP Security Considerations                            | 2577* |
| -----       | 6Bone Routing Practice                                 | 2546* |
| DNS-SOC     | DNS Security Operational Considerations                | 2541* |
| -----       | Internet X.509 Public Key Infrastructure KEA           | 2528* |
| -----       | Internet X.509 Public Key Infrastructure CP & CPF      | 2527* |
| -----       | Known TCP Implementation Problems                      | 2525* |
| EMSD        | Neda's Efficient Mail Submission and Delivery Protocol | 2524* |
| IDRA        | Framework for Inter-Domain Route Aggregation           | 2519* |
| PPPOE       | Method for Transmitting PPP Over Ethernet              | 2516* |
| -----       | MIME Types for Use with the ISO ILL Protocol           | 2503* |
| MANET       | Mobile Ad hoc Networking Performance Issues            | 2501* |
| -----       | ST2+ over ATM Protocol Spec - UNI 3.1 Version          | 2383  |
| -----       | Mapping Airline Reservation, Ticketing, Messaging      | 2351  |
| KOI8-U      | Ukrainian Character Set KOI8-U                         | 2319  |
| TEXT-CSS    | The text/css Media Type                                | 2318  |
| PKCS-7      | PKCS #7: Cryptographic Message Syntax Version 1.5      | 2315  |
| PKCS-10     | PKCS #10: Certification Request Syntax Version 1.5     | 2314  |
| PKCS-1      | PKCS #1: RSA Encryption Version 1.5                    | 2313  |
| SMIME-CERT  | S/MIME Version 2 Certificate Handling                  | 2312  |
| SMIME-MSG   | S/MIME Version 2 Message Specification                 | 2311  |
| TIFF        | Tag Image File Format F Profile for Facsimile          | 2302  |
| GSMP        | Ipsilon's General Switch Management Protocol           | 2297  |
| HSRP        | Cisco Hot Standby Router Protocol (HSRP)               | 2281  |
| RC2-ENCRP   | A Description of the RC2(r) Encryption Algorithm       | 2268  |
| SNQP        | Simple Nomenclator Query Protocol                      | 2259  |
| -----       | Japanese Character Encoding for Internet Messages      | 2237  |
| KEYX-DNS    | Key Exchange Delegation Record for the DNS             | 2230  |
| DSP         | A Dictionary Server Protocol                           | 2229  |
| NFS-URL     | NFS URL Scheme   | 2224  |
| APP-MARC    | The Application/MARC Content-type                      | 2220  |
| ODETTE-FTP  | ODETTE File Transfer Protocol                          | 2204  |
| ESRO        | AT&T/Neda's Efficient Short Remote Operations Protocol | 2188  |
| ICP         | Internet Cache Protocol Version 2                      | 2186  |
| IPV4-MAPOS  | IPv4 over MAPOS Version 1                              | 2176  |
| MAPOS-SONET | Multiple Access Protocol over SONET/SDH Version 1      | 2171  |
| RWHOIS      | Referral Whois Protocol                                | 2167  |
| PPP-EXT     | PPP Vendor Extensions                                  | 2153  |
| UTF-7       | UTF-7  | 2152  |

|            |   |      |
|------------|---|------|
| CAST-128   | CAST-128 Encryption Algorithm   | 2144 |
| RADIUS-ACC | RADIUS Accounting   | 2139 |
| DLSCAP     | Data Link Switching Client Access Protocol  | 2114 |
| PNG        | Portable Network Graphics Version 1.0   | 2083 |
| RC5        | RC5, RC5-CBC, RC5-CBC-Pad, and RC5-CTS Algorithms                                 | 2040 |
| SNTP       | Simple Network Time Protocol v4 for IPv4, IPv6 and OSI                            | 2030 |
| PGP-MEF    | PGP Message Exchange Formats  | 1991 |
| 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 |
| -----      | 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<br>over TCP RFC1006 extension | 1859 |
| -----      | 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 |
| -----      | Data Link Switching: Switch-to-Switch Protocol                                    | 1795 |
| BGP-4      | Experience with the BGP-4 Protocol  | 1773 |
| SDMD       | IPv4 Option for Sender Directed MD Delivery                                       | 1770 |
| SNOOP      | Snoop Version 2 Packet Capture File Format  | 1761 |
| BINHEX     | MIME Content Type for BinHex Encoded Files  | 1741 |
| 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 |
| ADSNA-IP   | Advanced SNA/IP: A Simple SNA Transport Protocol                                  | 1538 |
| TACACS     | Terminal Access Control Protocol  | 1492 |
| MD4        | MD4 Message Digest Algorithm  | 1320 |
| SUN-NFS    | Network File System Protocol  | 1094 |
| SUN-RPC    | Remote Procedure Call Protocol Version 2  | 1057 |
| GOPHER     | The Internet Gopher Protocol  | 1436 |
| 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 |
| 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.]

#### 4.2. Historic Protocols

| Protocol   | Name                                       | RFC       | STD   |
|------------|--|-----------|-------|
| =====      | =====                                      | =====     | ===== |
| CONTENT    | Content Type Header Field                  | 1049      | 11 *  |
| IPV6-UNI   | IPv6 Provider-Based Unicast Address        | 2073      |       |
| IPV6-Addr  | IPv6 Addressing Architecture               | 1884      |       |
| L2F        | Cisco Layer Two Forwarding Protocol        | 2341      |       |
| IPSO       | DoD Security Options for IP                | 1108      |       |
| SNMPv2     | Manager-to-Manager MIB                     | 1451      |       |
| SNMPv2     | Party MIB for SNMPv2                       | 1447      |       |
| SNMPv2     | Security Protocols for SNMPv2              | 1446      |       |
| SNMPv2     | Administrative Model for SNMPv2            | 1445      |       |
| RIP        | Routing Information Protocol               | 1058      | 34    |
| -----      | Mapping full 822 to Restricted 822         | 1137      |       |
| BGP3       | Border Gateway Protocol 3 (BGP-3)          | 1267,1268 |       |
| -----      | Gateway Requirements                       | 1009      | 4     |
| EGP        | Exterior Gateway Protocol                  | 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      |       |
| TOPT-ENVIR | Telnet Environment Option                  | 1408      |       |
| 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       |
| TOPT-OLD   | Output Linefeed Disposition             | 658       |
| TOPT-OVTD  | Output Vertical Tab Disposition         | 657       |
| TOPT-OVT   | Output Vertical Tabstops                | 656       |
| TOPT-OFD   | Output Formfeed Disposition             | 655       |
| TOPT-OHTD  | Output Horizontal Tab Disposition       | 654       |
| TOPT-OHT   | Output Horizontal Tabstops              | 653       |
| TOPT-OCRD  | Output Carriage-Return Disposition      | 652       |
| 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 |

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## 5. Contacts

### 5.1. IAB, IETF, and IRTF Contacts

Internet Architecture Board (IAB) Contact: [www.iab.org](http://www.iab.org)

Internet Engineering Task Force (IETF) Contact: [www.ietf.org](http://www.ietf.org)

Internet Research Task Force (IRTF) Contact: [www.irtf.org](http://www.irtf.org)

### 5.2. Internet Assigned Numbers Authority Contact

See: [www.iana.org](http://www.iana.org)

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```
Retrieve: RFC
Doc-ID: RFCnnnn
```

(Where "nnnn" refers to the number of the RFC (always use 4 digits - the DOC-ID of RFC 822 is "RFC0822")). The RFC-INFO@ISI.EDU server provides other ways of selecting RFCs based on keywords and such; for more information send a message to "rfc-info@isi.edu" with the message body "help: help".

contact: RFC-Manager@ISI.EDU

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

```
help: ways_to_get_rfcs
```

## 6. Security Considerations

This memo does not affect the technical security of the Internet, but it does cite a number of important security specifications.

## 7. Editors' Addresses

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## Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

