IP, Internet Protocol

RFC Sourcebook   Description   Glossary   RFCs   Publications   Obsolete RFCs

Description:

Protocol suite: TCP/IP.

Protocol type: Connectionless network layer protocol.

Ethertype: 0x0800.

URI:

MIME subtype:

SNMP MIBs: iso.org.dod.internet.mgmt.mib-2.ip (1.3.6.1.2.1.4)
iso.org.dod.internet.mgmt.mib-2.ipMIB (1.3.6.1.2.1.48)
iso.org.dod.internet.mgmt.mib-2.ipMRouteStdMIB (1.3.6.1.2.1.83)

Working groups: 16ng, IP over IEEE 802.16 Networks.
bmwg, Benchmarking Methodology.
diffserv, Differentiated Services.
imss, Internet and Management Support for Storage.
ip1394, IP Over IEEE 1394.
ipdvb, IP over DVB.
ipoib, IP over InfiniBand.
tsvwg, Transport Area Working Group.

IANA: IP option numbers.
IP protocol numbers.
Differentiated Services Field Codepoints.

Links:

MAC header	IP header	Data :::

IP header:

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version				IHL				Differentiated Services								Total length															
Identification																Flags			Fragment offset												
TTL								Protocol								Header checksum															
Source IP address																															
Destination IP address																															
Options and padding :::																															

Version. 4 bits.
Specifies the format of the IP packet header.

Version	Description
0	reserved.
1 2 3	
4	IP, Internet Protocol.
5	ST, ST Datagram Mode.
6	SIP, Simple Internet Protocol. SIPP, Simple Internet Protocol Plus. IPv6, Internet Protocol.
7	TP/IX, The Next Internet.
8	PIP, The P Internet Protocol.
9	TUBA.
10 - 14	
15	reserved.

IHL, Internet Header Length. 4 bits.
Specifies the length of the IP packet header in 32 bit words. The minimum value for a valid header is 5.

Differentiated Services. 8 bits.
This field is defined in RFC 2474 and obsoletes the TOS field.

00	01	02	03	04	05	06	07
Codepoint						unused	

Codepoint. 6 bits.

Codepoint	Description	References
000000	CS0	RFC 2474
001000	CS1	RFC 2474
010000	CS2	RFC 2474
011000	CS3	RFC 2474
100000	CS4	RFC 2474
101000	CS5	RFC 2474
110000	CS6	RFC 2474
111000	CS7	RFC 2474
001010	Assured Forwarding 11	RFC 2597
001100	Assured Forwarding 12	RFC 2597
001110	Assured Forwarding 13	RFC 2597
010010	Assured Forwarding 21	RFC 2597
010100	Assured Forwarding 22	RFC 2597
010110	Assured Forwarding 23	RFC 2597

011010	Assured Forwarding 31	[RFC 2597](RFC 2597)
011100	Assured Forwarding 32	[RFC 2597](RFC 2597)
011110	Assured Forwarding 33	[RFC 2597](RFC 2597)
100010	Assured Forwarding 41	[RFC 2597](RFC 2597)
100100	Assured Forwarding 42	[RFC 2597](RFC 2597)
100110	Assured Forwarding 43	[RFC 2597](RFC 2597)
101100	Voice-Admit	RFC 5865
101110	Expedited Forwarding PHB	[RFC 2598](RFC 2598), RFC 3246

unused. 2 bits.

TOS, Type of Service. 8 bits.
Obsoleted by the Differentiated Services field. This field specifies the parameters for the type of service requested. The parameters may be utilized by networks to define the handling of the datagram during transport. The M bit was added to this field in [RFC 1349](RFC 1349).

00	01	02	03	04	05	06	07
Precedence			D	T	R	M	0

Precedence. 3 bits.

Value	Description
0	Routine.
1	Priority.
2	Immediate.
3	Flash.
4	Flash override.
5	CRITIC/ECP.
6	Internetwork control.
7	Network control.

D. 1 bit.
Minimize delay.

Value	Description
0	Normal delay.
1	Low delay.

T. 1 bit.
Maximize throughput.

Value	Description
0	Normal throughput.
1	High throughput.

R. 1 bit.
Maximize reliability.

Value	Description
0	Normal reliability.
1	High reliability.

M. 1 bit.
Minimize monetary cost.

Value	Description
0	Normal monetary cost.
1	Minimize monetary cost.

Total length. 16 bits.
Contains the length of the datagram.

Identification. 16 bits.
Used to identify the fragments of one datagram from those of another. The originating protocol module of an internet datagram sets the identification field to a value that must be unique for that source-destination pair and protocol for the time the datagram will be active in the internet system. The originating protocol module of a complete datagram clears the *MF* bit to zero and the *Fragment Offset* field to zero.

Flags. 3 bits.

00	01	02
R	DF	MF

R, reserved. 1 bit.
Should be cleared to 0.

DF, Don't fragment. 1 bit.
Controls the fragmentation of the datagram.

Value	Description
0	Fragment if necessary.
1	Do not fragment.

MF, More fragments. 1 bit.
Indicates if the datagram contains additional fragments.

Value	Description
0	This is the last fragment.
1	More fragments follow this fragment.

Fragment Offset. 13 bits.
Used to direct the reassembly of a fragmented datagram.

TTL, Time to Live. 8 bits.
A timer field used to track the lifetime of the datagram. When the TTL field is decremented down to zero, the datagram is discarded.

Protocol. 8 bits.
This field specifies the next encapsulated protocol.

Value	Protocol	References
0	HOPOPT, IPv6 Hop-by-Hop Option.	RFC 2460
1	ICMP, Internet Control Message Protocol.	RFC 792
2	IGAP, IGMP for user Authentication Protocol. IGMP, Internet Group Management Protocol. RGMP, Router-port Group Management Protocol.	RFC 1112
3	GGP, Gateway to Gateway Protocol.	RFC 823
4	IP in IP encapsulation.	RFC 2003
5	ST, Internet Stream Protocol.	RFC 1190, RFC 1819
6	TCP, Transmission Control Protocol.	RFC 793
7	UCL, CBT.	
8	EGP, Exterior Gateway Protocol.	RFC 888
9	IGRP, Interior Gateway Routing Protocol.	
10	BBN RCC Monitoring.	
11	NVP, Network Voice Protocol.	RFC 741
12	PUP.	
13	ARGUS.	
14	EMCON, Emission Control Protocol.	
15	XNET, Cross Net Debugger.	IEN 158
16	Chaos.	
17	UDP, User Datagram Protocol.	RFC 768
18	TMux, Transport Multiplexing Protocol.	IEN 90
19	DCN Measurement Subsystems.	
20	HMP, Host Monitoring Protocol.	RFC 869
21	Packet Radio Measurement.	
22	XEROX NS IDP.	
23	Trunk-1.	
24	Trunk-2.	
25	Leaf-1.	
26	Leaf-2.	
27	RDP, Reliable Data Protocol.	RFC 908
28	IRTP, Internet Reliable Transaction Protocol.	RFC 938
29	ISO Transport Protocol Class 4.	RFC 905
30	NETBLT, Network Block Transfer.	
31	MFE Network Services Protocol.	
32	MERIT Internodal Protocol.	

33	DCCP, Datagram Congestion Control Protocol.	
34	Third Party Connect Protocol.	
35	IDPR, Inter-Domain Policy Routing Protocol.	
36	XTP, Xpress Transfer Protocol.	
37	Datagram Delivery Protocol.	
38	IDPR, Control Message Transport Protocol.	
39	TP++ Transport Protocol.	
40	IL Transport Protocol.	
41	IPv6 over IPv4.	RFC 2473
42	SDRP, Source Demand Routing Protocol.	
43	IPv6 Routing header.	
44	IPv6 Fragment header.	
45	IDRP, Inter-Domain Routing Protocol.	
46	RSVP, Reservation Protocol.	
47	GRE, General Routing Encapsulation.	
48	DSR, Dynamic Source Routing Protocol.	
49	BNA.	
50	ESP, Encapsulating Security Payload.	
51	AH, Authentication Header.	
52	I-NLSP, Integrated Net Layer Security TUBA.	
53	SWIPE, IP with Encryption.	
54	NARP, NBMA Address Resolution Protocol.	
55	Minimal Encapsulation Protocol.	
56	TLSP, Transport Layer Security Protocol using Kryptonet key management.	
57	SKIP.	
58	ICMPv6, Internet Control Message Protocol for IPv6. MLD, Multicast Listener Discovery.	
59	IPv6 No Next Header.	
60	IPv6 Destination Options.	
61	Any host internal protocol.	
62	CFTP.	
63	Any local network.	
64	SATNET and Backroom EXPAK.	
65	Kryptolan.	
66	MIT Remote Virtual Disk Protocol.	
67	Internet Pluribus Packet Core.	
68	Any distributed file system.	
69	SATNET Monitoring.	
70	VISA Protocol.	
71	Internet Packet Core Utility.	
72	Computer Protocol Network Executive.	
73	Computer Protocol Heart Beat.	

74	Wang Span Network.	
75	Packet Video Protocol.	
76	Backroom SATNET Monitoring.	
77	SUN ND PROTOCOL-Temporary.	
78	WIDEBAND Monitoring.	
79	WIDEBAND EXPAK.	
80	ISO-IP.	
81	VMTP, Versatile Message Transaction Protocol.	
82	SECURE-VMTP	
83	VINES.	
84	TTP.	
85	NSFNET-IGP.	
86	Dissimilar Gateway Protocol.	
87	TCF.	
88	EIGRP.	
89	OSPF, Open Shortest Path First Routing Protocol. MOSPF, Multicast Open Shortest Path First.	
90	Sprite RPC Protocol.	
91	Locus Address Resolution Protocol.	
92	MTP, Multicast Transport Protocol.	
93	AX.25.	
94	IP-within-IP Encapsulation Protocol.	
95	Mobile Internetworking Control Protocol.	
96	Semaphore Communications Sec. Pro.	
97	EtherIP.	
98	Encapsulation Header.	
99	Any private encryption scheme.	
100	GMTP.	
101	IFMP, Ipsilon Flow Management Protocol.	
102	PNNI over IP.	
103	PIM, Protocol Independent Multicast.	
104	ARIS.	
105	SCPS.	
106	QNX.	
107	Active Networks.	
108	IPPCP, IP Payload Compression Protocol.	RFC 2393
109	SNP, Sitara Networks Protocol.	
110	Compaq Peer Protocol.	
111	IPX in IP.	
112	VRRP, Virtual Router Redundancy Protocol.	RFC 3768, RFC 5798
113	PGM, Pragmatic General Multicast.	

114	any 0-hop protocol.	
115	L2TP, Level 2 Tunneling Protocol.	RFC 3931
116	DDX, D-II Data Exchange.	
117	IATP, Interactive Agent Transfer Protocol.	
118	ST, Schedule Transfer.	
119	SRP, SpectraLink Radio Protocol.	
120	UTI.	
121	SMP, Simple Message Protocol.	
122	SM.	
123	PTP, Performance Transparency Protocol.	
124	ISIS over IPv4.	
125	FIRE.	
126	CRTP, Combat Radio Transport Protocol.	
127	CRUDP, Combat Radio User Datagram.	
128	SSCOPMCE.	
129	IPLT.	
130	SPS, Secure Packet Shield.	
131	PIPE, Private IP Encapsulation within IP.	
132	SCTP, Stream Control Transmission Protocol.	
133	Fibre Channel.	RFC 6172
134	RSVP-E2E-IGNORE.	RFC 3175
135	Mobility Header.	RFC 3775
136	UDP-Lite, Lightweight User Datagram Protocol.	RFC 3828
137	MPLS in IP.	RFC 4023
138	MANET protocols.	RFC 5498
139	HIP, Host Identity Protocol.	RFC 5201
140	Shim6, Level 3 Multihoming Shim Protocol for IPv6.	RFC 5533
141	WESP, Wrapped Encapsulating Security Payload.	RFC 5840
142	ROHC, RObust Header Compression.	RFC 5858
143 - 252		
253 254	Experimentation and testing.	
255	reserved.	

Header checksum. 16 bits.
A 16 bit one's complement checksum of the IP header and IP options.

Source IP address. 32 bits.
IP address of the sender.

Destination IP address. 32 bits.
IP address of the intended receiver.

Options. Variable length.

00	01	02	03	04	05	06	07
C	Class		Option				

C, Copy flag. 1 bit.
Indicates if the option is to be copied into all fragments.

Value	Description
0	Do not copy.
1	Copy.

Class. 2 bits.

Value	Description
0	Control.
1	Reserved.
2	Debugging and measurement.
3	Reserved.

Option. 5 bits.

Option	Copy	Class	Value	Length	Description	References
0	0	0	0	1	End of options list.	RFC 791
1	0	0	1	1	NOP.	RFC 791
2	1	0	130	11	Security.	RFC 791, RFC 1108
3	1	0	131	variable	Loose Source Route.	RFC 791
4	0	2	68	variable	Time stamp.	RFC 781, RFC 791
5	1	0	133	3 to 31	Extended Security.	RFC 1108
6	1	0	134		Commercial Security.	
7	0	0	7	variable	Record Route.	RFC 791
8	1	0	136	4	Stream Identifier.	RFC 791, RFC 1122
9	1	0	137	variable	Strict Source Route.	RFC 791
10	0	0	10		Experimental Measurement.	
11	0	0	11	4	MTU Probe. (obsolete).	RFC 1063
12	0	0	12	4	MTU Reply. (obsolete).	RFC 1063
13	1	2	205		Experimental Flow Control.	
14	1	0	142		Expermental Access Control.	
15	0	0	15		ENCODE.	
16	1	0	144		IMI Traffic Descriptor.	
17	1	0	145	variable	Extended Internet Protocol.	RFC 1385
18	0	2	82	12	Traceroute.	RFC 1393
19	1	0	147	10	Address Extension.	RFC 1475
20	1	0	148	4	Router Alert.	RFC 2113

21	1	0	149	6 to 38	Selective Directed Broadcast Mode.	RFC 1770
22	1	0	150			
23	1	0	151		Dynamic Packet State.	
24	1	0	152		Upstream Multicast Packet.	
25	0	0	25		QS, Quick-Start.	RFC 4782
26 - 29						
30	0	0	30		EXP - RFC3692-style Experiment.	RFC 4727
30	0	2	94		EXP - RFC3692-style Experiment.	RFC 4727
30	1	0	158		EXP - RFC3692-style Experiment	RFC 4727
30	1	2	222		EXP - RFC3692-style Experiment.	RFC 4727
31						

Padding. Variable length.
Used as a filler to guarantee that the data starts on a 32 bit boundary.

Glossary:

Back-to-back.
(RFC 1242: 3.1) Fixed length frames presented at a rate such that there is the minimum legal separation for a given medium between frames over a short to medium period of time, starting from an idle state.

Bridge/router.
(RFC 1242: 3.3) A network device that can selectively function as a router and/or a bridge based on the protocol of a specific frame.

Constant Load.
(RFC 1242: 3.4) Fixed length frames at a fixed interval time.

Data link frame size.
(RFC 1242: 3.5) The number of bytes in the frame from the first byte following the preamble to the end of the FCS, if present, or to the last octet of the data if there is no FCS.

Differentiated Services.
(RFC 3140) Differentiated Services introduces the notion of Per Hop Behaviors (PHBs) that define how traffic belonging to a particular behavior aggregate is treated at an individual network node. In IP packet headers, PHBs are not indicated as such; instead Differentiated Services Codepoint (DSCP) values are used. There are only 64 possible DSCP values, but there is no such limit on the number of PHBs. In a given network domain, there is a locally defined mapping between DSCP values and PHBs. Standardized PHBs recommend a DSCP mapping, but network operators may choose alternative mappings.

Forward Tunnel.
(RFC 2344: 1.1) A tunnel that shuttles packets towards the mobile node. It starts at the home agent, and ends at the mobile node's care-of address.

Frame loss rate.
(RFC 1242: 3.6) Percentage of frames that should have been forwarded by a network device under steady

state (constant) load that were not forwarded due to lack of resources.

Inter Frame Gap.
(RFC 1242: 3.7) The delay from the end of a data link frame to the start of the preamble of the next data link frame.

IPv4 internet address.
A 32 bit value that contains the network and host number fields. There are five classes of internet addresses: The class indicates the size of the network and host fields. Internet addresses are commonly displayed in dotted decimal notation format XXX.XXX.XXX.XXX.

Class	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	0	Network bits							Host bits																							
B	1	0	Network bits														Host bits															
C	1	1	0	Network bits																				Host bits							
D	1	1	1	0	Multicast group																											
E	1	1	1	1	0	reserved																										

Internet address block allocation.

Block	Description
0.0.0.0/8	Addresses in this block refer to source hosts on "this" network. Address 0.0.0.0/32 may be used as a source address for this host on this network; other addresses within 0.0.0.0/8 may be used to refer to specified hosts on this network.
10.0.0.0/8	Private use networks. Addresses within this block should not appear on the public Internet.
14.0.0.0/8	Public Data Networks.
24.0.0.0/8	Cable television networks provisioning.
39.0.0.0/8	This block was used in the "Class A Subnet Experiment" that commenced in May 1995. The experiment has been completed and this block has been returned to the pool of addresses reserved for future allocation or assignment. This block therefore no longer has a special use and is subject to allocation to a Regional Internet Registry for assignment in the normal manner.
127.0.0.0/8	Loopback. A datagram sent by a higher level protocol to an address anywhere within this block should loop back inside the host. This is ordinarily implemented using only 127.0.0.1/32 for loopback, but no addresses within this block should ever appear on any network anywhere.
128.0.0.0/16	This block, corresponding to the numerically lowest of the former Class B addresses, was initially and is still reserved by the IANA. Given the present classless nature of the IP address space, the basis for the reservation no longer applies and addresses in this block are subject to future allocation to a Regional Internet Registry for assignment in the normal manner.
169.254.0.0/16	Link Local. It is allocated for communication between hosts on a single link. Hosts obtain these addresses by autoconfiguration, such as when a DHCP server may not be found.
172.16.0.0/12	Private use networks. Addresses within this block should not appear on the public Internet.
	This block, corresponding to the numerically highest to the former Class B addresses, was

191.255.0.0/16	initially and is still reserved by the IANA. Given the present classless nature of the IP address space, the basis for the reservation no longer applies and addresses in this block are subject to future allocation to a Regional Internet Registry for assignment in the normal manner.
192.0.0.0/24	This block, corresponding to the numerically lowest of the former Class C addresses, was initially and is still reserved by the IANA. Given the present classless nature of the IP address space, the basis for the reservation no longer applies and addresses in this block are subject to future allocation to a Regional Internet Registry for assignment in the normal manner.
192.0.2.0/24	Test-Net. It is often used in conjunction with domain names example.com or example.net in vendor and protocol documentation. Addresses within this block should not appear on the public Internet.
192.88.99.0/24	6to4 relay anycast.
192.168.0.0/16	Private use networks. Addresses within this block should not appear on the public Internet.
198.18.0.0/15	Network interconnect device benchmark testing.
223.255.255.0/24	This block, corresponding to the numerically highest of the former Class C addresses, was initially and is still reserved by the IANA. Given the present classless nature of the IP address space, the basis for the reservation no longer applies and addresses in this block are subject to future allocation to a Regional Internet Registry for assignment in the normal manner.
224.0.0.0/4	Multicast. Formerly known as the Class D address space, it is allocated for use in IPv4 multicast address assignments.
240.0.0.0/4	This block, formerly known as the Class E address space, is reserved. The "limited broadcast" destination address 255.255.255.255 should never be forwarded outside the (sub-)net of the source. The remainder of this space is reserved for future use.

Internet datagram.
The data header and message that are transmitted between internet hosts.

Internet fragment.
A part of the data message with intact header fields.

Latency.
(RFC 1242: 3.8) For store and forward devices: The time interval starting when the last bit of the input frame reaches the input port and ending when the first bit of the output frame is seen on the output port. For bit forwarding devices: The time interval starting when the end of the first bit of the input frame reaches the input port and ending when the start of the first bit of the output frame is seen on the output port.

Link Speed Mismatch.
(RFC 1242: 3.9) Speed mismatch between input and output data rates.

Multicast.

multihomed.
A node with multiple IP addresses.

MTU, Maximum Transmission Unit.

MTU-mismatch behavior.
The MTU of the output network is smaller than the MTU of the input network. This results in packet fragmentation.

Overhead behavior.
(RFC 1242: 3.11) Processing done other than that for normal data frames.

Overloaded behavior.
(RFC 1242: 3.12) When demand exceeds available system resources.

Policy based filtering.
(RFC 1242: 3.13) The process of discarding received frames by administrative decision where normal operation would be to forward them.

Restart behavior.
(RFC 1242: 3.14) Reinitialization of system causing data loss.

Reverse Tunnel.
(RFC 2344: 1.1) A tunnel that starts at the mobile node's care-of address and terminates at the home agent.

Route.

Routing.
An algorithm for moving frames between connected networks.

Single frame behavior.
(RFC 1242: 3.16) One frame received on the input to a device.

Subnet.

Throughput.
(RFC 1242: 3.17) The maximum rate at which none of the offered frames are dropped by the device.

RFCs:

[**IEN 92**] Protocol Options.

[**IEN 95**] Source Routing.

[**IEN 114**] PROTOCOL OPTIONS.

[**IEN 186**] PROPOSED DCEC IP SPECIFICATION.

[**IEN 212**] IP - Local Area Network Addressing Issues.

[**RFC 781**] A SPECIFICATION OF THE INTERNET PROTOCOL (IP) TIMESTAMP OPTION.

- Defines IP option 4 (Timestamp).

[**RFC 791**] Internet Protocol.

- STD: 5.

- Defines Internet Protocol version 4.
- Updated by:
  RFC 1349.

[RFC 795] SERVICE MAPPINGS.

[RFC 796] ADDRESS MAPPINGS.

- Obsoletes:
  IEN 115.

[RFC 815] IP DATAGRAM REASSEMBLY ALGORITHMS.

[RFC 894] A Standard for the Transmission of IP Datagrams over Ethernet Networks.

- STD: 41.

[RFC 895] A Standard for the Transmission of IP Datagrams over Experimental Ethernet Networks.

- STD: 42.

[RFC 917] INTERNET SUBNETS.

[RFC 919] BROADCASTING INTERNET DATAGRAMS.

- STD: 5.

[RFC 922] BROADCASTING INTERNET DATAGRAMS IN THE PRESENCE OF SUBNETS.

- STD: 5.

[RFC 932] A SUBNETWORK ADDRESSING SCHEME.

[RFC 936] Another Internet Subnet Addressing Scheme.

[RFC 940] Toward an Internet Standard Scheme for Subnetting.

[RFC 950] IP Subnet Extension.

- STD: 5.
- Defines ICMP messages 17 (Address mask request) and 18 (Address mask reply).

[RFC 963] SOME PROBLEMS WITH THE SPECIFICATION OF THE MILITARY STANDARD INTERNET PROTOCOL.

[RFC 1042] A Standard for the Transmission of IP Datagrams over IEEE 802 Networks.

- STD: 43.
- Obsoletes:
  RFC 948.

[RFC 1044] Internet Protocol on Network Systems HYPERchannel Protocol Specification.

- STD: 45.

[RFC 1046] A Queuing Algorithm to Provide Type-of-Service for IP Links.

[RFC 1055] A NONSTANDARD FOR TRANSMISSION OF IP DATAGRAMS OVER SERIAL LINES: SLIP.

- STD: 47.

[RFC 1070] Use of the Internet as a Subnetwork for Experimentation with the OSI Network Layer.

[RFC 1088] A Standard for the Transmission of IP Datagrams over NetBIOS Networks.

- STD: 48.

[RFC 1108] U.S. Department of Defense Security Options for the Internet Protocol.

- Defines IP options 2 and 5.
- Obsoletes: RFC 1038.

[RFC 1112] Host Extensions for IP Multicasting.

- STD: 5.
- Updated by:
  RFC 2236.
- Obsoletes:
  RFC 988, RFC 1054.

[RFC 1122] Requirements for Internet Hosts -- Communication Layers.

- STD: 3.
- Updated by:
  RFC 1349, RFC 4379.

[RFC 1132] A Standard for the Transmission of 802.2 Packets over IPX Networks.

- STD: 49.

[RFC 1141] Incremental Updating of the Internet Checksum.

- Obsoletes:
  RFC 1071.

[RFC 1156] Management Information Base for Network Management of TCP/IP-based internets.

- Obsoletes:
  RFC 1066.

[RFC 1180] A TCP/IP Tutorial.

[RFC 1188] A Proposed Standard for the Transmission of IP Datagrams over FDDI Networks.

- Obsoletes:

[RFC 1103](#).

[RFC 1191] Path MTU Discovery.

- Obsoletes:
  [RFC 1063](#).

[RFC 1201] Transmitting IP Traffic over ARCNET Networks.

- STD: 46.
- Obsoletes:
  [RFC 1051](#).

[RFC 1209] The Transmission of IP Datagrams over the SMDS Service.

- STD: 52.

[RFC 1213] Management Information Base for Network Management of TCP/IP-based internets: MIB-II.

- STD: 17.
- Obsoletes:
  [RFC 1158](#).

[RFC 1219] On the Assignment of Subnet Numbers.

[RFC 1226] Internet Protocol Encapsulation of AX.25 Frames.

[RFC 1234] Tunneling IPX Traffic through IP Networks.

[RFC 1236] IP to X.121 Address Mapping for DDN.

[RFC 1242] Benchmarking Terminology for Network Interconnection Devices.

[RFC 1356] Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode.

- Obsoletes:
  [RFC 877](#).

[RFC 1365] An IP Address Extension Proposal.

[RFC 1375] Suggestion for New Classes of IP Addresses.

[RFC 1390] Transmission of IP and ARP over FDDI Networks.

- STD: 36.

[RFC 1393] Traceroute Using an IP Option.

- Defines ICMP message 30 (Traceroute).
- Defines IP option 18 (Traceroute).

[RFC 1454] Comparison of Proposals for Next Version of IP.

[RFC 1466] Guidelines for Management of IP Address Space.

- Obsoletes:
  RFC 1366.

[RFC 1469] IP Multicast over Token-Ring Local Area Networks.

[RFC 1475] TP/IX: The Next Internet.

- Defines ICMP message 31 (Conversion error).
- Defines IP version 7.

[RFC 1575] An Echo Function for CLNP (ISO 8473).

- Category: Standards Track.
- Obsoletes:
  RFC 1139.

[RFC 1608] Representing IP Information in the X.500 Directory.

- Category: Experimental.

[RFC 1620] Internet Architecture Extensions for Shared Media.

- Category: Informational.

[RFC 1624] Computation of the Internet Checksum via Incremental Update.

- Category: Informational.
- Updates:
  RFC 1141.

[RFC 1744] Observations on the Management of the Internet Address Space.

- Category: Informational.

[RFC 1755] ATM Signaling Support for IP over ATM.

- Category: Standards Track.

[RFC 1770] IPv4 Option for Sender Directed Multi-Destination Delivery.

- Category: Informational.
- Defines IP option 21 (Selective Directed Broadcast Mode).

[RFC 1797] Class A Subnet Experiment.

- Category: Experimental.

[RFC 1812] Requirements for IP Version 4 Routers.

- Category: Standards Track.
- Obsoletes:

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[**RFC 1814**] Unique Addresses are Good.

- Category: Informational.

[**RFC 1821**] Integration of Real-time Services in an IP-ATM Network Architecture.

- Category: Informational.

[**RFC 1858**] Security Considerations for IP Fragment Filtering.

- Category: Informational.

[**RFC 1878**] Variable Length Subnet Table For IPv4.

- Category: Informational.
- Obsoletes:
  RFC 1860.

[**RFC 1917**] An Appeal to the Internet Community to Return Unused IP Networks (Prefixes) to the IANA.

- BCP: 4.

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- BCP: 5.
- Obsoletes:
  RFC 1597, RFC 1627.

[**RFC 1932**] IP over ATM: A Framework Document.

- Category: Informational.

[**RFC 1944**] Benchmarking Methodology for Network Interconnect Devices.

- Category: Informational.

[**RFC 1953**] Ipsilon Flow Management Protocol Specification for IPv4 Version 1.0.

- Category: Informational.

[**RFC 1954**] Transmission of Flow Labelled IPv4 on ATM Data Links Ipsilon Version 1.0.

- Category: Informational.

[**RFC 2003**] IP Encapsulation within IP.

- Category: Standards Track.

[**RFC 2004**] Minimal Encapsulation within IP.

- Category: Standards Track.

[RFC 2005] Applicability Statement for IP Mobility Support.

- Category: Standards Track.

[RFC 2006] The Definitions of Managed Objects for IP Mobility Support using SMIv2.

- Category: Standards Track.
- Defines SNMP MIB iso.org.dod.internet.mgmt.mib-2.mipMIB (1.3.6.1.2.1.44).

[RFC 2022] Support for Multicast over UNI 3.0/3.1 based ATM Networks.

- Category: Standards Track.

[RFC 2067] IP over HIPPI.

- Category: Standards Track.
- Obsoletes:
  RFC 1374.

[RFC 2085] HMAC-MD5 IP Authentication with Replay Prevention.

- Category: Standards Track.

[RFC 2101] IPv4 Address Behaviour Today.

- Category: Informational.

[RFC 2113] IP Router Alert Option.

- Category: Standards Track.
- Defines IP option 20 (Router Alert).

[RFC 2143] Encapsulating IP with the Small Computer System Interface.

- Category: Experimental.

[RFC 2176] IPv4 over MAPOS Version 1.

- Category: Informational.
- Describes how IP and ARP are encapsulated in MAPOS.

[RFC 2225] Classical IP and ARP over ATM.

- Category: Standards Track.
- Obsoletes:
  RFC 1577, RFC 1626.

[RFC 2226] IP Broadcast over ATM Networks.

- Category: Standards Track.

[RFC 2285] Benchmarking Terminology for LAN Switching Devices.

- Category: Informational.

[**RFC 2336**] Classical IP and ARP over ATM to NHRP Transition.

- Category: Informational.

[**RFC 2365**] Administratively Scoped IP Multicast.

- BCP: 23.

[**RFC 2432**] Terminology for IP Multicast Benchmarking.

- Category: Informational.

[**RFC 2474**] Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers.

- Category: Standards Track.
- Defines use of the Differentiated Services Field in the IP and IPv6 headers.
- Obsoletes:
  RFC 1349, RFC 1455.

[**RFC 2475**] An Architecture for Differentiated Services.

- Category: Informational.

[**RFC 2507**] IP Header Compression.

- Category: Standards Track.

[**RFC 2508**] Compressing IP/UDP/RTP Headers for Low-Speed Serial Links.

- Category: Standards Track.

[**RFC 2597**] Assured Forwarding PHB Group.

- Category: Standards Track.
- Defines the Differentiated Services Assured Forwarding PHB group.

[**RFC 2598**] An Expedited Forwarding PHB.

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[**RFC 2697**] A Single Rate Three Color Marker.

- Category: Informational.

[**RFC 2698**] A Two Rate Three Color Marker.

- Category: Informational.

[**RFC 2728**] The Transmission of IP Over the Vertical Blanking Interval of a Television Signal.

- Category: Standards Track.

[**RFC 2734**] IPv4 over IEEE 1394.

- Category: Standards Track.

[**RFC 2757**] Long Thin Networks.

- Category: Informational.

[**RFC 2765**] Stateless IP/ICMP Translation Algorithm (SIIT).

- Category: Standards Track.

[**RFC 2766**] Network Address Translation - Protocol Translation (NAT-PT).

- Category: Standards Track.

[**RFC 2767**] Dual Stack Hosts using the "Bump-In-the-Stack" Technique (BIS).

- Category: Informational.

[**RFC 2780**] IANA Allocation Guidelines For Values In the Internet Protocol and Related Headers.

- BCP: 37.
- Updated by:
  RFC 4443, RFC 5237.

[**RFC 2834**] ARP and IP Broadcast over HIPPI-800.

- Category: Standards Track.
- Obsoletes:
  RFC 1374.

[**RFC 2835**] IP and ARP over HIPPI-6400 (GSN).

- Category: Standards Track.

[**RFC 2932**] IPv4 Multicast Routing MIB.

- Category: Standards Track.
- Defines SNMP MIB iso.org.dod.internet.mgmt.mib-2.ipMRouteStdMIB (1.3.6.1.2.1.83).

[**RFC 2983**] Differentiated Services and Tunnels.

- Category: Informational.

[**RFC 3021**] Using 31-Bit Prefixes on IPv4 Point-to-Point Links.

- Category: Standards Track.

[**RFC 3086**] Definition of Differentiated Services Per Domain Behaviors and Rules for their Specification.

- Category: Informational.

[RFC 3095] RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP, and uncompressed.

- Category: Standards Track.
- Updated by:
  RFC 3759.

[RFC 3128] Protection Against a Variant of the Tiny Fragment Attack.

- Category: Informational.
- Updates:
  RFC 1858.

[RFC 3140] Per Hop Behavior Identification Codes.

- Category: Standards Track.
- Obsoletes:
  RFC 2836.

[RFC 3142] An IPv6-to-IPv4 Transport Relay Translator.

- Category: Informational.

[RFC 3168] The Addition of Explicit Congestion Notification (ECN) to IP.

- Category: Standards Track.
- Updated by:
  RFC 6040.
- Obsoletes:
  RFC 2481.
- Updates:
  RFC 793, RFC 2401, RFC 2474.

[RFC 3330] Special-Use IPv4 Addresses.

- Category: Informational.

[RFC 3393] IP Packet Delay Variation Metric for IP Performance Metrics (IPPM).

- Category: Standards Track.

[RFC 3544] IP Header Compression over PPP.

- Category: Standards Track.
- Obsoletes:
  RFC 2509.

[RFC 3545] Enhanced Compressed RTP (CRTP) for Links with High Delay, Packet Loss and Reordering.

- Category: Standards Track.

[RFC 3754] IP Multicast in Differentiated Services (DS) Networks.

- Category: Informational.

[RFC 3789] Introduction to the Survey of IPv4 Addresses in Currently Deployed IETF Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3790] Survey of IPv4 Addresses in Currently Deployed IETF Internet Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3791] Survey of IPv4 Addresses in Currently Deployed IETF Routing Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3792] Survey of IPv4 Addresses in Currently Deployed IETF Security Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3793] Survey of IPv4 Addresses in Currently Deployed IETF Sub-IP Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3794] Survey of IPv4 Addresses in Currently Deployed IETF Transport Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3795] Survey of IPv4 Addresses in Currently Deployed IETF Application Area Standards Track and Experimental Documents.

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[RFC 3796] Survey of IPv4 Addresses in Currently Deployed IETF Operations & Management Area Standards Track and Experimental Documents.

- Category: Informational.

[RFC 3843] RObust Header Compression (ROHC): A Compression Profile for IP.

- Category: Standards Track.

[RFC 3927] Dynamic Configuration of IPv4 Link-Local Addresses.

- Category: Standards Track.
- Defines the configuration of IPv4 Link-Local addresses (169.254/16).

[RFC 3964] Security Considerations for 6to4.

- Category: Informational.

[RFC 4213] Basic Transition Mechanisms for IPv6 Hosts and Routers.

- Category: Standards Track.
- Obsoletes:
  RFC 2893.

[RFC 4215] Analysis on IPv6 Transition in Third Generation Partnership Project (3GPP) Networks.

- Category: Informational.

[RFC 4259] A Framework for Transmission of IP Datagrams over MPEG-2 Networks.

- Category: Informational.

[RFC 4292] IP Forwarding Table MIB.

- Category: Standards Track.
- Obsoletes:
  RFC 2096.

[RFC 4293] Management Information Base for the Internet Protocol (IP).

- Category: Standards Track.
- Updates SNMP MIB iso.org.dod.internet.mgmt.mib-2.icmp (1.3.6.1.2.1.5).
- Updates SNMP MIB iso.org.dod.internet.mgmt.mib-2.ipMIB (1.3.6.1.2.1.48).
- Obsoletes:
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[RFC 4301] Security Architecture for the Internet Protocol.

- Category: Standards Track.
- Updated by:
  RFC 6040.
- Obsoletes:
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[RFC 4326] Unidirectional Lightweight Encapsulation (ULE) for Transmission of IP Datagrams over an MPEG-2 Transport Stream (TS).

- Category: Standards Track.

[RFC 4338] Transmission of IPv6, IPv4, and Address Resolution Protocol (ARP) Packets over Fibre Channel.

- Category: Standards Track.
- Obsoletes:
  RFC 2625, RFC 3831.

[RFC 4391] Transmission of IP over InfiniBand (IPoIB).

- Category: Standards Track.

[RFC 4392] IP over InfiniBand (IPoIB) Architecture.

- Category: Informational.

[RFC 4413] TCP/IP Field Behavior.

- Category: Informational.

[RFC 4774] Specifying Alternate Semantics for the Explicit Congestion Notification (ECN) Field.

- BCP: 124.
- Updated by:
  RFC 6040.

[RFC 5227] IPv4 Address Conflict Detection.

- Category: Standards Track.
- Updates:
  RFC 826.

[RFC 5237] IANA Allocation Guidelines for the Protocol Field.

- BCP: 37.
- Updates:
  RFC 2780.

[RFC 5889] IP Addressing Model in Ad Hoc Networks.

- Category: Informational.

[RFC 6040] Tunnelling of Explicit Congestion Notification.

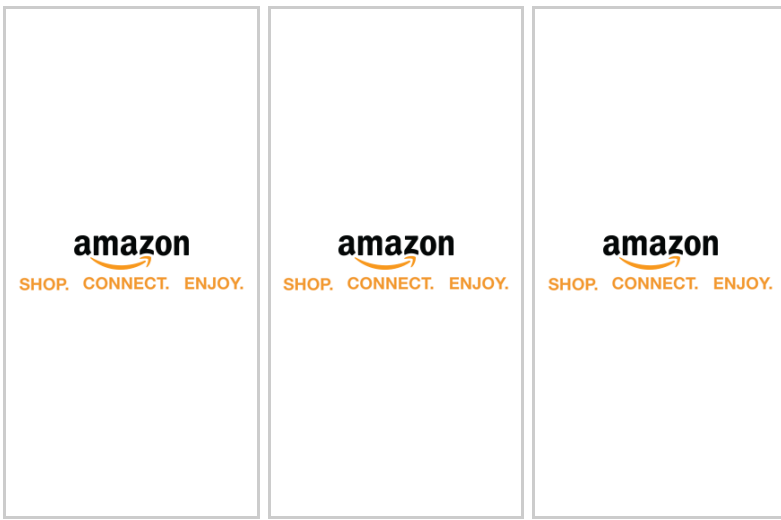- Category: Standards Track.
- Updates:
  RFC 3168, RFC 4301, RFC 4774.

[RFC 6598] IANA-Reserved IPv4 Prefix for Shared Address Space.

- BCP: 153.
- Defines the IPv4 address range 100.64.0.0/10 as a Shared Address Space.
- Updates:
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- Obsoleted by:
  IEN 123, RFC 760.
- Obsoletes:
  IEN 26, IEN 28, IEN 41, IEN 44, IEN 54, IEN 80.

[IEN 115] ADDRESS MAPPINGS.

- Obsoleted by:
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[IEN 123] DOD STANDARD INTERNET PROTOCOL.

- Obsoleted by:
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- Obsoletes:
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[RFC 760] DOD STANDARD INTERNET PROTOCOL.

- Obsoleted by:
  RFC 791.
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  RFC 777, RFC 792.
- Obsoletes:
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[RFC 877] A Standard for the Transmission of IP Datagrams Over Public Data Networks.

- Obsoleted by:
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[RFC 948] TWO METHODS FOR THE TRANSMISSION OF IP DATAGRAMS OVER IEEE 802.3 NETWORKS.

- Obsoleted by:
  RFC 1042.

[RFC 988] Host Extensions for IP Multicasting.

- Defines IGMP version 0.
- Obsoleted by:
  RFC 1054, RFC 1112.
- Obsoletes:
  RFC 966.

[RFC 1038] Draft Revised IP Security Option.

- Obsoleted by:
  RFC 1108.

[RFC 1051] A Standard for the Transmission of IP Datagrams and ARP Packets over ARCNET Networks.

- Obsoleted by:
  RFC 1201.

[RFC 1054] Host Extensions for IP Multicasting.

- Obsoleted by:
  RFC 1112.
- Obsoletes:
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[RFC 1063] IP MTU Discovery Options.

- Obsoleted by:
  RFC 1191.

[RFC 1066] Management Information Base for Network Management of TCP/IP-based internets.

- Obsoleted by:
  RFC 1156.

[RFC 1071] Computing the Internet Checksum.

- Obsoleted by:
  RFC 1141.

[RFC 1103] A Proposed Standard for the Transmission of IP Datagrams over FDDI Networks.

- Obsoleted by:
  RFC 1188.

[RFC 1349] Type of Service in the Internet Protocol Suite.

- Obsoleted by:
  RFC 2474.

- Updates:
  [RFC 791](), [RFC 1060](), [RFC 1122](), [RFC 1123](), [RFC 1195](), [RFC 1247](), [RFC 1248]().

[RFC 1354] IP Forwarding Table MIB.

- Obsoleted by:
  [RFC 2096]().

[RFC 1366] Guidelines for Management of IP Address Space.

- Obsoleted by:
  [RFC 1466]().

[RFC 1374] IP and ARP on HIPPI.

- Obsoleted by:
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[RFC 1455] Physical Link Security Type of Service.

- Obsoleted by:
  [RFC 2474]().

[RFC 1597] Address Allocation for Private Internets.

- Category: Informational.
- Obsoleted by:
  [RFC 1918]().

[RFC 1626] Default IP MTU for use over ATM AAL5.

- Category: Standards Track.
- Obsoleted by:
  [RFC 2225]().

[RFC 1716] Towards Requirements for IP Routers.

- Category: Informational.
- Obsoleted by:
  [RFC 1812]().

[RFC 1826] IP Authentication Header.

- Category: Standards Track.
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  [RFC 2402]().

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- Obsoleted by:
  [RFC 2406]().

[RFC 1860] Variable Length Subnet Table For IPv4.

- Category: Informational.
- Obsoleted by:
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[RFC 1933] Transition Mechanisms for IPv6 Hosts and Routers.

- Category: Standards Track.
- Obsoleted by:
  RFC 2893.

[RFC 2002] IP Mobility Support.

- Category: Standards Track.
- Obsoleted by:
  RFC 3220.

[RFC 2011] SNMPv2 Management Information Base for the Internet Protocol using SMIv2.

- Category: Standards Track.
- Updates SNMP MIB iso.org.dod.internet.mgmt.mib-2.icmp (1.3.6.1.2.1.5).
- Defines SNMP MIB iso.org.dod.internet.mgmt.mib-2.ipMIB (1.3.6.1.2.1.48).
- Obsoleted by:
  RFC 4293.
- Updates:
  RFC 1213.

[RFC 2096] IP Forwarding Table MIB.

- Category: Standards Track.
- Obsoleted by:
  RFC 4292.
- Obsoletes:
  RFC 1354.

[RFC 2344] Reverse Tunneling for Mobile IP.

- Category: Standards Track.
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  RFC 3024.

[RFC 2401] Security Architecture for the Internet Protocol.

- Category: Standards Track.
- Obsoleted by:
  RFC 4301.
- Obsoletes:
  RFC 1825.

[RFC 2481] A Proposal to add Explicit Congestion Notification (ECN) to IP.

- Category: Experimental.
- Obsoleted by:
  RFC 3168.

[RFC 2509] IP Header Compression over PPP.

- Category: Standards Track.
- Obsoleted by:
  RFC 3544.

[RFC 2625] IP and ARP over Fibre Channel.

- Category: Standards Track.
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  RFC 4338.

[RFC 2836] Per Hop Behavior Identification Codes.

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- Obsoleted by:
  RFC 3140.

[RFC 2893] Transition Mechanisms for IPv6 Hosts and Routers.

- Category: Standards Track.
- Obsoleted by:
  RFC 4213.
- Obsoletes:
  RFC 1933.

RFC Sourcebook   **Description**   **Glossary**   **RFCs**   **Publications**   **Obsolete RFCs**