

Network Working Group  
Request for Comments: 1010

J. Reynolds  
J. Postel  
ISI  
May 1987

Obsoletes RFCs: 990, 960, 943, 923, 900, 870,  
820, 790, 776, 770, 762, 758,  
755, 750, 739, 604, 503, 433, 349  
Obsoletes IENs: 127, 117, 93

## ASSIGNED NUMBERS

### Status of this Memo

This memo is an official status report on the numbers used in protocols in the Internet community. Distribution of this memo is unlimited.

### Introduction

This Network Working Group Request for Comments documents the currently assigned values from several series of numbers used in network protocol implementations. This RFC will be updated periodically, and in any case current information can be obtained from Joyce Reynolds. If you are developing a protocol or application that will require the use of a link, socket, port, protocol, etc., please contact Joyce to receive a number assignment.

Joyce K. Reynolds  
USC - Information Sciences Institute  
4676 Admiralty Way  
Marina del Rey, California 90292-6695

Phone: (213) 822-1511

Electronic mail: JKREYNOLDS@ISI.EDU

Most of the protocols mentioned here are documented in the RFC series of notes. Some of the items listed are undocumented. Further information on protocols can be found in the memo "Official Internet Protocols" [91]. The more prominent and more generally used are documented in the "DDN Protocol Handbook, Volume Two, DARPA Internet Protocols" [36] prepared by the NIC. Other collections of older or obsolete protocols are contained in the "Internet Protocol Transition Workbook" [57], or in the "ARPANET Protocol Transition Handbook" [38]. For further information on ordering the complete 1985 DDN Protocol Handbook, write: SRI International (SRI-NIC), DDN Network Information Center, Room EJ291, 333 Ravenswood Avenue, Menlo Park, CA., 94025; or call: 1-800-235-3155.

In the entries below, the name and mailbox of the responsible individual is indicated. The bracketed entry, e.g., [nm,iii], at the

The convention in the documentation of Internet Protocols is to express numbers in decimal and to picture data in "big-endian" order [14]. That is, fields are described left to right, with the most significant octet on the left and the least significant octet on the right.

0										1										2										3									
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
				1										2										3										4					
+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
				5										6										7										8					
+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
				9										10										11										12					
+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-

$$\begin{array}{cccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ + & - & + & - & + & - & + & - & + & - & + & - & + \\ | & 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & | \end{array}$$

[Page 2]

## VERSION NUMBERS

In the Internet Protocol (IP) [[36](#),[80](#)] there is a field to identify the version of the internetwork general protocol. This field is 4 bits in size.

### Assigned Internet Version Numbers

Decimal	Keyword	Version	References
-----	-----	-----	-----
0		Reserved	[ <a href="#">JBP</a> ]
1-3		Unassigned	[ <a href="#">JBP</a> ]
4	IP	Internet Protocol	[ <a href="#">80</a> , <a href="#">JBP</a> ]
5	ST	ST Datagram Mode	[ <a href="#">41</a> , <a href="#">JWF</a> ]
6-14		Unassigned	[ <a href="#">JBP</a> ]
15		Reserved	[ <a href="#">JBP</a> ]

## PROTOCOL NUMBERS

In the Internet Protocol (IP) [36,80] there is a field, called Protocol, to identify the the next level protocol. This is an 8 bit field.

### Assigned Internet Protocol Numbers

Decimal	Keyword	Protocol	References
-----	-----	-----	-----
0		Reserved	[JBP]
1	ICMP	Internet Control Message	[72,JBP]
2	IGMP	Internet Group Management	[34,JBP]
3	GGP	Gateway-to-Gateway	[49,MB]
4		Unassigned	[JBP]
5	ST	Stream	[41,JWF]
6	TCP	Transmission Control	[81,JBP]
7	UCL	UCL	[PK]
8	EGP	Exterior Gateway Protocol	[92,DLM1]
9	IGP	any private interior gateway	[JBP]
10	BBN-RCC-MON	BBN RCC Monitoring	[SGC]
11	NVP-II	Network Voice Protocol	[15,SC3]
12	PUP	PUP	[7,XEROX]
13	ARGUS	ARGUS	[RWS4]
14	EMCON	EMCON	[BN7]
15	XNET	Cross Net Debugger	[47,JFH2]
16	CHAOS	Chaos	[NC3]
17	UDP	User Datagram	[79,JBP]
18	MUX	Multiplexing	[16,JBP]
19	DCN-MEAS	DCN Measurement Subsystems	[DLM1]
20	HMP	Host Monitoring	[48,RH6]
21	PRM	Packet Radio Measurement	[ZSU]
22	XNS-IDP	XEROX NS IDP	[102,XEROX]
23	TRUNK-1	Trunk-1	[SA2]
24	TRUNK-2	Trunk-2	[SA2]
25	LEAF-1	Leaf-1	[SA2]
26	LEAF-2	Leaf-2	[SA2]
27	RDP	Reliable Data Protocol	[106,RH6]
28	IRTP	Internet Reliable Transaction	[59,TXM]
29	ISO-TP4	ISO Transport Protocol Class 4	[51,RC77]
30	NETBLT	Bulk Data Transfer Protocol	[13,DDC1]
31	MFE-NSP	MFE Network Services Protocol	[93,BCH2]
32	MERIT-INP	MERIT Internodal Protocol	[HWB]
33	SEP	Sequential Exchange Protocol	[JC120]
34-60		Unassigned	[JBP]
61		any host internal protocol	[JBP]
62	CFTP	CFTP	[42,HCF2]
63		any local network	[JBP]

64	SAT-EXPAK	SATNET and Backroom EXPAK	[SHB]
65	MIT-SUBNET	MIT Subnet Support	[NC3]
66	RVD	MIT Remote Virtual Disk Protocol	[MBG]
67	IPPC	Internet Pluribus Packet Core	[SHB]
68		any distributed file system	[JBP]
69	SAT-MON	SATNET Monitoring	[SHB]
70		Unassigned	[JBP]
71	IPCV	Internet Packet Core Utility	[SHB]
72-75		Unassigned	[JBP]
76	BR-SAT-MON	Backroom SATNET Monitoring	[SHB]
77		Unassigned	[JBP]
78	WB-MON	WIDEBAND Monitoring	[SHB]
79	WB-EXPAK	WIDEBAND EXPAK	[SHB]
80-254		Unassigned	[JBP]
255		Reserved	[JBP]

## PORT NUMBERS

Ports are used in the TCP [36,81] to name the ends of logical connections which carry long term conversations. For the purpose of providing services to unknown callers, a service contact port is defined. This list specifies the port used by the server process as its contact port. The contact port is sometimes called the "well-known port".

To the extent possible, these same port assignments are used with the UDP [37,79].

To the extent possible, these same port assignments are used with the ISO-TP4 [52].

The assigned ports use a small portion of the possible port numbers. The assigned ports have all except the low order eight bits cleared to zero. The low order eight bits are specified here.

### Port Assignments:

Decimal	Keyword	Description	References
-----	-----	-----	-----
0		Reserved	[JBP]
1-4		Unassigned	[JBP]
5	RJE	Remote Job Entry	[9,JBP]
7	ECHO	Echo	[70,JBP]
9	DISCARD	Discard	[69,JBP]
11	USERS	Active Users	[65,JBP]
13	DAYTIME	Daytime	[68,JBP]
15		Unassigned	[JBP]
17	QUOTE	Quote of the Day	[75,JBP]
19	CHARGEN	Character Generator	[67,JBP]
20	FTP-DATA	File Transfer [Default Data]	[71,JBP]
21	FTP	File Transfer [Control]	[71,JBP]
23	TELNET	Telnet	[87,JBP]
25	SMTP	Simple Mail Transfer	[77,JBP]
27	NSW-FE	NSW User System FE	[17,RHT]
29	MSG-ICP	MSG ICP	[63,RHT]
31	MSG-AUTH	MSG Authentication	[63,RHT]
33	DSP	Display Support Protocol	[MLC]
35		any private printer server	[JBP]
37	TIME	Time	[83,JBP]
39	RLP	Resource Location Protocol	[MA]
41	GRAPHICS	Graphics	[98,JBP]
42	NAMESERVER	Host Name Server	[74,JBP]
43	NICNAME	Who Is	[46,JAKE]
44	MPM-FLAGS	MPM FLAGS Protocol	[JBP]

45	MPM	Message Processing Module [recv]	[73,JBP]
46	MPM-SND	MPM [default send]	[73,JBP]
47	NI-FTP	NI FTP	[103,SK8]
49	LOGIN	Login Host Protocol	[PHD1]
51	LA-MAINT	IMP Logical Address Maintenance	[58,AGM]
53	DOMAIN	Domain Name Server	[61,70,PM1]
55	ISI-GL	ISI Graphics Language	[6,RB9]
57		any private terminal access	[JBP]
59		any private file service	[JBP]
61	NI-MAIL	NI MAIL	[4,SK8]
63	VIA-FTP	VIA Systems - FTP	[DXD]
65	TACACS-DS	TACACS-Database Service	[3,RHT]
67	BOOTPS	Bootstrap Protocol Server	[29,WJC2]
68	BOOTPC	Bootstrap Protocol Client	[29,WJC2]
69	TFTP	Trivial File Transfer	[95,DDC1]
71	NETRJS-1	Remote Job Service	[8,RTB3]
72	NETRJS-2	Remote Job Service	[8,RTB3]
73	NETRJS-3	Remote Job Service	[8,RTB3]
74	NETRJS-4	Remote Job Service	[8,RTB3]
75		any private dial out service	[JBP]
77		any private RJE service	[JBP]
79	FINGER	Finger	[44,KLH]
81	HOSTS2-NS	HOSTS2 Name Server	[EAK1]
83	MIT-ML-DEV	MIT ML Device	[DPR]
85	MIT-ML-DEV	MIT ML Device	[DPR]
87		any private terminal link	[JBP]
89	SU-MIT-TG	SU/MIT Telnet Gateway	[MRC]
91	MIT-DOV	MIT Dover Spooler	[EBM]
93	DCP	Device Control Protocol	[DT15]
95	SUPDUP	SUPDUP	[20,MRC]
97	SWIFT-RVF	Swift Remote Vitural File Protocol	[MXR]
98	TACNEWS	TAC News	[FRAN]
99	METAGRAM	Metagram Relay	[GEOF]
101	HOSTNAME	NIC Host Name Server	[45,JAKE]
102	ISO-TSAP	ISO-TSAP	[12,MTR]
103	X400	X400	[HCF2]
104	X400-SND	X400-SND	[HCF2]
105	CSNET-NS	Mailbox Name Nameserver	[96,MAS3]
107	RTELNET	Remote Telnet Service	[76,JBP]
109	POP-2	Post Office Protocol - Version 2	[11,JKR1]
111	SUNRPC	SUN Remote Procedure Call	[DXG]
113	AUTH	Authentication Service	[99,MCSJ]
115	SFTP	Simple File Transfer Protocol	[56,MKL1]
117	UUCP-PATH	UUCP Path Service	[35,MAE]
119	NNTP	Network News Transfer Protocol	[53,PL4]
121	ERPC	HYDRA Expedited Remote Procedure Call	[101,JXO]
123	NTP	Network Time Protocol	[60,DLM1]
125	LOCUS-MAP	Locus PC-Interface Net Map Server	[105,BXG]

127	LOCUS-CON	Locus PC-Interface Conn Server	[ <a href="#">105</a> , <a href="#">BXG</a> ]
129	PWDGEN	Password Generator Protocol	[ <a href="#">107</a> , <a href="#">FJW</a> ]
130	CISCO-FNA	CISCO FNATIVE	[ <a href="#">WXB</a> ]
131	CISCO-TNA	CISCO TNATIVE	[ <a href="#">WXB</a> ]
132	CISCO-SYS	CISCO SYSMANT	[ <a href="#">WXB</a> ]
133	STATSRV	Statistics Service	[ <a href="#">DLM1</a> ]
134	INGRES-NET	INGRES-NET Service	[ <a href="#">MXB</a> ]
135	LOC-SRV	Location Service	[ <a href="#">JXP</a> ]
136	PROFILE	PROFILE Naming System	[ <a href="#">LLP</a> ]
137	NETBIOS-NS	NETBIOS Name Service	[ <a href="#">JBP</a> ]
138	NETBIOS-DGM	NETBIOS Datagram Service	[ <a href="#">JBP</a> ]
139	NETBIOS-SSN	NETBIOS Session Service	[ <a href="#">JBP</a> ]
140	EMFIS-DATA	EMFIS Data Service	[ <a href="#">GB7</a> ]
141	EMFIS-CNTL	EMFIS Control Service	[ <a href="#">GB7</a> ]
142	BL-IDM	Britton-Lee IDM	[ <a href="#">SXS1</a> ]
143-159		Unassigned	[ <a href="#">JBP</a> ]
160-223		Reserved	[ <a href="#">JBP</a> ]
224-241		Unassigned	[ <a href="#">JBP</a> ]
243	SUR-MEAS	Survey Measurement	[ <a href="#">5</a> , <a href="#">AV</a> ]
245	LINK	LINK	[ <a href="#">10</a> , <a href="#">RDB2</a> ]
247-255		Unassigned	[ <a href="#">JBP</a> ]



## DOMAIN SYSTEM PARAMETERS

The Internet Domain Naming System (DOMAIN) includes several parameters. These are documented in [RFC 883 \[61\]](#). The CLASS parameter is listed here. The per CLASS parameters are defined in separate RFCs as indicated.

Domain System Parameters:

Decimal	Name	References
-----	----	-----
0	Reserved	[ <a href="#">PM1</a> ]
1	Internet	[ <a href="#">61</a> , <a href="#">PM1</a> ]
2	Unassigned	[ <a href="#">PM1</a> ]
3	Chaos	[ <a href="#">PM1</a> ]
4-65534	Unassigned	[ <a href="#">PM1</a> ]
65535	Reserved	[ <a href="#">PM1</a> ]

#### ARPANET LOGICAL ADDRESSES

The ARPANET facility for "logical addressing" is described in [RFC 878](#) [57] and [RFC 1005](#) [109]. A portion of the possible logical addresses are reserved for standard uses.

There are 49,152 possible logical host addresses. Of these, 256 are reserved for assignment to well-known functions. Assignments for well-known functions are made by Joyce Reynolds. Assignments for other logical host addresses are made by the NIC.

#### Logical Address Assignments:

Decimal	Description	References
-----	-----	-----
0	Reserved	[JBP]
1	The BBN Core Gateways	[MB]
2-254	Unassigned	[JBP]
255	Reserved	[JBP]

#### ARPANET LINK NUMBERS

The word "link" here refers to a field in the original ARPANET Host/IMP interface leader. The link was originally defined as an 8-bit field. Later specifications defined this field as the "message-id" with a length of 12 bits. The name link now refers to the high order 8 bits of this 12-bit message-id field. The Host/IMP interface is defined in BBN Report 1822 [2].

The low-order 4 bits of the message-id field are called the sub-link. Unless explicitly specified otherwise for a particular protocol, there is no sender to receiver significance to the sub-link. The sender may use the sub-link in any way he chooses (it is returned in the RFNM by the destination IMP), the receiver should ignore the sub-link.

#### Link Assignments:

Decimal	Description	References
-----	-----	-----
0	Reserved	[JBP]
1-149	Unassigned	[JBP]
150	Xerox NS IDP	[102,XEROX]
151	Unassigned	[JBP]
152	PARC Universal Protocol	[7,XEROX]
153	TIP Status Reporting	[JGH]
154	TIP Accounting	[JGH]
155	Internet Protocol [regular]	[80,JBP]
156-158	Internet Protocol [experimental]	[80,JBP]
159	Figleaf Link	[JBW1]
160-194	Unassigned	[JBP]
195	ISO-IP	[52,RXM]
196-247	Experimental Protocols	[JBP]
248-255	Network Maintenance	[JGH]

#### IEEE 802 NUMBERS OF INTEREST

Some of the networks of all classes are IEEE 802 Networks. These systems may use a Link Service Access Point (LSAP) field in much the same way the ARPANET uses the "link" field. Further, there is an extension of the LSAP header called the Sub-Network Access Protocol (SNAP).

The IEEE likes to describe numbers in binary in bit transmission order, which is the opposite of the big-endian order used throughout the Internet protocol documentation.

#### Assignments:

Link Service Access Point			Description	References
-----			-----	-----
IEEE binary	Internet binary	decimal		
00000000	00000000	0	Null LSAP	[IEEE]
01000000	00000010	2	Indiv LLC Sublayer Mgt	[IEEE]
11000000	00000011	3	Group LLC Sublayer Mgt	[IEEE]
00100000	00000100	4	SNA Path Control	[IEEE]
01100000	00000110	6	DOD IP	[79,JBP]
01110000	00001110	14	PROWAY-LAN	[IEEE]
01110010	01001110	78	EIA-RS 511	[IEEE]
01110001	10001110	142	PROWAY-LAN	[IEEE]
01010101	10101010	170	SNAP	[IEEE]
01111111	11111110	254	ISO DIS 8473	[52,JXJ]
11111111	11111111	255	Global DSAP	[IEEE]

These numbers (and others) are assigned by the IEEE Standards Office. The address is: IEEE Standards Office, 345 East 47th Street, New York, N.Y. 10017, Attn: Vince Condello. Phone: (212) 705-7092.

At an ad hoc special session on "IEEE 802 Networks and ARP", held during the TCP Vendors Workshop (August 1986), an approach to a consistent way to send DoD-IP datagrams and other IP related protocols on 802 networks was developed.

Due to some evolution of the IEEE 802.2 standards and the need to provide for a standard way to do additional DoD-IP related protocols (such as the Address Resolution Protocol (ARP) on IEEE 802 network, the following new policy is established, which will replace the old policy (see RFC 960 and RFC 948 [108]).

The new policy is for the Internet community to use the IEEE 802.2 encapsulation on 802.3, 802.4, and 802.5 networks by using the SNAP with an organization code indicating that the following 16 bits specify the EtherType code (where IP = 2048 (0800 hex), see Ethernet Numbers of Interest).

Header

```
...-----+-----+-----+
MAC Header|      Length      |      802.{3/4/5} MAC
...-----+-----+-----+

+-----+-----+-----+
| Dsap=K1| Ssap=K1| control|      802.2 SAP
+-----+-----+-----+

+-----+-----+-----+-----+-----+
|protocol id or org code =K2|      Ether Type      |      802.2 SNAP
+-----+-----+-----+-----+-----+
```

The total length of the SAP Header and the SNAP header is 8-octets, making the 802.2 protocol overhead come out on a nice boundary.

K1 is 170. The IEEE likes to talk about things in little-endian bit transmission order and specifies this value as 01010101. In big-endian order, as used in Internet specifications, this becomes 10101010 binary, or AA hex, or 170 decimal.

K2 is 0 (zero).

The use of the IP LSAP (K1 = 6) is to be phased out as quickly as possible.

# ETHERNET NUMBERS OF INTEREST

Many of the networks of all classes are Ethernets (10Mb) or Experimental Ethernets (3Mb). These systems use a message "type" field in much the same way the ARPANET uses the "link" field.

If you need an Ethernet type, contact the XEROX Corporation, 2300 Geng Road, Palo Alto, California 94303, ATTN: Ms. Pam Cance.

## Assignments:

Ethernet		Exp. Ethernet		Description	References
-----		-----		-----	-----
decimal	Hex	decimal	octal		
512	0200	512	1000	XEROX PUP	[7,XEROX]
513	0201	-	-	PUP Addr. Trans.	[XEROX]
1536	0600	1536	3000	XEROX NS IDP	[102,XEROX]
2048	0800	513	1001	DOD IP	[80,JBP]
2049	0801	-	-	X.75 Internet	[XEROX]
2050	0802	-	-	NBS Internet	[XEROX]
2051	0803	-	-	ECMA Internet	[XEROX]
2052	0804	-	-	Chaosnet	[XEROX]
2053	0805	-	-	X.25 Level 3	[XEROX]
2054	0806	-	-	ARP	[64,JBP]
2055	0807	-	-	XNS Compatability	[XEROX]
2076	081C	-	-	Symbolics Private	[DCP1]
4096	1000	-	-	Berkeley Trailer	[XEROX]
5632	1600	-	-	Valid	[XEROX]
21000	5208	-	-	BBN Simnet	[XEROX]
24577	6001	-	-	DEC MOP Dump/Load	[XEROX]
24578	6002	-	-	DEC MOP Remote Console	[XEROX]
24579	6003	-	-	DEC DECNET Phase IV	[XEROX]
24580	6004	-	-	DEC LAT	[XEROX]
24581	6005	-	-	DEC	[XEROX]
24582	6006	-	-	DEC	[XEROX]
32771	8003	-	-	Cronus VLN	[100,DT15]
32772	8004	-	-	Cronus Direct	[100,DT15]
32773	8005	-	-	HP Probe	[XEROX]
32774	8006	-	-	Nestar	[XEROX]
32784	8010	-	-	Excelan	[XEROX]
32821	8035	-	-	Reverse ARP	[40,JXM]
32824	8038	-	-	DEC LANBridge	[XEROX]
32859	805B	-	-	Stanford V Kernel experimental	
[XEROX]					
32860	805C	-	-	Stanford V Kernel production	
[XEROX]					
32892	807C	-	-	Merit Internodal	[HWB]
32923	809B	-	-	Appletalk	[XEROX]

36864 9000 - - Loopback [XEROX]

The standard for transmission of IP datagrams over Ethernets and Experimental Ethernets is specified in RFC 894 [50] and RFC 895 [66] respectively.

NOTE: Ethernet 48-bit address blocks are now assigned by the IEEE.

IEEE Standards Office, 345 East 47th Street, New York, N.Y. 10017,  
Attn: Vince Condello. Phone: (212) 705-7092.

#### ADDRESS RESOLUTION PROTOCOL PARAMETERS

The Address Resolution Protocol (ARP) specified in [RFC 826](#) [64] has several parameters. The assigned values for these parameters are listed here.

##### Assignments:

###### Operation Code (op)

- 1 REQUEST
- 2 REPLY

###### Hardware Type (hrd)

Type	Description	References
----	-----	-----
1	Ethernet (10Mb)	[JBP]
2	Experimental Ethernet (3Mb)	[JBP]
3	Amateur Radio AX.25	[PXX]
4	Proteon ProNET Token Ring	[JBP]
5	Chaos	[GXP]
6	IEEE 802 Networks	[JBP]
7	ARCNET	[JBP]

###### Protocol Type (pro)

Use the same codes as listed in the section called "Ethernet Numbers of Interest" (all hardware types use this code set for the protocol type).



## PUBLIC DATA NETWORK NUMBERS

One of the Internet Class A Networks is the international system of Public Data Networks. This section lists the mapping between the Internet Addresses and the Public Data Network Addresses (X.121).

The numbers below are assigned for networks that are connected to the Internet, and for independent networks. These independent networks are marked with an asterisk preceding the number.

### Assignments:

* Internet	Public Data Net	Description	References
- - - - -	- - - - -	- - - - -	- - - - -
014.000.000.000		Reserved	[JBP]
014.000.000.001	3110-317-00035 00	PURDUE-TN	[CAK]
014.000.000.002	3110-608-00027 00	UWISC-TN	[CAK]
014.000.000.003	3110-302-00024 00	UDEL-TN	[CAK]
014.000.000.004	2342-192-00149 23	UCL-VTEST	[PK]
014.000.000.005	2342-192-00300 23	UCL-TG	[PK]
014.000.000.006	2342-192-00300 25	UK-SATNET	[PK]
014.000.000.007	3110-608-00024 00	UWISC-IBM	[MAS3]
014.000.000.008	3110-213-00045 00	RAND-TN	[MO2]
014.000.000.009	2342-192-00300 23	UCL-CS	[PK]
014.000.000.010	3110-617-00025 00	BBN-VAN-GW	[JD21]
*014.000.000.011	2405-015-50300 00	CHALMERS	[UXB]
014.000.000.012	3110-713-00165 00	RICE	[PAM6]
014.000.000.013	3110-415-00261 00	DECWRL	[PAM6]
014.000.000.014	3110-408-00051 00	IBM-SJ	[SA1]
014.000.000.015	2041-117-01000 00	SHAPE	[JFW]
014.000.000.016	2628-153-90075 00	DFVLR4-X25	[GB7]
014.000.000.017	3110-213-00032 00	ISI-VAN-GW	[JD21]
014.000.000.018	2624-522-80900 52	DFVLR5-X25	[GB7]
014.000.000.019	2041-170-10000 00	SHAPE-X25	[JFW]
014.000.000.020	5052-737-20000 50	UQNET	[AXH]
014.000.000.021	3020-801-00057 50	DMC-CRC1	[JR17]
014.000.000.022	2624-522-80902 77	DFVLRVAX-X25	[GB7]
*014.000.000.023	2624-589-00908 01	ECRC-X25	[PXD]
014.000.000.024	2342-905-24242 83	UK-MOD-RSRE	[JXE2]
014.000.000.025	2342-905-24242 82	UK-VAN-RSRE	[AXM]
014.000.000.026-014.255.255.254		Unassigned	[JBP]
014.255.255.255		Reserved	[JBP]

The standard for transmission of IP datagrams over the Public Data Network is specified in [RFC 877](#) [55].

## TELNET OPTIONS

The Telnet Protocol has a number of options that may be negotiated. These options are listed here. "Official Internet Protocols" [91] provides more detailed information.

Options	Name	References
0	Binary Transmission	[85,JBP]
1	Echo	[86,JBP]
2	Reconnection	[33,JBP]
3	Suppress Go Ahead	[89,JBP]
4	Approx Message Size Negotiation	[102,JBP]
5	Status	[88,JBP]
6	Timing Mark	[90,JBP]
7	Remote Controlled Trans and Echo	[82,JBP]
8	Output Line Width	[31,JBP]
9	Output Page Size	[32,JBP]
10	Output Carriage-Return Disposition	[21,JBP]
11	Output Horizontal Tab Stops	[25,JBP]
12	Output Horizontal Tab Disposition	[24,JBP]
13	Output Formfeed Disposition	[22,JBP]
14	Output Vertical Tabstops	[27,JBP]
15	Output Vertical Tab Disposition	[26,JBP]
16	Output Linefeed Disposition	[23,JBP]
17	Extended ASCII	[104,JBP]
18	Logout	[18,MRC]
19	Byte Macro	[28,JBP]
20	Data Entry Terminal	[30,JBP]
22	SUPDUP	[19,20,MRC]
22	SUPDUP Output	[43,MRC]
23	Send Location	[54,EAK1]
24	Terminal Type	[97,MAS3]
25	End of Record	[78,JBP]
26	TACACS User Identification	[1,BA4]
27	Output Marking	[94,SXS]
28	Terminal Location Number	[62,RN6]
255	Extended-Options-List	[84,JBP]

#### MACHINE NAMES

These are the Official Machine Names as they appear in the NIC Host Table. Their use is described in [RFC 810](#) [39].

A machine name or CPU type may be up to 40 characters taken from the set of uppercase letters, digits, and the two punctuation characters hyphen and slash. It must start with a letter, and end with a letter or digit.

ALTO  
AMDAHL-V7  
APOLLO  
ATT-3B20  
BBN-C/60  
BURROUGHS-B/29  
BURROUGHS-B/4800  
BUTTERFLY  
C/30  
C/70  
CADLINC  
CADR  
CDC-170  
CDC-170/750  
CDC-173  
CELERITY-1200  
COMTEN-3690  
CP8040  
CRAY-1  
CRAY-X/MP  
CRAY-2  
CTIWS-117  
DANDELION  
DEC-10  
DEC-1050  
DEC-1077  
DEC-1080  
DEC-1090  
DEC-1090B  
DEC-1090T  
DEC-2020T  
DEC-2040  
DEC-2040T  
DEC-2050T  
DEC-2060  
DEC-2060T  
DEC-2065  
DEC-FALCON

DEC-KS10  
DORADO  
DPS8/70M  
ELXSI-6400  
FOONLY-F2  
FOONLY-F3  
FOONLY-F4  
GOULD  
GOULD-6050  
GOULD-6080  
GOULD-9050  
GOULD-9080  
H-316  
H-60/68  
H-68  
H-68/80  
H-89  
HONEYWELL-DPS-6  
HONEYWELL-DPS-8/70  
HP3000  
HP3000/64  
IBM-158  
IBM-360/67  
IBM-370/3033  
IBM-3081  
IBM-3084QX  
IBM-3101  
IBM-4331  
IBM-4341  
IBM-4361  
IBM-4381  
IBM-4956  
IBM-PC  
IBM-PC/AT  
IBM-PC/XT  
IBM-SERIES/1  
IMAGEN  
IMAGEN-8/300  
IMSAI  
INTEGRATED-SOLUTIONS  
INTEGRATED-SOLUTIONS-68K  
INTEGRATED-SOLUTIONS-CREATOR  
INTEGRATED-SOLUTIONS-CREATOR-8  
INTEL-IPSC  
IS-1  
IS-68010  
LMI  
LSI-11

LSI-11/2  
LSI-11/23  
LSI-11/73  
M68000  
MASSCOMP  
MC500  
MC68000  
MICROVAX  
MICROVAX-I  
MV/8000  
NAS3-5  
NCR-COMTEN-3690  
NOW  
ONYX-Z8000  
PDP-11  
PDP-11/3  
PDP-11/23  
PDP-11/24  
PDP-11/34  
PDP-11/40  
PDP-11/44  
PDP-11/45  
PDP-11/50  
PDP-11/70  
PDP-11/73  
PE-7/32  
PE-3205  
PERQ  
PLEXUS-P/60  
PLI  
PLURIBUS  
PRIME-2350  
PRIME-2450  
PRIME-2755  
PRIME-9655  
PRIME-9755  
PRIME-9955II  
PRIME-2250  
PRIME-2655  
PRIME-9955  
PRIME-9950  
PRIME-9650  
PRIME-9750  
PRIME-2250  
PRIME-750  
PRIME-850  
PRIME-550II  
PYRAMID-90

PYRAMID-90MX  
PYRAMID-90X  
RIDGE  
RIDGE-32  
RIDGE-32C  
ROLM-1666  
S1-MKIIA  
SMI  
SEQUENT-BALANCE-8000  
SIEMENS  
SILICON-GRAPHICS  
SILICON-GRAPHICS-IRIS  
SPERRY-DCP/10  
SUN  
SUN-2  
SUN-2/50  
SUN-2/100  
SUN-2/120  
SUN-2/140  
SUN-2/150  
SUN-2/160  
SUN-2/170  
SUN-3/160  
SUN-3/50  
SUN-3/75  
SUN-3/110  
SUN-50  
SUN-100  
SUN-120  
SUN-130  
SUN-150  
SUN-170  
SUN-68000  
SYMBOLICS-3600  
SYMBOLICS-3670  
TANDEM-TXP  
TEK-6130  
TI-EXPLORER  
TP-4000  
TRS-80  
UNIVAC-1100  
UNIVAC-1100/60  
UNIVAC-1100/62  
UNIVAC-1100/63  
UNIVAC-1100/64  
UNIVAC-1100/70  
UNIVAC-1160  
VAX-11/725

VAX-11/730  
VAX-11/750  
VAX-11/780  
VAX-11/785  
VAX-11/790  
VAX-11/8600  
VAX-8600  
WANG-PC002  
WANG-VS100  
WANG-VS400  
XEROX-1108  
XEROX-8010

#### SYSTEM NAMES

These are the Official System Names as they appear in the NIC Host Table. Their use is described in [RFC 810](#) [39].

A system name may be up to 40 characters taken from the set of uppercase letters, digits, and the two punctuation characters hyphen and slash. It must start with a letter, and end with a letter or digit.

AEGIS  
APOLLO  
BS-2000  
CEDAR  
CGW  
CHRYSALIS  
CMOS  
CMS  
COS  
CPIX  
CTOS  
CTSS  
DCN  
DDNOS  
DOMAIN  
EDX  
ELF  
EMBOS  
EMMOS  
EPOS  
FOONEX  
FUZZ  
GCOS  
GPOS  
HDOS  
IMAGEN  
INTERCOM  
IMPRESS  
INTERLISP  
IOS  
ITS  
LISP  
LISPM  
LOCUS  
MINOS  
MOS  
MPE5  
MSDOS



MULTICS  
MVS  
MVS/SP  
NEXUS  
NMS  
NONSTOP  
NOS-2  
OS/DDP  
OS4  
OS86  
OSX  
PCDOS  
PERQ/OS  
PLI  
PSDOS/MIT  
PRIMOS  
RMX/RDOS  
ROS  
RSX11M  
SATOPS  
SCS  
SIMP  
SWIFT  
TAC  
TANDEM  
TENEX  
TOPS10  
TOPS20  
TP3010  
TRSDOS  
ULTRIX  
UNIX  
UT2D  
V  
VM  
VM/370  
VM/CMS  
VM/SP  
VMS  
VMS/EUNICE  
VRTX  
WAITS  
WANG  
XDE  
XENIX

## PROTOCOL AND SERVICE NAMES

These are the Official Protocol Names. Their use is described in greater detail in [RFC 810 \[39\]](#).

A protocol or service may be up to 40 characters taken from the set of uppercase letters, digits, and the punctuation character hyphen. It must start with a letter, and end with a letter or digit.

ARGUS	- ARGUS Protocol
AUTH	- Authentication Service
BBN-RCC-MON	- BBN RCC Monitoring
BL-IDM	- Britton Lee Intelligent Database Machine
BOOTPC	- Bootstrap Protocol Client
BOOTPS	- Bootstrap Protocol Server
BR-SAT-MON	- Backroom SATNET Monitoring
CFTP	- CFTP
CHAOS	- CHAOS Protocol
CHARGEN	- Character Generator Protocol
CISCO-FNA	- CISCO FNATIVE
CISCO-TNA	- CISCO TNATIVE
CISCO-SYS	- CISCO SYSMANT
CLOCK	- DCNET Time Server Protocol
COOKIE-JAR	- Cookie Jar Authentication Procedure
CSNET-NS	- CSNET Mailbox Nameserver Protocol
DAYTIME	- Daytime Protocol
DCN-MEAS	- DCN Measurement Subsystems Protocol
DCP	- Device Control Protocol
DISCARD	- Discard Protocol
DOMAIN	- Domain Name Server
ECHO	- Echo Protocol
EGP	- Exterior Gateway Protocol
EMCON	- Emission Control Protocol
EMFIS-CNTL	- EMFIS Control Service
EMFIS-DATA	- EMFIS Data Service
FINGER	- Finger Protocol
FTP	- File Transfer Protocol
FTP-DATA	- File Transfer Protocol Data
GGP	- Gateway Gateway Protocol
GRAPHICS	- Graphics Protocol
HMP	- Host Monitoring Protocol
HOST2-NS	- Host2 Name Server
HOSTNAME	- Hostname Protocol
ICMP	- Internet Control Message Protocol
IGMP	- Internet Group Management Protocol
IGP	- Interior Gateway Protocol
INGRES-NET	- INGRES-NET Service
IP	- Internet Protocol

IPCU	- Internet Packet Core Utility
IPPC	- Internet Pluribus Packet Core
IRTP	- Internet Reliable Transaction Protocol
ISI-GL	- ISI Graphics Language Protocol
ISO-TP4	- ISO Transport Protocol Class 4
ISO-TSAP	- ISO TSAP
LA-MAINT	- IMP Logical Address Maintenance
LEAF-1	- Leaf-1 Protocol
LEAF-2	- Leaf-2 Protocol
LINK	- Link Protocol
LOC-SRV	- Location Service
LOGIN	- Login Host Protocol
MERIT-INP	- MERIT Internodal Protocol
METAGRAM	- Metagram Relay
MIT-ML-DEV	- MIT ML Device
MFE-NSP	- MFE Network Services Protocol
MIT-SUBNET	- MIT Subnet Support
MIT-DOV	- MIT Dover Spooler
MPM	- Internet Message Protocol (Multimedia Mail)
MPM-FLAGS	- MPM Flags Protocol
MPM-SND	- MPM Send Protocol
MSG-AUTH	- MSG Authentication Protocol
MSG-ICP	- MSG ICP Protocol
MUX	- Multiplexing Protocol
NAMESERVER	- Host Name Server
NETBIOS-DGM	- NETBIOS Datagram Service
NETBIOS-NS	- NETBIOS Name Service
NETBIOS-SSN	- NETBIOS Session Service
NETBLT	- Bulk Data Transfer Protocol
NETED	- Network Standard Text Editor
NETRJS	- Remote Job Service
NI-FTP	- NI File Transfer Protocol
NI-MAIL	- NI Mail Protocol
NICNAME	- Who Is Protocol
NSW-FE	- NSW User System Front End
NTP	- Network Time Protocol
NVP-II	- Network Voice Protocol
POP2	- Post Office Protocol - Version 2
PRM	- Packet Radio Measurement
PUP	- PUP Protocol
PWDGEN	- Password Generator Protocol
QUOTE	- Quote of the Day Protocol
RDP	- Reliable Data Protocol
RJE	- Remote Job Entry
RLP	- Resource Location Protocol
RTELNET	- Remote Telnet Service
RVD	- Remote Virtual Disk Protocol
SAT-EXPAK	- Satnet and Backroom EXPAK

SAT-MON	- SATNET Monitoring
SEP	- Sequential Exchange Protocol
SFTP	- Simple File Transfer Protocol
SMTP	- Simple Mail Transfer Protocol
ST	- Stream Protocol
STATSRV	- Statistics Service
SU-MIT-TG	- SU/MIT Telnet Gateway Protocol
SUNRPC	- SUN Remote Procedure Call
SUPDUP	- SUPDUP Protocol
SUR-MEAS	- Survey Measurement
SWIFT-RVF	- Remote Virtual File Protocol
TACACS-DS	- TACACS-Database Service
TACNEWS	- TAC News
TCP	- Transmission Control Protocol
TELNET	- Telnet Protocol
TFTP	- Trivial File Transfer Protocol
TIME	- Time Server Protocol
TRUNK-1	- Trunk-1 Protocol
TRUNK-2	- Trunk-2 Protocol
UCL	- University College London Protocol
UDP	- User Datagram Protocol
NNTP	- Network News Transfer Protocol
USERS	- Active Users Protocol
UUCP-PATH	- UUCP Path Service
VIA-FTP	- VIA Systems-File Transfer Protocol
WB-EXPAK	- Wideband EXPAK
WB-MON	- Wideband Monitoring
XNET	- Cross Net Debugger
XNS-IDP	- Xerox NS IDP

#### TERMINAL TYPE NAMES

These are the Official Terminal Type Names. Their use is described in RFC 930 [97]. The maximum length of a name is 40 characters.

A terminal names may be up to 40 characters taken from the set of uppercase letters, digits, and the two punctuation characters hyphen and slash. It must start with a letter, and end with a letter or digit.

ADDS-CONSUL-980  
ADDS-REGENT-100  
ADDS-REGENT-20  
ADDS-REGENT-200  
ADDS-REGENT-25  
ADDS-REGENT-40  
ADDS-REGENT-60  
AMPEX-DIALOGUE-80  
ANDERSON-JACOBSON-630  
ANDERSON-JACOBSON-832  
ANDERSON-JACOBSON-841  
ANN-ARBOR-AMBASSADOR  
ARDS  
BITGRAPH  
BUSSIPLEXER  
CALCOMP-565  
CDC-456  
CDI-1030  
CDI-1203  
CLNZ  
COMPUCOLOR-II  
CONCEPT-100  
CONCEPT-104  
CONCEPT-108  
DATA-100  
DATA-GENERAL-6053  
DATAGRAPHIX-132A  
DATAMEDIA-1520  
DATAMEDIA-1521  
DATAMEDIA-2500  
DATAMEDIA-3025  
DATAMEDIA-3025A  
DATAMEDIA-3045  
DATAMEDIA-3045A  
DATAMEDIA-DT80/1  
DATAPOINT-2200  
DATAPOINT-3000  
DATAPOINT-3300

DATAPOINT-3360  
DEC-DECWRITER-I  
DEC-DECWRITER-II  
DEC-GT40  
DEC-GT40A  
DEC-GT42  
DEC-LA120  
DEC-LA30  
DEC-LA36  
DEC-LA38  
DEC-VT05  
DEC-VT100  
DEC-VT132  
DEC-VT50  
DEC-VT50H  
DEC-VT52  
DELTA-DATA-5000  
DELTA-TELTERM-2  
DIABLO-1620  
DIABLO-1640  
DIGILOG-333  
DTC-300S  
EDT-1200  
EXECUPORT-4000  
EXECUPORT-4080  
GENERAL-TERMINAL-100A  
GSI  
HAZELTINE-1500  
HAZELTINE-1510  
HAZELTINE-1520  
HAZELTINE-2000  
HP-2621  
HP-2621A  
HP-2621P  
HP-2626  
HP-2626A  
HP-2626P  
HP-2640  
HP-2640A  
HP-2640B  
HP-2645  
HP-2645A  
HP-2648  
HP-2648A  
HP-2649  
HP-2649A  
IBM-3101  
IBM-3101-10

IBM-3275-2  
IBM-3276-2  
IBM-3276-3  
IBM-3276-4  
IBM-3277-2  
IBM-3278-2  
IBM-3278-3  
IBM-3278-4  
IBM-3278-5  
IBM-3279-2  
IBM-3279-3  
IMLAC  
INFOTON-100  
INFOTONKAS  
ISC-8001  
LSI-ADM-3  
LSI-ADM-31  
LSI-ADM-3A  
LSI-ADM-42  
MEMOREX-1240  
MICROBEE  
MICROTERM-ACT-IV  
MICROTERM-ACT-V  
MICROTERM-MIME-1  
MICROTERM-MIME-2  
NETRONICS  
NETWORK-VIRTUAL-TERMINAL  
OMRON-8025AG  
PERKIN-ELMER-1100  
PERKIN-ELMER-1200  
PERQ  
PLASMA-PANEL  
QUME-SPRINT-5  
SOROC  
SOROC-120  
SOUTHWEST-TECHNICAL-PRODUCTS-CT82  
SUPERBEE  
SUPERBEE-III-M  
TEC  
TEKTRONIX-4010  
TEKTRONIX-4012  
TEKTRONIX-4013  
TEKTRONIX-4014  
TEKTRONIX-4023  
TEKTRONIX-4024  
TEKTRONIX-4025  
TEKTRONIX-4027  
TELERAY-1061

TELERAY-3700  
TELERAY-3800  
TELETEC-DATASCREEN  
TELETERM-1030  
TELETYPE-33  
TELETYPE-35  
TELETYPE-37  
TELETYPE-38  
TELETYPE-43  
TELEVIDEO-912  
TELEVIDEO-920  
TELEVIDEO-920B  
TELEVIDEO-920C  
TELEVIDEO-950  
TERMINET-1200  
TERMINET-300  
TI-700  
TI-733  
TI-735  
TI-743  
TI-745  
TYCOM  
UNIVAC-DCT-500  
VIDEO-SYSTEMS-1200  
VIDEO-SYSTEMS-5000  
VISUAL-200  
XEROX-1720  
ZENITH-H19  
ZENTEC-30



DOCUMENTS

- [1] Anderson, B., "TACACS User Identification Telnet Option", [RFC 927](#), BBN, December 1984.
- [2] BBN, "Specifications for the Interconnection of a Host and an IMP", Report 1822, Bolt Beranek and Newman, Cambridge, Massachusetts, revised, December 1981.
- [3] BBN, "User Manual for TAC User Database Tool", Bolt Beranek and Newman, September 1984.
- [4] Bennett, C., "A Simple NIFTP-Based Mail System", IEN 169, University College, London, January 1981.
- [5] Bhushan, A., "A Report on the Survey Project", [RFC 530](#), NIC 17375, June 1973.
- [6] Bisbey, R., D. Hollingworth, and B. Britt, "Graphics Language (version 2.1)", ISI/TM-80-18, Information Sciences Institute, July 1980.
- [7] Boggs, D., J. Shoch, E. Taft, and R. Metcalfe, "PUP: An Internetwork Architecture", XEROX Palo Alto Research Center, CSL-79-10, July 1979; also in IEEE Transactions on Communication, Volume COM-28, Number 4, April 1980.
- [8] Braden, R., "NETRJS Protocol", [RFC 740](#), NIC 42423, November 1977.
- [9] Bressler, B., "Remote Job Entry Protocol", [RFC 407](#), NIC 12112, October 1972.
- [10] Bressler, R., "Inter-Entity Communication -- An Experiment", [RFC 441](#), NIC 13773, January 1973.
- [11] Butler, M., J. Postel, D. Chase, J. Goldberger, and J. K. Reynolds, "Post Office Protocol - Version 2", [RFC 937](#), Information Sciences Institute, February 1985.
- [12] Cass, D. E., and M. T. Rose, "ISO Transport Services on Top of the TCP", [RFC 983](#), NTRC, April 1986.
- [13] Clark, D., M. Lambert, and L. Zhang, "NETBLT: A Bulk Data Transfer Protocol", [RFC 969](#), MIT Laboratory for Computer Science, December 1985.

- [14] Cohen, D., "On Holy Wars and a Plea for Peace", IEEE Computer Magazine, October 1981.
- [15] Cohen, D., "Specifications for the Network Voice Protocol", [RFC 741](#), ISI/RR 7539, Information Sciences Institute, March 1976.
- [16] Cohen, D. and J. Postel, "Multiplexing Protocol", IEN 90, Information Sciences Institute, May 1979.
- [17] COMPASS, "Semi-Annual Technical Report", CADD-7603-0411, Massachusetts Computer Associates, 4 March 1976. Also as, "National Software Works, Status Report No. 1," RADC-TR-76-276, Volume 1, September 1976. And COMPASS. "Second Semi-Annual Report," CADD-7608-1611, Massachusetts Computer Associates, August 1976.
- [18] Crispin, M., "Telnet Logout Option", Stanford University-AI, [RFC 727](#), April 1977.
- [19] Crispin, M., "Telnet SUPDUP Option", Stanford University-AI, [RFC 736](#), October 1977.
- [20] Crispin, M., "SUPDUP Protocol", [RFC 734](#), NIC 41953, October 1977.
- [21] Crocker, D., "Telnet Output Carriage-Return Disposition Option", [RFC 652](#), October 1974.
- [22] Crocker, D., "Telnet Output Formfeed Disposition Option", [RFC 655](#), October 1974.
- [23] Crocker, D., "Telnet Output Linefeed Disposition", [RFC 658](#), October 1974.
- [24] Crocker, D., "Telnet Output Horizontal Tab Disposition Option", [RFC 654](#), October 1974.
- [25] Crocker, D., "Telnet Output Horizontal Tabstops Option", [RFC 653](#), October 1974.
- [26] Crocker, D., "Telnet Output Vertical Tab Disposition Option", [RFC 657](#), October 1974.
- [27] Crocker, D., "Telnet Output Vertical Tabstops Option", [RFC 656](#), October 1974.

- [28] Crocker, D. H. and R. H. Gumpertz, "Revised Telnet Byte Marco Option", [RFC 735](#), November 1977.
- [29] Croft, B., and J. Gilmore, "BOOTSTRAP Protocol (BOOTP)", [RFC 951](#), Stanford and SUN Microsystems, September 1985.
- [30] Day, J., "Telnet Data Entry Terminal Option", [RFC 732](#), September 1977.
- [31] DDN Protocol Handbook, "Telnet Output Line Width Option", NIC 50005, December 1985.
- [32] DDN Protocol Handbook, "Telnet Output Page Size Option", NIC 50005, December 1985.
- [33] DDN Protocol Handbook, "Telnet Reconnection Option", NIC 50005, December 1985.
- [34] Deering, S. E., "Host Extensions for IP Multicasting", [RFC 988](#), Stanford University, December 1985.
- [35] Elvy, M., and R. Nedved, "Network Mail Path Service", [RFC 915](#), Harvard and CMU, July 1986.
- [36] Feinler, E., editor, "DDN Protocol Handbook", Network Information Center, SRI International, December 1985.
- [37] Feinler, E., editor, "Internet Protocol Transition Workbook", Network Information Center, SRI International, March 1982.
- [38] Feinler, E. and J. Postel, eds., "ARPANET Protocol Handbook", NIC 7104, for the Defense Communications Agency by SRI International, Menlo Park, California, Revised January 1978.
- [39] Feinler, E., K. Harrenstien, Z. Su, and V. White, "DoD Internet Host Table Specification", [RFC 810](#), SRI International, March 1982.
- [40] Finlayson, R., T. Mann, J. Mogul, and M. Theimer, "A Reverse Address Resolution Protocol", [RFC 903](#), Stanford University, June 1984.
- [41] Forgie, J., "ST - A Proposed Internet Stream Protocol", IEN 119, MIT Lincoln Laboratory, September 1979.
- [42] Forsdick, H., "CFTP", Network Message, Bolt Beranek and Newman, January 1982.

- [43] Greenberg, B., "Telnet SUPDUP-OUTPUT Option", [RFC 749](#), MIT-Multics, September 1978.
- [44] Harrenstien, K., "Name/Finger", [RFC 742](#), NIC 42758, SRI International, December 1977.
- [45] Harrenstien, K., V. White, and E. Feinler, "Hostnames Server", [RFC 811](#), SRI International, March 1982.
- [46] Harrenstien, K., and V. White, "Nickname/Whois", [RFC 812](#), SRI International, March 1982.
- [47] Haverty, J., "XNET Formats for Internet Protocol Version 4", IEN 158, October 1980.
- [48] Hinden, R. M., "A Host Monitoring Protocol", [RFC 869](#), Bolt Beranek and Newman, December 1983.
- [49] Hinden, R., and A. Sheltzer, "The DARPA Internet Gateway", [RFC 823](#), September 1982.
- [50] Hornig, C., "A Standard for the Transmission of IP Datagrams over Ethernet Networks", [RFC 894](#), Symbolics, April 1984.
- [51] International Standards Organization, "ISO Transport Protocol Specification - ISO DP 8073", [RFC 905](#), April 1984.
- [52] International Standards Organization, "Protocol for Providing the Connectionless-Mode Network Services", [RFC 926](#), ISO, December 1984.
- [53] Kantor, B., and P. Lapsley, "Network News Transfer Protocol", [RFC 977](#), UC San Diego & UC Berkeley, February 1986.
- [54] Killian, E., "Telnet Send-Location Option", [RFC 779](#), April 1981.
- [55] Korb, J. T., "A Standard for the Transmission of IP Datagrams Over Public Data Networks", [RFC 877](#), Purdue University, September 1983.
- [56] Lottor, M. K., "Simple File Transfer Protocol", [RFC 913](#), MIT, September 1984.
- [57] Malis, A., "Logical Addressing Implementation Specification", BBN Report 5256, pp 31-36, May 1983.

- [58] Metcalfe, R. M. and D. R. Boggs, "Ethernet: Distributed Packet Switching for Local Computer Networks", Communications of the ACM, 19 (7), pp 395-402, July 1976.
- [59] Miller, T., "Internet Reliable Transaction Protocol", RFC 938, ACC, February 1985.
- [60] Mills, D., "Network Time Protocol", RFC 958, M/A-COM Linkabit, September 1985.
- [61] Mockapetris, P., "Domain Names - Implementation and Specification", RFC 883, Information Sciences Institute, November 1983.
- [62] Nedved, R., "Telnet Terminal Location Number Option", RFC 946, Carnegie-Mellon University, May 1985.
- [63] NSW Protocol Committee, "MSG: The Interprocess Communication Facility for the National Software Works", CADD-7612-2411, Massachusetts Computer Associates, BBN 3237, Bolt Beranek and Newman, Revised December 1976.
- [64] Plummer, D., "An Ethernet Address Resolution Protocol or Converting Network Protocol Addresses to 48-bit Ethernet Addresses for Transmission on Ethernet Hardware", RFC 826, MIT-LCS, November 1982.
- [65] Postel, J., "Active Users", RFC 866, Information Sciences Institute, May 1983.
- [66] Postel, J., "A Standard for the Transmission of IP Datagrams over Experimental Ethernet Networks", RFC 895, Information Sciences Institute, April 1984.
- [67] Postel, J., "Character Generator Protocol", RFC 864, Information Sciences Institute, May 1983.
- [68] Postel, J., "Daytime Protocol", RFC 867, Information Sciences Institute, May 1983.
- [69] Postel, J., "Discard Protocol", RFC 863, Information Sciences Institute, May 1983.
- [70] Postel, J., "Echo Protocol", RFC 862, Information Sciences Institute, May 1983.
- [71] Postel, J. and J. Reynolds, "File Transfer Protocol", RFC 959, Information Sciences Institute, October 1985.

- [72] Postel, J., "Internet Control Message Protocol - DARPA Internet Program Protocol Specification", [RFC 792](#), Information Sciences Institute, September 1981.
- [73] Postel, J., "Internet Message Protocol", [RFC 759](#), IEN 113, Information Sciences Institute, August 1980.
- [74] Postel, J., "Name Server", IEN 116, Information Sciences Institute, August 1979.
- [75] Postel, J., "Quote of the Day Protocol", [RFC 865](#), Information Sciences Institute, May 1983.
- [76] Postel, J., "Remote Telnet Service", [RFC 818](#), Information Sciences Institute, November 1982.
- [77] Postel, J., "Simple Mail Transfer Protocol", [RFC 821](#), Information Sciences Institute, August 1982.
- [78] Postel, J., "Telnet End of Record Option", [RFC 885](#), Information Sciences Institute, December 1983.
- [79] Postel, J., "User Datagram Protocol", [RFC 768](#), Information Sciences Institute, August 1980.
- [80] Postel, J., ed., "Internet Protocol - DARPA Internet Program Protocol Specification", [RFC 791](#), Information Sciences Institute, September 1981.
- [81] Postel, J., ed., "Transmission Control Protocol - DARPA Internet Program Protocol Specification", [RFC 793](#), Information Sciences Institute, September 1981.
- [82] Postel, J. and D. Crocker, "Remote Controlled Transmission and Echoing Telnet Option", [RFC 726](#), March 1977.
- [83] Postel, J., and K. Harrenstien, "Time Protocol", [RFC 868](#), Information Sciences Institute, May 1983.
- [84] Postel, J. and J. Reynolds, "Telnet Extended Options - List Option", [RFC 861](#), Information Sciences Institute, May 1983.
- [85] Postel, J. and J. Reynolds, "Telnet Binary Transmission", [RFC 856](#), Information Sciences Institute, May 1983.
- [86] Postel, J. and J. Reynolds, "Telnet Echo Option", [RFC 857](#), Information Sciences Institute, May 1983.

- [87] Postel, J., and J. Reynolds, "Telnet Protocol Specification", [RFC 854](#), Information Sciences Institute, May 1983.
- [88] Postel, J. and J. Reynolds, "Telnet Status Option", [RFC 859](#), Information Sciences Institute, May 1983.
- [89] Postel, J. and J. Reynolds, "Telnet Suppress Go Ahead Option", [RFC 858](#), Information Sciences Institute, May 1983.
- [90] Postel, J. and J. Reynolds, "Telnet Timing Mark Option", [RFC 860](#), Information Sciences Institute, May 1983.
- [91] Reynolds, J. and J. Postel, "Official Internet Protocols", [RFC 1011](#), Information Sciences Institute, May 1987.
- [92] Seamonson, L. J., and E. C. Rosen, "STUB" Exterior Gateway Protocol", [RFC 888](#), BBN Communications Corporation, January 1984.
- [93] Shuttleworth, B., "A Documentary of MFENet, a National Computer Network", UCRL-52317, Lawrence Livermore Labs, Livermore, California, June 1977.
- [94] Silverman, S., "Output Marking Telnet Option", [RFC 933](#), MITRE, January 1985.
- [95] Sollins, K., "The TFTP Protocol (Revision 2)", [RFC 783](#), MIT/LCS, June 1981.
- [96] Solomon, M., L. Landweber, and D. Neuhengen, "The CSNET Name Server", Computer Networks, v.6, n.3, pp. 161-172, July 1982.
- [97] Solomon, M., and E. Wimmers, "Telnet Terminal Type Option", [RFC 930](#), Supersedes [RFC 884](#), University of Wisconsin, Madison, January 1985.
- [98] Sproull, R., and E. Thomas, "A Networks Graphics Protocol", NIC 24308, August 1974.
- [99] StJohns, M., "Authentication Service", [RFC 931](#), TPSC, January 1985.
- [100] Tappan, D. C., "The CRONUS Virtual Local Network", [RFC 824](#), Bolt Beranek and Newman, August 1982.
- [101] Taylor, J., "ERPC Functional Specification", Version 1.04, HYDRA Computer Systems, Inc., July 1984.

- [102] "The Ethernet, A Local Area Network: Data Link Layer and Physical Layer Specification", AA-K759B-TK, Digital Equipment Corporation, Maynard, MA. Also as: "The Ethernet - A Local Area Network", Version 1.0, Digital Equipment Corporation, Intel Corporation, Xerox Corporation, September 1980. And: "The Ethernet, A Local Area Network: Data Link Layer and Physical Layer Specifications", Digital, Intel and Xerox, November 1982. And: XEROX, "The Ethernet, A Local Area Network: Data Link Layer and Physical Layer Specification", X3T51/80-50, Xerox Corporation, Stamford, CT., October 1980.
- [103] The High Level Protocol Group, "A Network Independent File Transfer Protocol", INWG Protocol Note 86, December 1977.
- [104] Tovar, "Telnet Extended ASCII Option", RFC 698, Stanford University-AI, July 1975.
- [105] Uttal, J, J. Rothschild, and C. Kline, "Transparent Integration of UNIX and MS-DOS", Locus Computing Corporation.
- [106] Velten, D., R. Hinden, and J. Sax, "Reliable Data Protocol", RFC 908, BBN Communications Corporation, July 1984.
- [107] Wancho, F., "Password Generator Protocol", RFC 972, WSMR, January 1986.
- [108] Winston, I., "Two Methods for the Transmission of IP Datagrams Over IEEE 802.3 Networks", RFC 948, University Of Pennsylvania, June 1985.
- [109] Khanna, A., and A. Malis, "The ARPANET AHIP-E Host Access Protocol (Enhanced AHIP)", RFC 1005, BBN Communications Corporation, May 1987.



PEOPLE

[AGM]	Andy Malis	BBN	Malis@CCS.BBN.COM
[AV]	Al Vezza	MIT	AV@XX.LCS.MIT.EDU
[AXH]	Arthur Hartwig	UQNET	---none---
[BA4]	Brian Anderson	BBN	baanders@CCQ.BBN.COM
[BCH2]	Barry Howard	LLL	Howard@LLL-MFE.ARPA
[BN4]	Bill Nowicki	SUN	Nowicki@SUN.COM
[CAK]	Chris Kent	PURDUE	CAK@PURDUE.EDU
[DCP1]	David Plummer	MIT	DCP@SYMBOLICS.ARPA
[DDC1]	David Clark	MIT	DClark@MIT-MULTICS.ARPA
[DLM1]	David Mills	LINKABIT	Mills@D.ISI.EDU
[DPR]	David Reed	MIT-LCS	Reed@MIT-MULTICS.ARPA
[DT15]	Daniel Tappan	BBN	Tappan@BBN.COM
[DXD]	Dennis J.W. Dube	VIA SYSTEMS	---none---
[DXG]	David Goldberg	SMI	sun!dg@UCBARPA.BERKELEY.EDU
[EAK1]	Earl Killian	LLL	EAK@S1-C.ARPA
[EBM]	Eliot Moss	MIT	EBM@XX.LCS.MIT.EDU
[FJW]	Frank J. Wancho	WSMR	WANCHO@SIMTEL20.ARPA
[FRAN]	Francine Perillo	SRI	Perillo@NIC.SRI.COM
[GB7]	Gerd Beling	DFVLR	GBELING@ISI.EDU
[GEOF]	Geoff Goodfellow	SRI	Geoff@SRI-CSL.ARPA
[GXP]	Gill Pratt	MIT	gill%mit-ccc@MC.LCS.MIT.EDU
[HCF2]	Harry Forsdick	BBN	Forsdick@A.BBN.COM
[HWB]	Hans-Werner Braun	MICHIGAN	HWB@MCR.UMICH.EDU

[IEEE]	Vince Condello	IEEE	---none---
[JAKE]	Jake Feinler	SRI	Feinler@SRI-NIC.ARPA
[JBP]	Jon Postel	ISI	Postel@ISI.EDU
[JBW1]	Joseph Walters, Jr.	BBN	JWalters@CCX.BBN.COM
[JD21]	Jonathan Dreyer	BBN	JDreyer@CCV.BBN.COM
[JFH2]	Jack Haverty	BBN	Haverty@CCV.BBN.COM
[JFW]	Jon F. Wilkes	STC	Wilkes@STC.ARPA
[JGH]	Jim Herman	BBN	Herman@CCJ.BBN.COM
[JR17]	John L. Robinson	CANADA	Robinson@DMC-CRC.ARPA
[JWF]	Jim Forgie	LL	jwf@LL-EN.ARPA
[JXE2]	Jeanne Evans	UKMOD	JME%RSRE.MOD.UK@CS.UCL.AC.UK
[JXM]	Jeff Mogul	Stanford	---none---
[JXO]	Jack O'Neil	ENCORE	---none---
[JXP]	Joe Pato	Apollo	apollo!pato@EDDIE.MIT.EDU
[KLH]	Ken Harrenstien	SRI	KLH@NIC.SRI.COM
[LLP]	Larry Peterson	PURDUE	llp@PURDUE.EDU
[MA]	Mike Accetta	CMU	MIKE.ACETTA@CMU-CS-A.EDU
[MAE]	Marc A. Elvy	HARVARD	elvy@HARVARD.EDU
[MAS3]	Marc Solomon	MDAC	solomon@OFFICE-1.ARPA
[MB]	Michael Brescia	BBN	Brescia@CCV.BBN.COM
[MBG]	Michael Greenwald	MIT-LCS	Greenwald@MIT-MULTICS.ARPA
[MCSJ]	Mike StJohns	TPSC	StJohns@MIT-MULTICS.ARPA
[MKL1]	Mark Lottor	MIT	MKL@NIC.SRI.COM
[MLC]	Mike Corrigan	DDN	Corrigan@DDN1.ARPA

[MO2]	Michael O'Brien	RAND	OBrien@RAND-UNIX.ARPA
[MRC]	Mark Crispin	STANFORD	Admin.MRC@SU-SCORE.STANFORD.EDU
[MTR]	Marshall Rose	NRTC	MRose@NRTC.ARPA
[MXB]	Mike Berrow	Relational Technology	---none---
[MXR]	Mark A. Rosenstein	MIT	mark@BORAX.LCS.MIT.EDU
[NC3]	J. Noel Chiappa	MIT	JNC@XX.LCS.MIT.EDU
[PAM6]	Paul McNabb	RICE	pam@PURDUE.EDU
[PHD1]	Pieter Ditmars	BBN	pditmars@CCX.BBN.COM
[PK]	Peter Kirstein	UCL	Kirstein@ISI.EDU
[PL4]	Phil Lapsley	BERKELEY	phil@UCBARPA.BERKELEY.EDU
[PM1]	Paul Mockapetris	ISI	Mockapetris@ISI.EDU
[PXD]	Pete Delaney	ECRC	pete%ecrcvax@CSNET-RELAY.ARPA
[RDB2]	Robert Bressler	BBN	Bressler@CCW.BBN.COM
[RH6]	Robert Hinden	BBN	Hinden@CCV.BBN.COM
[RHT]	Robert Thomas	BBN	BThomas@F.BBN.COM
[RN6]	Rudy Nedved	CMU	Rudy.Nedved@CMU-CS-A.EDU
[RTB3]	Bob Braden	ISI	Braden@ISI.EDU
[RWS4]	Robert W. Scheifler	ARGUS	RWS@XX.LCS.MIT.EDU
[RXM]	Robert Myhill	BBN	Myhill@CCS.BBN.COM
[SA1]	Sten Andler	ARPA	andler.ibm-sj@RAND-RELAY.ARPA
[SA2]	Saul Amarel	ARPA	Amarel@ISI.EDU
[SC3]	Steve Casner	ISI	Casner@ISI.EDU
[SGC]	Steve Chipman	BBN	Chipman@F.BBN.COM
[SHB]	Steven Blumenthal	BBN	BLUMENTHAL@VAX.BBN.COM

[SXS]	Steve Silverman	MITRE	Blankert@MITRE-GATEWAY.ORG
[SXS1]	Susie Snitzer	Britton-Lee	---none---
[TXM]	Trudy Miller	ACC	Trudy@ACC.ARPA
[UXB]	Ulf Bilting	CHALMERS	bilting@PURDUE.EDU
[WJC2]	Bill Croft	STANFORD	Croft@SUMEX-AIM.ARPA
[WXB]	William L. Biagi	CISCO	---none---
[XEROX]	Pam Cance	XEROX	Cance.OSBUnorth@XEROX.COM
[ZSU]	Zaw-Sing Su	SRI	ZSu@SRI-TSC.ARPA