ASSIGNED NUMBERS

Status of this Memo

Thismemo isa status reporton the parameters (i.e., numbers and
keywords) used in protocols in the Internet community. Distribution
of this memois unlimited.

Table of Contents

INTRODUCTION

ThisNetworkWorkingGroup 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 inany case current information can be obtained from
the InternetAssigned Numbers Authority (IANA). If you are developing
a protocol or application that will require the use of a link, socket,
port, protocol, etc., pleasecontactthe IANA to receive a number
assignment.

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Mostof the protocols mentioned hereare documented in the RFC series
of notes. Some of the itemslisted are undocumented. Further
information on protocols canbe found in thememo "IAB Official
Protocol Standards" [62].

In the entries below, the name and mailbox of the responsible
individual is indicated. The bracketed entry, e.g.,[nn,iii], at the
right hand margin ofthe page indicates a reference for the listed
protocol, where the number ("nn") cites the documentand theletters
("iii") cites the person. Whenever possible, the letters are a NIC
Ident as used in theWhoIs (NICNAME)service.

Data Notations

   The convention in the documentation of Internet Protocols isto
   express numbers in decimal and to picture data in "big-endian" order
   [21]. That is, fields are describedleft toright, with themost
   significant octet onthe left and the least significant octet on the
   right.

   The order oftransmission ofthe header and data described in this
   document is resolvedto the octet level. Whenever adiagramshows a
   group of octets, theorder of transmission of those octets is the
   normal orderin which they are read in English. Forexample, in the
   following diagram the octetsare transmittedin the order they are
   numbered.

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

Transmission Order of Bytes

   Whenever an octet representsa numeric quantity the left most bit in
   the diagram is the high order or most significant bit. Thatis, the
   bit labeled 0 is themost significant bit. For example, the
   following diagram representsthe value 170 (decimal).

     0 1 2 3 4 5 6 7
    +-+-+-+-+-+-+-+-+
    |1 0 1 0 1 0 1 0|
    +-+-+-+-+-+-+-+-+

   Significanceof Bits

   Similarly, whenever a multi-octet field represents anumericquantity
   the left most bit ofthe whole fieldis the most significantbit.
   Whena multi-octet quantity is transmitted the most significant octet
   is transmitted first.

SpecialAddresses:

There are five classes of IPaddresses: Class A through Class E
[119]. Of these, Class E addresses are reserved forexperimental
use. A gateway which is notparticipating in these experiments must
ignore all datagramswith a Class E destination IP address.ICMP
Destination Unreachable or ICMP Redirect messages must not result
fromreceiving such datagrams.

There are certain special cases for IP addresses [11]. These special
cases can beconcisely summarized using the earlier notationfor an
IP address:

IP-address ::= { <Network-number>, <Host-number> }

    or

IP-address ::= { <Network-number>, <Subnet-number>,
<Host-number> }

if we also use the notation "-1" to mean thefield contains all 1
bits. Some common special cases areas follows:

(a)   {0, 0}

This host on this network.Can only be used as a source
address (see note later).

(b)   {0, <Host-number>}

Specified host on this network. Can only be used as a
source address.

(c)   { -1, -1}

Limited broadcast.Can only be used as a destination
address, and a datagram with this address must never be
forwarded outside the (sub-)net of the source.

(d)   {<Network-number>, -1}

Directed broadcast to specified network. Can only be used
as a destination address.

(e)   {<Network-number>, <Subnet-number>, -1}

Directed broadcast to specified subnet. Can only be used as
a destination address.

(f)   {<Network-number>, -1, -1}

   Directed broadcast to all subnets of specified subnetted
   network. Can only be used as a destinationaddress.

(g)   {127, <any>}

   Internal host loopback address. Should never appear outside
   a host.

VERSION NUMBERS

In the Internet Protocol (IP) [45,105] thereis a field to identify
the version of the internetwork general protocol. This field is 4
bitsin size.

Assigned Internet Version Numbers

```
   DecimalKeyword   Version        References
   --------------   -------        ----------
 0   Reserved   [JBP]
1-3  Unassigned   [JBP]
 4  IP   Internet Protocol      [105,JBP]
 5  ST   ST Datagram Mode[49,JWF]
6-14  Unassigned   [JBP]
 15   Reserved   [JBP]
```

PROTOCOLNUMBERS

In the Internet Protocol (IP) [45,105] thereis a field, called
Protocol, toidentify 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[97,JBP]
 2 IGMP      Internet Group Management[43,JBP]
 3 GGP       Gateway-to-Gateway [60,MB]
 4 IP      IPin IP (encasulation)   [JBP]
 5 ST      Stream[49,JWF]
 6 TCP       Transmission Control       [106,JBP]
 7 UCL      UCL     [PK]
 8 EGP       Exterior Gateway Protocol      [123,DLM1]
 9 IGP       any private interior gateway   [JBP]
10 BBN-RCC-MON BBN RCC Monitoring   [SGC]
11 NVP-II      Network Voice Protocol[22,SC3]
12 PUP      PUP       [8,XEROX]
13 ARGUS      ARGUS  [RWS4]
14 EMCON       EMCON   [BN7]
15 XNET       Cross Net Debugger       [56,JFH2]
16 CHAOS       Chaos   [NC3]
17 UDP       User Datagram       [104,JBP]
18 MUX       Multiplexing[23,JBP]
19 DCN-MEAS      DCN Measurement Subsystems  [DLM1]
20 HMP      Host Monitoring[59,RH6]
21 PRM      Packet Radio Measurement   [ZSU]
22 XNS-IDP      XEROX NS IDP      [133,XEROX]
23 TRUNK-1      Trunk-1 [BWB6]
24 TRUNK-2      Trunk-2 [BWB6]
25 LEAF-1      Leaf-1 [BWB6]
26 LEAF-2      Leaf-2 [BWB6]
27 RDP       Reliable Data Protocol       [138,RH6]
28 IRTP      Internet Reliable Transaction[79,TXM]
29 ISO-TP4      ISO Transport Protocol Class 4    [63,RC77]
30 NETBLT      Bulk Data TransferProtocol       [20,DDC1]
31 MFE-NSP      MFE Network Services Protocol    [124,BCH2]
32 MERIT-INP   MERIT Internodal Protocol   [HWB]
33 SEP      SequentialExchange Protocol [JC120]
34 3PC      Third Party Connect Protocol [SAF3]
35 IDPR      Inter-Domain Policy Routing Protocol [MXS1]
36 XTP      XTP   [GXC]
37 DDP      Datagram Delivery Protocol   [WXC]
```

```
38 IDPR-CMTP    IDPR Control Message Transport Proto [MXS1]
39 TP++       TP++ Transport Protocol    [DXF]
40 IL      ILTransport Protocol  [DXP2]
   41-60      Unassigned   [JBP]
61     any host internal protocol   [JBP]
62 CFTP       CFTP      [50,HCF2]
63     any local network   [JBP]
64 SAT-EXPAK    SATNET andBackroom EXPAK   [SHB]
65 KRYPTOLAN    Kryptolan  [PXL1]
66 RVD       MIT RemoteVirtualDisk Protocol    [MBG]
67 IPPC      Internet Pluribus Packet Core    [SHB]
68     any distributed file system   [JBP]
69 SAT-MON      SATNET Monitoring    [SHB]
70 VISA      VISA Protocol  [GXT1]
71 IPCV       Internet Packet Core Utility    [SHB]
72 CPNX       Computer Protocol Network Executive  [DXM2]
73 CPHB       Computer Protocol Heart Beat   [DXM2]
74 WSN      Wang Span Network    [VXD]
75 PVP      Packet Video Protocol    [SC3]
76 BR-SAT-MON  Backroom SATNET Monitoring    [SHB]
77 SUN-ND       SUN ND PROTOCOL-Temporary    [WM3]
78 WB-MON       WIDEBAND Monitoring    [SHB]
79 WB-EXPAK     WIDEBAND EXPAK    [SHB]
80 ISO-IP       ISO Internet Protocol    [MTR]
81 VMTP       VMTP   [DRC3]
82 SECURE-VMTP SECURE-VMTP   [DRC3]
83 VINES      VINES    [BXH]
84 TTP      TTP   [JXS]
85 NSFNET-IGP  NSFNET-IGP    [HWB]
86 DGP       DissimilarGatewayProtocol      [74,ML109]
87 TCF      TCF   [GAL5]
88 IGRP      IGRP[18,GXS]
89 OSPFIGP      OSPFIGP      [83,JTM4]
90 Sprite-RPC  Sprite RPCProtocol      [143,BXW]
91 LARP      Locus Address Resolution Protocol   [BXH]
92 MTP      Multicast Transport Protocol    [SXA]
93 AX.25       AX.25 Frames   [BK29]
94 IPIP       IP-within-IP EncapsulationProtocol  [JXI1]
95 MICP       Mobile Internetworking Control Pro.   [JXI1]
96 AES-SP3-D   AES Security Protocol 3-D    [HXH]
97 ETHERIP      Ethernet-within-IPEncapsulation  [RXH1]
98 ENCAP      Encapsulation Header      [148,RXB3]
   99-254      Unassigned   [JBP]
  255     Reserved   [JBP]
```

WELLKNOWN PORT NUMBERS

The Well Known Ports are controlled andassigned by theIANA and on most
systemscan only be used by system (or root) processes or by programs
executed by privileged users.

Ports are used in the TCP [45,106] to name the ends of logical
connections which carrylong 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
contactport. The contact portis sometimes called the"well-known
port".

To the extent possible,these same portassignments areused with the
UDP [46,104].

The assigned ports use a small portion of the possible port numbers.
For many years the assigned ports were in the range 0-255. Recently,
the range for assigned ports managed bythe IANA has been expanded to
the range 0-1023.

Port Assignments:

```
   Keyword    Decimal    Description        References
   -------    -------    -----------        ----------
     0/tcp     Reserved   [JBP]
     0/udp     Reserved   [JBP]
   tcpmux      1/tcp    TCP Port Service Multiplexer   [MKL]
   tcpmux      1/udp    TCP Port Service Multiplexer   [MKL]
   compressnet    2/tcp    Management Utility  [BV15]
   compressnet    2/udp    Management Utility  [BV15]
   compressnet    3/tcp    Compression Process  [BV15]
   compressnet    3/udp    Compression Process  [BV15]
     4/tcp    Unassigned   [JBP]
     4/udp    Unassigned   [JBP]
   rje     5/tcp    Remote Job Entry[12,JBP]
   rje     5/udp    Remote Job Entry[12,JBP]
     6/tcp    Unassigned   [JBP]
     6/udp    Unassigned   [JBP]
   echo    7/tcp    Echo[95,JBP]
   echo    7/udp    Echo[95,JBP]
     8/tcp    Unassigned   [JBP]
     8/udp    Unassigned   [JBP]
   discard    9/tcp    Discard[94,JBP]
   discard    9/udp    Discard[94,JBP]
    10/tcp    Unassigned   [JBP]
    10/udp    Unassigned   [JBP]
   systat    11/tcp    Active Users[89,JBP]
```

```
systat    11/udp    Active Users[89,JBP]
          12/tcp    Unassigned   [JBP]
          12/udp    Unassigned   [JBP]
daytime   13/tcp    Daytime[93,JBP]
daytime   13/udp    Daytime[93,JBP]
          14/tcp    Unassigned   [JBP]
          14/udp    Unassigned   [JBP]
          15/tcp    Unassigned [was netstat]   [JBP]
          15/udp    Unassigned   [JBP]
          16/tcp    Unassigned   [JBP]
          16/udp    Unassigned   [JBP]
qotd   17/tcp    Quote of the Day        [100,JBP]
qotd   17/udp    Quote of the Day        [100,JBP]
msp    18/tcp    Message Send Protocol   [RXN]
msp    18/udp    Message Send Protocol   [RXN]
chargen   19/tcp    CharacterGenerator[92,JBP]
chargen   19/udp    CharacterGenerator[92,JBP]
ftp-data   20/tcp    File Transfer [Default Data][96,JBP]
ftp-data   20/udp    File Transfer [Default Data][96,JBP]
ftp    21/tcp    File Transfer [Control][96,JBP]
ftp    21/udp    File Transfer [Control][96,JBP]
          22/tcp    Unassigned   [JBP]
          22/udp    Unassigned   [JBP]
telnet    23/tcp    Telnet       [112,JBP]
telnet    23/udp    Telnet       [112,JBP]
          24/tcp    any private mail system  [RA11]
          24/udp    any private mail system  [RA11]
smtp   25/tcp    Simple Mail Transfer      [102,JBP]
smtp   25/udp    Simple Mail Transfer      [102,JBP]
          26/tcp    Unassigned   [JBP]
          26/udp    Unassigned   [JBP]
nsw-fe    27/tcp    NSW User System FE[24,RHT]
nsw-fe    27/udp    NSW User System FE[24,RHT]
          28/tcp    Unassigned   [JBP]
          28/udp    Unassigned   [JBP]
msg-icp   29/tcp    MSG ICP[85,RHT]
msg-icp   29/udp    MSG ICP[85,RHT]
          30/tcp    Unassigned   [JBP]
          30/udp    Unassigned   [JBP]
msg-auth   31/tcp    MSG Authentication[85,RHT]
msg-auth   31/udp    MSG Authentication[85,RHT]
          32/tcp    Unassigned   [JBP]
          32/udp    Unassigned   [JBP]
dsp    33/tcp    Display Support Protocol   [EXC]
dsp    33/udp    Display Support Protocol   [EXC]
          34/tcp    Unassigned   [JBP]
          34/udp    Unassigned   [JBP]
          35/tcp    any private printer server   [JBP]
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   35/udp     any private printer server    [JBP]
   36/tcp     Unassigned   [JBP]
   36/udp     Unassigned   [JBP]
time    37/tcp     Time        [108,JBP]
time    37/udp     Time        [108,JBP]
   38/tcp     Unassigned   [JBP]
   38/udp     Unassigned   [JBP]
rlp     39/tcp     Resource LocationProtocol    [MA]
rlp     39/udp     Resource LocationProtocol    [MA]
   40/tcp     Unassigned   [JBP]
   40/udp     Unassigned   [JBP]
graphics    41/tcp     Graphics      [129,JBP]
graphics    41/udp     Graphics      [129,JBP]
nameserver    42/tcp     Host NameServer[99,JBP]
nameserver    42/udp     Host NameServer[99,JBP]
nicname   43/tcp    Who Is      [55,ANM2]
nicname   43/udp    Who Is      [55,ANM2]
mpm-flags    44/tcp    MPM FLAGSProtocol   [JBP]
mpm-flags    44/udp    MPM FLAGSProtocol   [JBP]
mpm    45/tcp    Message Processing Module[recv][98,JBP]
mpm    45/udp    Message Processing Module[recv][98,JBP]
mpm-snd    46/tcp    MPM [default send][98,JBP]
mpm-snd    46/udp    MPM [default send][98,JBP]
ni-ftp    47/tcp    NI FTP      [134,SK8]
ni-ftp    47/udp    NI FTP      [134,SK8]
   48/tcp     Unassigned   [JBP]
   48/udp     Unassigned   [JBP]
login    49/tcp    Login Host Protocol  [PHD1]
login    49/udp    Login Host Protocol  [PHD1]
re-mail-ck    50/tcp    Remote Mail Checking Protocol    [171,SXD1]
re-mail-ck    50/udp    Remote Mail Checking Protocol    [171,SXD1]
la-maint    51/tcp    IMP Logical Address Maintenance[76,AGM]
la-maint    51/udp    IMP Logical Address Maintenance[76,AGM]
xns-time    52/tcp    XNS Time Protocol    [SXA]
xns-time    52/udp    XNS Time Protocol    [SXA]
domain    53/tcp    Domain Name Server    [81,95,PM1]
domain    53/udp    Domain Name Server    [81,95,PM1]
xns-ch    54/tcp    XNS Clearinghouse    [SXA]
xns-ch    54/udp    XNS Clearinghouse    [SXA]
isi-gl    55/tcp    ISI Graphics Language [7,RB9]
isi-gl    55/udp    ISI Graphics Language [7,RB9]
xns-auth    56/tcp    XNS Authentication    [SXA]
xns-auth    56/udp    XNS Authentication    [SXA]
   57/tcp     any private terminal access    [JBP]
   57/udp     any private terminal access    [JBP]
xns-mail    58/tcp    XNS Mail   [SXA]
xns-mail    58/udp    XNS Mail   [SXA]
   59/tcp     any private file service    [JBP]
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 59/udp    any private file service    [JBP]
 60/tcp    Unassigned   [JBP]
 60/udp    Unassigned   [JBP]
ni-mail    61/tcp     NI MAIL [5,SK8]
ni-mail    61/udp     NI MAIL [5,SK8]
acas    62/tcp    ACA Services    [EXW]
acas    62/udp    ACA Services    [EXW]
via-ftp    63/tcp    VIA Systems - FTP    [DXD]
via-ftp    63/udp    VIA Systems - FTP    [DXD]
covia    64/tcp    Communications Integrator(CI)    [TXD]
covia    64/udp    Communications Integrator(CI)    [TXD]
tacacs-ds    65/tcp    TACACS-Database Service[3,KH43]
tacacs-ds    65/udp    TACACS-Database Service[3,KH43]
sql*net    66/tcp    Oracle SQL*NET   [JFH2]
sql*net    66/udp    Oracle SQL*NET   [JFH2]
bootps    67/tcp    BootstrapProtocol Server      [36,WJC2]
bootps    67/udp    BootstrapProtocol Server      [36,WJC2]
bootpc    68/tcp    BootstrapProtocol Client      [36,WJC2]
bootpc    68/udp    BootstrapProtocol Client      [36,WJC2]
tftp    69/tcp    Trivial File Transfer    [126,DDC1]
tftp    69/udp    Trivial File Transfer    [126,DDC1]
gopher    70/tcp    Gopher   [MXC1]
gopher    70/udp    Gopher   [MXC1]
netrjs-1    71/tcp    Remote Job Service     [10,RTB3]
netrjs-1    71/udp    Remote Job Service     [10,RTB3]
netrjs-2    72/tcp    Remote Job Service     [10,RTB3]
netrjs-2    72/udp    Remote Job Service     [10,RTB3]
netrjs-3    73/tcp    Remote Job Service     [10,RTB3]
netrjs-3    73/udp    Remote Job Service     [10,RTB3]
netrjs-4    74/tcp    Remote Job Service     [10,RTB3]
netrjs-4    74/udp    Remote Job Service     [10,RTB3]
 75/tcp    any private dial out service    [JBP]
 75/udp    any private dial out service    [JBP]
 76/tcp    Unassigned    [JBP]
 76/udp    Unassigned    [JBP]
 77/tcp    any private RJE service    [JBP]
 77/udp    any private RJE service    [JBP]
vettcp    78/tcp    vettcp  [CXL1]
vettcp    78/udp    vettcp  [CXL1]
finger    79/tcp    Finger[52,KLH]
finger    79/udp    Finger[52,KLH]
www    80/tcp    World Wide Web HTTP    [TXL]
www    80/udp    World Wide Web HTTP    [TXL]
hosts2-ns    81/tcp    HOSTS2 Name Server  [EAK1]
hosts2-ns    81/udp    HOSTS2 Name Server  [EAK1]
xfer    82/tcp    XFER Utility [TXS2]
xfer    82/udp    XFER Utility [TXS2]
mit-ml-dev    83/tcp    MIT ML Device  [DXR3]
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   mit-ml-dev    83/udp    MIT ML Device [DXR3]
   ctf     84/tcp    Common Trace Facility   [HXT]
   ctf     84/udp    Common Trace Facility   [HXT]
   mit-ml-dev    85/tcp    MIT ML Device [DXR3]
   mit-ml-dev    85/udp    MIT ML Device [DXR3]
   mfcobol    86/tcp    Micro Focus Cobol    [SXE]
   mfcobol    86/udp    Micro Focus Cobol    [SXE]
     87/tcp    any private terminal link    [JBP]
     87/udp    any private terminal link    [JBP]
   kerberos    88/tcp    Kerberos    [BCN]
   kerberos    88/udp    Kerberos    [BCN]
   su-mit-tg    89/tcp    SU/MIT Telnet Gateway    [MRC]
   su-mit-tg    89/udp    SU/MIT Telnet Gateway    [MRC]
   dnsix    90/tcp    DNSIX Securit Attribute Token Map  [CXW1]
   dnsix    90/udp    DNSIX Securit Attribute Token Map  [CXW1]
   mit-dov    91/tcp    MIT DoverSpooler    [EBM]
   mit-dov    91/udp    MIT DoverSpooler    [EBM]
   npp    92/tcp    Network Printing Protocol    [LXM]
   npp    92/udp    Network Printing Protocol    [LXM]
   dcp    93/tcp    Device Control Protocol  [DT15]
   dcp    93/udp    Device Control Protocol  [DT15]
   objcall    94/tcp    Tivoli Object Dispatcher   [TXB1]
   objcall    94/udp    Tivoli Object Dispatcher   [TXB1]
   supdup    95/tcp    SUPDUP[27,MRC]
   supdup    95/udp    SUPDUP[27,MRC]
   dixie    96/tcp    DIXIE Protocol Specification   [TXH1]
   dixie    96/udp    DIXIE Protocol Specification   [TXH1]
   swift-rvf    97/tcp    Swift Remote Vitural FileProtocol    [MXR]
   swift-rvf    97/udp    Swift Remote Vitural FileProtocol    [MXR]
   tacnews    98/tcp    TAC News   [ANM2]
   tacnews    98/udp    TAC News   [ANM2]
   metagram    99/tcp    Metagram Relay   [GEOF]
   metagram    99/udp    Metagram Relay   [GEOF]
   newacct    100/tcp    [unauthorized use]
   hostname    101/tcp    NIC Host Name Server      [54,ANM2]
   hostname    101/udp    NIC Host Name Server      [54,ANM2]
   iso-tsap    102/tcp    ISO-TSAP[16,MTR]
   iso-tsap    102/udp    ISO-TSAP[16,MTR]
   gppitnp    103/tcp    Genesis Point-to-Point Trans Net   [PXM1]
   gppitnp    103/udp    Genesis Point-to-Point Trans Net   [PXM1]
   acr-nema    104/tcp    ACR-NEMA Digital Imag. & Comm. 300   [PXM1]
   acr-nema    104/udp    ACR-NEMA Digital Imag. & Comm. 300   [PXM1]
   csnet-ns    105/tcp    Mailbox Name Nameserver     [127,MS56]
   csnet-ns    105/udp    Mailbox Name Nameserver     [127,MS56]
   3com-tsmux    106/tcp    3COM-TSMUX   [JXS5]
   3com-tsmux    106/udp    3COM-TSMUX   [JXS5]
   rtelnet    107/tcp    Remote Telnet Service      [101,JBP]
   rtelnet    107/udp    Remote Telnet Service      [101,JBP]
```

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snagas    108/tcp     SNA Gateway Access Server    [KXM]
snagas    108/udp     SNA Gateway Access Server    [KXM]
pop2   109/tcp     Post Office Protocol - Version 2 [14,JKR1]
pop2   109/udp     Post Office Protocol - Version 2 [14,JKR1]
pop3   110/tcp     Post Office Protocol - Version 3 [122,MTR]
pop3   110/udp     Post Office Protocol - Version 3 [122,MTR]
sunrpc    111/tcp     SUN Remote Procedure Call    [DXG]
sunrpc    111/udp     SUN Remote Procedure Call    [DXG]
mcidas    112/tcp     McIDAS Data Transmission Protocol    [GXD]
mcidas    112/udp     McIDAS Data Transmission Protocol    [GXD]
auth   113/tcp     Authentication Service       [130,MCSJ]
auth   113/udp     Authentication Service       [130,MCSJ]
audionews    114/tcp     Audio News Multicast   [MXF2]
audionews    114/udp     Audio News Multicast   [MXF2]
sftp   115/tcp     Simple File Transfer Protocol    [73,MKL1]
sftp   115/udp     Simple File Transfer Protocol    [73,MKL1]
ansanotify    116/tcp     ANSA REX Notify    [NXH]
ansanotify    116/udp     ANSA REX Notify    [NXH]
uucp-path    117/tcp     UUCP PathService[44,MAE]
uucp-path    117/udp     UUCP PathService[44,MAE]
sqlserv    118/tcp     SQL Services    [LXB3]
sqlserv    118/udp     SQL Services    [LXB3]
nntp   119/tcp     Network News Transfer Protocol[65,PL4]
nntp   119/udp     Network News Transfer Protocol[65,PL4]
cfdptkt    120/tcp     CFDPTKT    [JX03]
cfdptkt    120/udp     CFDPTKT    [JX03]
erpc   121/tcp     Encore Expedited Remote Pro.Call [132,JXO]
erpc   121/udp     Encore Expedited Remote Pro.Call [132,JXO]
smakynet    122/tcp     SMAKYNET    [MXO]
smakynet    122/udp     SMAKYNET    [MXO]
ntp   123/tcp     Network Time Protocol       [80,DLM1]
ntp   123/udp     Network Time Protocol       [80,DLM1]
ansatrader    124/tcp     ANSA REX Trader    [NXH]
ansatrader    124/udp     ANSA REX Trader    [NXH]
locus-map    125/tcp     Locus PC-Interface Net Map Ser  [137,EP53]
locus-map    125/udp     Locus PC-Interface Net Map Ser  [137,EP53]
unitary    126/tcp     Unisys Unitary Login  [FEIL]
unitary    126/udp     Unisys Unitary Login  [FEIL]
locus-con    127/tcp     Locus PC-Interface Conn Server   [137,EP53]
locus-con    127/udp     Locus PC-Interface Conn Server   [137,EP53]
gss-xlicen    128/tcp     GSS X License Verification    [JXL]
gss-xlicen    128/udp     GSS X License Verification    [JXL]
pwdgen    129/tcp     Password Generator Protocol       [141,FJW]
pwdgen    129/udp     Password Generator Protocol       [141,FJW]
cisco-fna    130/tcp     cisco FNATIVE    [WXB]
cisco-fna    130/udp     cisco FNATIVE    [WXB]
cisco-tna    131/tcp     cisco TNATIVE    [WXB]
cisco-tna    131/udp     cisco TNATIVE    [WXB]
```

```
cisco-sys   132/tcp     cisco SYSMAINT    [WXB]
cisco-sys   132/udp     cisco SYSMAINT    [WXB]
statsrv     133/tcp     Statistics Service   [DLM1]
statsrv     133/udp     Statistics Service   [DLM1]
ingres-net  134/tcp     INGRES-NET Service    [MXB]
ingres-net  134/udp     INGRES-NET Service    [MXB]
loc-srv     135/tcp     Location Service    [JXP]
loc-srv     135/udp     Location Service    [JXP]
profile     136/tcp     PROFILE Naming System    [LLP]
profile     136/udp     PROFILE Naming System    [LLP]
netbios-ns  137/tcp     NETBIOS Name Service    [JBP]
netbios-ns  137/udp     NETBIOS Name Service    [JBP]
netbios-dgm 138/tcp     NETBIOS Datagram Service    [JBP]
netbios-dgm 138/udp     NETBIOS Datagram Service    [JBP]
netbios-ssn 139/tcp     NETBIOS Session Service    [JBP]
netbios-ssn 139/udp     NETBIOS Session Service    [JBP]
emfis-data  140/tcp     EMFIS Data Service    [GB7]
emfis-data  140/udp     EMFIS Data Service    [GB7]
emfis-cntl  141/tcp     EMFIS Control Service    [GB7]
emfis-cntl  141/udp     EMFIS Control Service    [GB7]
bl-idm      142/tcp     Britton-Lee IDM    [SXS1]
bl-idm      142/udp     Britton-Lee IDM    [SXS1]
imap2       143/tcp     Interim Mail Access Protocol v2    [MRC]
imap2       143/udp     Interim Mail Access Protocol v2    [MRC]
news        144/tcp     NewS    [JAG]
news        144/udp     NewS    [JAG]
uaac        145/tcp     UAAC Protocol   [DAG4]
uaac        145/udp     UAAC Protocol   [DAG4]
iso-tp0     146/tcp     ISO-IP0[86,MTR]
iso-tp0     146/udp     ISO-IP0[86,MTR]
iso-ip      147/tcp     ISO-IP    [MTR]
iso-ip      147/udp     ISO-IP    [MTR]
cronus      148/tcp     CRONUS-SUPPORT       [135,JXB]
cronus      148/udp     CRONUS-SUPPORT       [135,JXB]
aed-512     149/tcp     AED 512 EmulationService   [AXB]
aed-512     149/udp     AED 512 EmulationService   [AXB]
sql-net     150/tcp     SQL-NET    [MXP]
sql-net     150/udp     SQL-NET    [MXP]
hems        151/tcp     HEMS[87,CXT]
hems        151/udp     HEMS[87,CXT]
bftp        152/tcp     Background File Transfer Program   [AD14]
bftp        152/udp     Background File Transfer Program   [AD14]
sgmp        153/tcp     SGMP[37,MS9]
sgmp        153/udp     SGMP[37,MS9]
netsc-prod  154/tcp     NETSC   [SH37]
netsc-prod  154/udp     NETSC   [SH37]
netsc-dev   155/tcp     NETSC   [SH37]
netsc-dev   155/udp     NETSC   [SH37]
```

```
sqlsrv    156/tcp     SQL Service    [CMR]
sqlsrv    156/udp     SQL Service    [CMR]
knet-cmp  157/tcp     KNET/VM Command/Message Protocol[77,GSM11]
knet-cmp  157/udp     KNET/VM Command/Message Protocol[77,GSM11]
pcmail-srv  158/tcp   PCMail Server[19,MXL]
pcmail-srv  158/udp   PCMail Server[19,MXL]
nss-routing  159/tcp  NSS-Routing    [JXR]
nss-routing  159/udp  NSS-Routing    [JXR]
sgmp-traps  160/tcp   SGMP-TRAPS[37,MS9]
sgmp-traps  160/udp   SGMP-TRAPS[37,MS9]
snmp    161/tcp    SNMP[15,MTR]
snmp    161/udp    SNMP[15,MTR]
snmptrap  162/tcp     SNMPTRAP[15,MTR]
snmptrap  162/udp     SNMPTRAP[15,MTR]
cmip-man  163/tcp     CMIP/TCP Manager[4,AXB1]
cmip-man  163/udp     CMIP/TCP Manager[4,AXB1]
cmip-agent  164/tcp   CMIP/TCP Agent[4,AXB1]
smip-agent  164/udp   CMIP/TCP Agent[4,AXB1]
xns-courier  165/tcp  Xerox144,SXA]
xns-courier  165/udp  Xerox          [144,SXA]
s-net   166/tcp    Sirius Systems    [BXL]
s-net   166/udp    Sirius Systems    [BXL]
namp    167/tcp    NAMP    [MS9]
namp    167/udp    NAMP    [MS9]
rsvd    168/tcp    RSVD   [NT12]
rsvd    168/udp    RSVD   [NT12]
send    169/tcp    SEND [WDW11]
send    169/udp    SEND [WDW11]
print-srv  170/tcp    Network PostScript    [BKR]
print-srv  170/udp    Network PostScript    [BKR]
multiplex  171/tcp    Network Innovations Multiplex    [KXD]
multiplex  171/udp    Network Innovations Multiplex    [KXD]
cl/1    172/tcp    Network Innovations CL/1    [KXD]
cl/1    172/udp    Network Innovations CL/1    [KXD]
xyplex-mux  173/tcp   Xyplex    [BXS]
xyplex-mux  173/udp   Xyplex    [BXS]
mailq   174/tcp    MAILQ   [RXZ]
mailq   174/udp    MAILQ   [RXZ]
vmnet   175/tcp    VMNET    [CXT]
vmnet   175/udp    VMNET    [CXT]
genrad-mux  176/tcp   GENRAD-MUX    [RXT]
genrad-mux  176/udp   GENRAD-MUX    [RXT]
xdmcp   177/tcp    XDisplayManagerControlProtocol  [RWS4]
xdmcp   177/udp    XDisplayManagerControlProtocol  [RWS4]
nextstep  178/tcp    NextStep Window Server    [LXH]
NextStep  178/udp    NextStep Window Server    [LXH]
bgp    179/tcp    Border Gateway Protocol    [KSL]
bgp    179/udp    Border Gateway Protocol    [KSL]
```

```
ris   180/tcp    Intergraph   [DXB]
ris   180/udp    Intergraph   [DXB]
unify    181/tcp    Unify   [VXS]
unify    181/udp    Unify   [VXS]
audit    182/tcp    Unisys Audit SITP   [GXG]
audit    182/udp    Unisys Audit SITP   [GXG]
ocbinder    183/tcp    OCBinder [JX01]
ocbinder    183/udp    OCBinder [JX01]
ocserver    184/tcp    OCServer [JX01]
ocserver    184/udp    OCServer [JX01]
remote-kis    185/tcp    Remote-KIS [RXD1]
remote-kis    185/udp    Remote-KIS [RXD1]
kis   186/tcp    KIS Protocol [RXD1]
kis   186/udp    KIS Protocol [RXD1]
aci   187/tcp    Application CommunicationInterface [RXC1]
aci   187/udp    Application CommunicationInterface [RXC1]
mumps    188/tcp    Plus Five's MUMPS   [HS23]
mumps    188/udp    Plus Five's MUMPS   [HS23]
qft   189/tcp    Queued File Transport   [WXS]
qft   189/udp    Queued File Transport   [WXS]
gacp    190/tcp    Gateway Access Control Protocol   [PCW]
cacp    190/udp    Gateway Access Control Protocol   [PCW]
prospero    191/tcp    Prospero   [BCN]
prospero    191/udp    Prospero   [BCN]
osu-nms    192/tcp    OSU Network Monitoring System    [DXK]
osu-nms    192/udp    OSU Network Monitoring System    [DXK]
srmp    193/tcp    Spider Remote Monitoring Protocol    [TXS]
srmp    193/udp    Spider Remote Monitoring Protocol    [TXS]
irc   194/tcp    Internet Relay Chat Protocol [JX02]
irc   194/udp    Internet Relay Chat Protocol [JX02]
dn6-nlm-aud    195/tcp    DNSIX Network Level Module Audit  [LL69]
dn6-nlm-aud    195/udp    DNSIX Network Level Module Audit  [LL69]
dn6-smm-red    196/tcp    DNSIX Session MgtModule Audit Redir[LL69]
dn6-smm-red    196/udp    DNSIX Session MgtModule Audit Redir[LL69]
dls   197/tcp    DirectoryLocation Service   [SXB]
dls   197/udp    DirectoryLocation Service   [SXB]
dls-mon    198/tcp    DirectoryLocation Service Monitor    [SXB]
dls-mon    198/udp    DirectoryLocation Service Monitor    [SXB]
smux    199/tcp    SMUX   [MTR]
smux    199/udp    SMUX   [MTR]
src   200/tcp    IBM System Resource Controller   [GXM]
src   200/udp    IBM System Resource Controller   [GXM]
at-rtmp    201/tcp    AppleTalkRoutingMaintenance    [RXC]
at-rtmp    201/udp    AppleTalkRoutingMaintenance    [RXC]
at-nbp    202/tcp    AppleTalkName Binding    [RXC]
at-nbp    202/udp    AppleTalkName Binding    [RXC]
at-3    203/tcp    AppleTalkUnused    [RXC]
at-3    203/udp    AppleTalkUnused    [RXC]
```

```
at-echo   204/tcp     AppleTalkEcho   [RXC]
at-echo   204/udp     AppleTalkEcho   [RXC]
at-5    205/tcp    AppleTalkUnused   [RXC]
at-5    205/udp    AppleTalkUnused   [RXC]
at-zis   206/tcp    AppleTalkZone Information   [RXC]
at-zis   206/udp    AppleTalkZone Information   [RXC]
at-7    207/tcp    AppleTalkUnused   [RXC]
at-7    207/udp    AppleTalkUnused   [RXC]
at-8    208/tcp    AppleTalkUnused   [RXC]
at-8    208/udp    AppleTalkUnused   [RXC]
tam   209/tcp    Trivial Authenticated Mail Protocol [DXB1]
tam   209/udp    Trivial Authenticated Mail Protocol [DXB1]
z39.50   210/tcp    ANSI Z39.50   [MXN]
z39.50   210/udp    ANSI Z39.50   [MXN]
914c/g   211/tcp    Texas Instruments914C/G Terminal  [BXH1]
914c/g   211/udp    Texas Instruments914C/G Terminal  [BXH1]
anet   212/tcp    ATEXSSTR   [JXT]
anet   212/udp    ATEXSSTR   [JXT]
ipx   213/tcp    IPX [DP666]
ipx   213/udp    IPX [DP666]
vmpwscs   214/tcp    VM PWSCS   [DXS]
vmpwscs   214/udp    VM PWSCS   [DXS]
softpc   215/tcp    Insignia Solutions   [MXT]
softpc   215/udp    Insignia Solutions   [MXT]
atls   216/tcp    Access TechnologyLicenseServer   [LXD]
atls   216/udp    Access TechnologyLicenseServer   [LXD]
dbase   217/tcp    dBASE Unix  [DXG1]
dbase   217/udp    dBASE Unix  [DXG1]
mpp   218/tcp    Netix Message Posting Protocol   [STY]
mpp   218/udp    Netix Message Posting Protocol   [STY]
uarps   219/tcp    Unisys ARPs  [AXM1]
uarps   219/udp    Unisys ARPs  [AXM1]
imap3   220/tcp    Interactive Mail Access Protocol v3 [JXR2]
imap3   220/udp    Interactive Mail Access Protocol v3 [JXR2]
fln-spx   221/tcp    Berkeley rlogind with SPXauth   [KXA]
fln-spx   221/udp    Berkeley rlogind with SPXauth   [KXA]
fsh-spx   222/tcp    Berkeley rshd with SPX auth   [KXA]
fsh-spx   222/udp    Berkeley rshd with SPX auth   [KXA]
cdc   223/tcp    Certificate Distribution Center   [KXA]
cdc   223/udp    Certificate Distribution Center   [KXA]

224-241    Reserved   [JBP]

sur-meas   243/tcp    Survey Measurement[6,DDC1]
sur-meas   243/udp    Survey Measurement[6,DDC1]
link   245/tcp    LINK[1,RDB2]
link   245/udp    LINK[1,RDB2]
dsp3270   246/tcp    Display Systems Protocol     [39,WJS1]
```

     dsp3270   246/udp   Display Systems Protocol   [39,WJS1]

     247-255   Reserved   [JBP]

     pawserv   345/tcp   Perf Analysis Workbench
     pawserv   345/udp   Perf Analysis Workbench
     zserv   346/tcp   Zebra server
     zserv   346/udp   Zebra server
     fatserv   347/tcp   Fatmen Server
     fatserv   347/udp   Fatmen Server
     clearcase   371/tcp   Clearcase [DXL1]
     clearcase   371/udp   Clearcase [DXL1]
     ulistserv   372/tcp   Unix Listserv   [AXK]
     ulistserv   372/udp   Unix Listserv   [AXK]
     legent-1   373/tcp   Legent Corporation   [KXB]
     legent-1   373/udp   Legent Corporation   [KXB]
     legent-2   374/tcp   Legent Corporation   [KXB]
     legent-2   374/udp   Legent Corporation   [KXB]
     exec   512/tcp   remote process execution;
        authentication performed using
        passwordsand UNIX loppgin names
     biff   512/udp   used by mail system to notify users
        of new mail received; currently
        receives messagesonly from
        processeson the same machine
     login   513/tcp   remote login a latelnet;
        automaticauthentication performed
        based on priviledged portnumbers
        and distributed data bases which
        identify "authentication domains"
     who   513/udp   maintainsdata bases showing who's
        logged into machines on a local
        net and the load average of the
        machine
     cmd   514/tcp   like exec, but automatic
        authentication isperformed as for
        login server
     syslog   514/udp
     printer   515/tcp   spooler
     printer   515/udp   spooler
     talk   517/tcp   like tenex link, but across
        machine -unfortunately, doesn't
        use link protocol(this is actually
        just a rendezvousport from whicha
        tcp connection isestablished)
     talk   517/udp   like tenex link, but across
        machine -unfortunately, doesn't
        use link protocol(this is actually

```
      just a rendezvousport from whicha
      tcp connection isestablished)
ntalk    518/tcp
ntalk    518/udp
utime    519/tcp     unixtime
utime    519/udp     unixtime
efs    520/tcp     extended file name server
router    520/udp     local routing process (onsite);
      uses variant of Xerox NS routing
      information protocol
timed    525/tcp     timeserver
timed    525/udp     timeserver
tempo    526/tcp     newdate
tempo    526/udp     newdate
courier    530/tcp     rpc
courier    530/udp     rpc
conference    531/tcp     chat
conference    531/udp     chat
netnews    532/tcp     readnews
netnews    532/udp     readnews
netwall    533/tcp     for emergency broadcasts
netwall    533/udp     for emergency broadcasts
uucp    540/tcp     uucpd
uucp    540/udp     uucpd
klogin    543/tcp
klogin    543/udp
kshell    544/tcp     krcmd
kshell    544/udp     krcmd
new-rwho    550/tcp     new-who
new-rwho    550/udp     new-who
dsf    555/tcp
dsf    555/udp
remotefs    556/tcp     rfs server
remotefs    556/udp     rfs server
rmonitor    560/tcp     rmonitord
rmonitor    560/udp     rmonitord
monitor    561/tcp
monitor    561/udp
chshell    562/tcp     chcmd
chshell    562/udp     chcmd
9pfs    564/tcp     plan 9 file service
9pfs    564/udp     plan 9 file service
whoami    565/tcp     whoami
whoami    565/udp     whoami
meter    570/tcp     demon
meter    570/udp     demon
meter    571/tcp     udemon
meter    571/udp     udemon
```

```
   ipcserver   600/tcp    Sun IPC server
   ipcserver   600/udp    Sun IPC server
   nqs    607/tcp    nqs
   nqs    607/udp    nqs
   mdqs   666/tcp
   mdqs   666/udp
   elcsd   704/tcp    errlog copy/server daemon
   elcsd   704/udp    errlog copy/server daemon
   netcp   740/tcp    NETscout Control Protocol  [AXS2]
   netcp   740/udp    NETscout Control Protocol  [AXS2]
   netgw   741/tcp    netGW   [OXK]
   netgw   741/udp    netGW   [OXK]
   netrcs   742/tcp    Network based Rev. Cont. Sys.  [GXC2]
   netrcs   742/udp    Network based Rev. Cont. Sys.  [GXC2]
   flexlm   744/tcp    Flexible License Manager  [MXC2]
   flexlm   744/udp    Flexible License Manager  [MXC2]
   fujitsu-dev   747/tcp    Fujitsu Device Control
   fujitsu-dev   747/udp    Fujitsu Device Control
   ris-cm   748/tcp    Russell Info Sci CalendarManager
   ris-cm   748/udp    Russell Info Sci CalendarManager
   kerberos-adm   749/tcp    kerberos administration
   kerberos-adm   749/udp    kerberos administration
   rfile   750/tcp
   loadav   750/udp
   pump   751/tcp
   pump   751/udp
   qrh   752/tcp
   qrh   752/udp
   rrh   753/tcp
   rrh   753/udp
   tell   754/tcp    send
   tell   754/udp    send
   nlogin   758/tcp
   nlogin   758/udp
   con   759/tcp
   con   759/udp
   ns   760/tcp
   ns   760/udp
   rxe   761/tcp
   rxe   761/udp
   quotad   762/tcp
   quotad   762/udp
   cycleserv   763/tcp
   cycleserv   763/udp
   omserv   764/tcp
   omserv   764/udp
   webster   765/tcp
   webster   765/udp
```

```
phonebook    767/tcp     phone
phonebook    767/udp     phone
vid    769/tcp
vid    769/udp
cadlock    770/tcp
cadlock    770/udp
rtip    771/tcp
rtip    771/udp
cycleserv2    772/tcp
cycleserv2    772/udp
submit    773/tcp
notify    773/udp
rpasswd    774/tcp
acmaint_dbd    774/udp
entomb    775/tcp
acmaint_transd  775/udp
wpages    776/tcp
wpages    776/udp
wpgs    780/tcp
wpgs    780/udp
hp-collector    781/tcp  hp performance data collector
hp-collector    781/udp  hp performance data collector
hp-managed-node 782/tcp  hp performance data managed node
hp-managed-node 782/udp  hp performance data managed node
hp-alarm-mgr    783/tcp  hp performance data alarm manager
hp-alarm-mgr    783/udp  hp performance data alarm manager
mdbs_daemon    800/tcp
mdbs_daemon    800/udp
device    801/tcp
device    801/udp
xtreelic    996/tcp  XTREELicenseServer
xtreelic    996/udp  XTREELicenseServer
maitrd    997/tcp
maitrd    997/udp
busboy    998/tcp
puparp    998/udp
garcon    999/tcp
applix    999/udp  Applix ac
puprouter    999/tcp
puprouter    999/udp
cadlock    1000/tcp
ock    1000/udp
```

  REGISTERED PORT NUMBERS

The Registered Ports are not controlledby the IANA andon mostsystems
can be used by ordinaryuser processes or programs executed by ordinary
users.

Ports are used in the TCP [45,106] to name the ends of logical
connections which carrylong 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
contactport. While the IANA can not control uses of these ports it
does register or list uses of these ports as a convience to the
community.

To the extent possible,these same portassignments areused with the
UDP [46,104].

The Registered Ports are in therange 1024-65535.

Port Assignments:

    Keyword   Decimal   Description   References
    -------   -------   -----------   ----------
    blackjack   1025/tcp   network blackjack
    blackjack   1025/udp   network blackjack
    hermes   1248/tcp
    hermes   1248/udp
    bbn-mmc   1347/tcp   multi media conferencing
    bbn-mmc   1347/udp   multi media conferencing
    bbn-mmx   1348/tcp   multi media conferencing
    bbn-mmx   1348/udp   multi media conferencing
    sbook   1349/tcp   Registration Network Protocol   [SXS4]
    sbook   1349/udp   Registration Network Protocol   [SXS4]
    editbench   1350/tcp   Registration Network Protocol   [SXS4]
    editbench   1350/udp   Registration Network Protocol   [SXS4]
    equationbuilder 1351/tcp   Digital Tool Works (MIT)   [TXT1]
    equationbuilder 1351/udp   Digital Tool Works (MIT)   [TXT1]
    lotusnote   1352/tcp   Lotus Note   [GXP1]
    lotusnote   1352/udp   Lotus Note   [GXP1]
    ingreslock   1524/tcp   ingres
    ingreslock   1524/udp   ingres
    orasrv   1525/tcp   oracle
    orasrv   1525/udp   oracle
    prospero-np   1525/tcp   prospero non-privileged
    prospero-np   1525/udp   prospero non-privileged
    tlisrv   1527/tcp   oracle
    tlisrv   1527/udp   oracle
    coauthor   1529/tcp   oracle

```
coauthor    1529/udp    oracle
issd    1600/tcp
issd    1600/udp
nkd     1650/tcp
nkd     1650/udp
callbook    2000/tcp
callbook    2000/udp
dc      2001/tcp
wizard    2001/udp     curry
globe    2002/tcp
globe    2002/udp
mailbox    2004/tcp
emce    2004/udp     CCWS mm conf
berknet    2005/tcp
oracle    2005/udp
invokator    2006/tcp
raid-cc    2006/udp     raid
dectalk    2007/tcp
raid-am    2007/udp
conf    2008/tcp
terminaldb    2008/udp
news    2009/tcp
whosockami    2009/udp
search    2010/tcp
pipe_server    2010/udp
raid-cc    2011/tcp     raid
servserv    2011/udp
ttyinfo    2012/tcp
raid-ac    2012/udp
raid-am    2013/tcp
raid-cd    2013/udp
troff    2014/tcp
raid-sf    2014/udp
cypress    2015/tcp
raid-cs    2015/udp
bootserver    2016/tcp
bootserver    2016/udp
cypress-stat    2017/tcp
bootclient    2017/udp
terminaldb    2018/tcp
rellpack    2018/udp
whosockami    2019/tcp
about    2019/udp
xinupageserver    2020/tcp
xinupageserver    2020/udp
servexec    2021/tcp
xinuexpansion1    2021/udp
down    2022/tcp
```

```
xinuexpansion2  2022/udp
xinuexpansion3  2023/tcp
xinuexpansion3  2023/udp
xinuexpansion4  2024/tcp
xinuexpansion4  2024/udp
ellpack    2025/tcp
xribs    2025/udp
scrabble    2026/tcp
scrabble    2026/udp
shadowserver    2027/tcp
shadowserver    2027/udp
submitserver    2028/tcp
submitserver    2028/udp
device2    2030/tcp
device2    2030/udp
blackboard    2032/tcp
blackboard    2032/udp
glogger    2033/tcp
glogger    2033/udp
scoremgr    2034/tcp
scoremgr    2034/udp
imsldoc    2035/tcp
imsldoc    2035/udp
objectmanager    2038/tcp
objectmanager    2038/udp
lam    2040/tcp
lam    2040/udp
interbase    2041/tcp
interbase    2041/udp
isis    2042/tcp
isis    2042/udp
isis-bcast    2043/tcp
isis-bcast    2043/udp
rimsl    2044/tcp
rimsl    2044/udp
cdfunc    2045/tcp
cdfunc    2045/udp
sdfunc    2046/tcp
sdfunc    2046/udp
dls    2047/tcp
dls    2047/udp
dls-monitor    2048/tcp
dls-monitor    2048/udp
shilp    2049/tcp
shilp    2049/udp
www-dev    2784/tcp    world wide web - development
www-dev    2784/udp    world wide web - development
NSWS    3049/tcp
```

```
   NSWS    3049/ddddp
   rfa    4672/tcp    remote file access server
   rfa    4672/udp    remote file access server
   commplex-main    5000/tcp
   commplex-main    5000/udp
   commplex-link    5001/tcp
   commplex-link    5001/udp
   rfe    5002/tcp    radio free ethernet
   rfe    5002/udp    radio free ethernet
   rmonitor_secure 5145/tcp
   rmonitor_secure 5145/udp
   padl2sim    5236/tcp
   padl2sim    5236/udp
   sub-process    6111/tcp    HP SoftBench Sub-Process Control
   sub-process    6111/udp    HP SoftBench Sub-Process Control
   xdsxdm    6558/udp
   xdsxdm    6558/tcp
   afs3-fileserver 7000/tcp    file server itself
   afs3-fileserver 7000/udp    file server itself
   afs3-callback    7001/tcp    callbacksto cache managers
   afs3-callback    7001/udp    callbacksto cache managers
   afs3-prserver    7002/tcp    users & groups database
   afs3-prserver    7002/udp    users & groups database
   afs3-vlserver    7003/tcp    volume location database
   afs3-vlserver    7003/udp    volume location database
   afs3-kaserver    7004/tcp    AFS/Kerberos authentication service
   afs3-kaserver    7004/udp    AFS/Kerberos authentication service
   afs3-volser    7005/tcp    volume managment server
   afs3-volser    7005/udp    volume managment server
   afs3-errors    7006/tcp    error interpretation service
   afs3-errors    7006/udp    error interpretation service
   afs3-bos    7007/tcp    basic overseer process
   afs3-bos    7007/udp    basic overseer process
   afs3-update    7008/tcp    server-to-server updater
   afs3-update    7008/udp    server-to-server updater
   afs3-rmtsys    7009/tcp    remote cache manager service
   afs3-rmtsys    7009/udp    remote cache manager service
   man    9535/tcp
   man    9535/udp
   isode-dua    17007/tcp
   isode-dua    17007/udp
```

INTERNETMULTICAST ADDRESSES

HostExtensions for IP Multicasting (RFC-1112) [43] specifies the
extensions required of a host implementationof the InternetProtocol
(IP)to support multicasting. Current addresses arelisted below.


```
     224.0.0.0 Reserved[43,JBP]
     224.0.0.1 All Systems onthis Subnet[43,JBP]
     224.0.0.2 All Routers onthis Subnet    [JBP]
     224.0.0.3 Unassigned    [JBP]
     224.0.0.4 DVMRP  Routers          [140,JBP]
     224.0.0.5 OSPFIGP  OSPFIGP All Routers        [83,JXM1]
     224.0.0.6 OSPFIGP  OSPFIGP Designated Routers        [83,JXM1]
     224.0.0.7 ST Routers   [KS14]
     224.0.0.8 ST Hosts   [KS14]
     224.0.0.9 RIP2 Routers [GSM11]
     224.0.0.10-224.0.0.255 Unassigned    [JBP]

     224.0.1.0 VMTP Managers Group        [17,DRC3]
     224.0.1.1 NTP  Network Time Protocol        [80,DLM1]
     224.0.1.2 SGI-Dogfight    [AXC]
     224.0.1.3 Rwhod    [SXD]
     224.0.1.4 VNP   [DRC3]
     224.0.1.5 Artificial Horizons - Aviator    [BXF]
     224.0.1.6 NSS - Name Service Server  [BXS2]
     224.0.1.7 AUDIONEWS - Audio NewsMulticast  [MXF2]
     224.0.1.8 SUN NIS+ Information Service  [CXM3]
     224.0.1.9 MTP Multicast Transport Protocol    [SXA]
     224.0.1.10-224.0.1.255  Unassigned    [JBP]

     224.0.2.1 "rwho"Group (BSD) (unofficial)    [JBP]
     224.0.2.2 SUN RPC PMAPPROC_CALLIT  [BXE1]

     224.0.3.0-224.0.3.255 RFEGenericService  [DXS3]
     224.0.4.0-224.0.4.255 RFEIndividual Conferences  [DXS3]

     224.1.0.0-224.1.255.255  ST Multicast Groups  [KS14]
     224.2.0.0-224.2.255.255  Multimedia Conference Calls    [SC3]

     232.x.x.x VMTP transientgroups         [17,DRC3]
```

These addresses are listed in theDomain Name Service under
MCAST.NETand 224.IN-ADDR.ARPA.

Note thatwhen used on anEthernet or IEEE 802 network, the 23
low-orderbits ofthe IP Multicast address are placed in the low-
order 23 bits of the Ethernet or IEEE 802net multicast address

1.0.94.0.0.0. See the next section on "IANA ETHERNET ADDRESS
BLOCK".

 IANA ETHERNET ADDRESS BLOCK

    The IANA owns an Ethernet address block which may be used for
    multicast address asignmentsor other special purposes.

    The address block in IEEE binary is (which is in bit transmission
    order):

        0000 0000 0000 0000 01111010

    In the normal Internet dotted decimal notation this is 0.0.94 since
    the bytes are transmitted higher order first and bits within bytes
    are transmitted lower order first (see "DataNotation" in the
    Introduction).

    IEEECSMA/CDand Token Bus bit transmission order: 00 00 5E

    IEEEToken Ring bit transmission order: 00 00 7A

    Appearance on the wire (bitstransmitted from left to right):

        0   23 47
        | | |
        1000 0000 0000 0000 01111010 xxxx xxx0 xxxx xxxx xxxx xxxx
        | |
        Multicast Bit   0 = Internet Multicast
      1 = Assigned by IANA for
 other uses

    Appearance in memory(bits transmitted right-to-leftwithin octets,
    octets transmitted left-to-right):

        0   23 47
        | | |
        0000 0001 0000 0000 01011110 0xxx xxxx xxxx xxxx xxxx xxxx
        | |
        Multicast Bit   0 = Internet Multicast
      1 = Assigned by IANA for other uses

    The latter representation corresponds to theInternet standard bit-
    order, and is the format that most programmers have to deal with.
    Using this representation, the rangeof Internet Multicast addresses
    is:

  01-00-5E-00-00-00 to 01-00-5E-7F-FF-FF in hex, or

  1.0.94.0.0.0to 1.0.94.127.255.255in dotted decimal

IPTOS PARAMETERS

Thisdocuments the default Type-of-Service values that are currently
recommended for the most important Internet protocols.

There are four assigned TOS values: low delay, high throughput, high
reliability,and lowcost; in each case, theTOS value is used to
indicate "better". Only oneTOS value or property can be requested
in any one IP datagram.

Generally, protocolswhich are involved in direct interaction with a
human shouldselect low delay, whiledata transfers which may involve
large blocksof dataare need high throughput. Finally, high
reliability is most important for datagram-based Internet management
functions.

Application protocols not included in these tables should beable to
makeappropriate choice of low delay(8 decimal, 1000 binary) or high
throughput (4 decimail, 0100binary).

The following are recommended valuesfor TOS:

 -----Type-of-ServiceValue -----

    Protocol TOS Value

    TELNET (1) 1000   (minimizedelay)

    FTP
Control 1000   (minimizedelay)
Data (2) 0100   (maximizethroughput)

    TFTP 1000   (minimizedelay)

    SMTP (3)
Commandphase 1000   (minimizedelay)
DATA phase 0100   (maximizethroughput)

    Domain Name Service
UDP Query 1000   (minimizedelay)
TCP Query 0000
Zone Transfer 0100   (maximizethroughput)

    NNTP 0001   (minimizemonetary cost)

ICMP
Errors 0000
Requests 0000 (4)
Responses <same as request> (4)

Any IGP 0010   (maximizereliability)

EGP 0000

SNMP 0010   (maximizereliability)

BOOTP 0000

Notes:

(1) Includes all interactive userprotocols (e.g., rlogin).

(2) Includes all bulk data transfer protocols (e.g., rcp).

(3) If the implementationdoes not support changing the TOS during the lifetime of the connection, then the recommended TOS on opening the connection isthe default TOS(0000).

(4) Although ICMPrequestmessages are normally sent withthe default TOS, there are sometimes good reasons whythey would be sent withsome other TOS value. An ICMP responsealways uses the same TOS value aswas used in thecorresponding ICMP request message.

An application may (at the request of the user) substitute 0001 (minimize monetary cost) forany of the above values.

 IP TIME TO LIVE PARAMETER

   The current recommended default timeto live(TTL) for the Internet
   Protocol (IP) [45,105] is 64.

DOMAINSYSTEM PARAMETERS

   The InternetDomain Naming System (DOMAIN) includes several
   parameters.These are documented inRFC-1034, [81] and RFC-1035
   [82]. The CLASS parameter is listedhere. The per CLASS parameters
   are defined in separate RFCsas indicated.

   Domain System Parameters:

      DecimalName   References
      ------------   ----------
      0Reserved   [PM1]
      1Internet (IN)[81,PM1]
      2Unassigned   [PM1]
      3Chaos (CH)   [PM1]
      4Hessoid(HS)   [PM1]
        5-65534Unassigned   [PM1]
   65535Reserved   [PM1]

   In the Internet (IN)class the following TYPEs and QTYPEs are
   defined:

      TYPE   value andmeaning

      A   1a host address   [82]
      NS   2an authoritative name server   [82]
      MD   3a mail destination (Obsolete - use MX)   [82]
      MF   4a mail forwarder (Obsolete - use MX)   [82]
      CNAME   5the canonical name for an alias   [82]
      SOA   6marks the startof a zone of authority   [82]
      MB   7a mailbox domain name (EXPERIMENTAL)   [82]
      MG   8a mail group member (EXPERIMENTAL)   [82]
      MR   9a mail rename domain name (EXPERIMENTAL)   [82]
      NULL   10 a nullRR (EXPERIMENTAL)   [82]
      WKS   11 a wellknown service description   [82]
      PTR   12 a domain name pointer   [82]
      HINFO   13 host information   [82]
      MINFO   14 mailbox or mail list information   [82]
      MX   15 mail exchange   [82]
      TXT   16 text strings   [82]

      RP   17 for Responsible Person   [172]
      AFSDB   18 for AFS Data Base location   [172]
      X25   19 for X.25 PSDN address   [172]
      ISDN   20 for ISDN address   [172]
      RT   21 for Route Through   [172]

```
NSAP        22 for NSAP address, NSAPstyle Arecord   [174]
NSAP-PTR      23 for domain name pointer, NSAP style   [174]

AXFR        252 transfer of an entirezone    [82]
MAILB      253 mailbox-related RRs (MB, MG or MR)    [82]
MAILA      254 mail agent RRs (Obsolete - see MX)    [82]
*        255 A request forall records    [82]
```

BOOTP PARAMETERS

The Bootstrap Protocol (BOOTP) RFC-951 [36] describes an IP/UDP
bootstrap protocol (BOOTP) which allows a diskless client machine to
discover itsown IP address,the address of a serverhost, and the
nameof a file to beloaded into memory and executed. The BOOTP
Vendor Information Extensions RFC-1084 [117]describes an addition to
the Bootstrap Protocol (BOOTP).

Vendor Extensions are listedbelow:

```
    Tag       Name     Data Length    Meaning
    ---       ----     -----------    -------
    0         Pad0    None
    1         Subnet Mask4    Subnet Mask Value
    2         Time Zone4    TimeOffset in
Seconds fromUTC
    3         GatewaysN    N/4 Gateway addresses
    4         Time ServerN    N/4 Timeserver addresses
    5         Name ServerN    N/4 IEN-116 Server addresses
    6         Domain ServerN    N/4 DNS Server addresses
    7         Log ServerN    N/4 Logging Server addresses
    8         Quotes ServerN    N/4 Quotes Server addresses
    9         LPR ServerN    N/4 Printer Server addresses
    10        Impress ServerN    N/4 Impress Server addresses
    11        RLP ServerN    N/4 RLP Server addresses
    12        HostnameN    Hostname string
    13        Boot FileSize2    Sizeof bootfile in512 byte
checks
    14        Merit Dump File    Client to dump and name
the file to dump it to
    15-127  Unassigned
    128-154 Reserved
    255       End0    None
```

NETWORK MANAGEMENT PARAMETERS

For the management of hosts and gateways on the Internet a data
structure for the information has been defined. This data structure
should be used with any of several possible management protocols, such
as the "Simple Network Management Protocol" (SNMP) RFC-1157 [15], or
the "Common Management Information Protocol over TCP" (CMOT)[142].

The data structure is the "Structureand Indentification of Management
Information for TCP/IP-basedInternets" (SMI) RFC-1155 [120], and the
"Management Information Basefor Network Management of TCP/IP-based
Internets" (MIB-II) [121].

The SMI includes theprovision for panrameters or codes to indicate
experimentalor private datastructures. These parameter assignments
are listed here.

The older "Simple Gateway MonitoringProtocol" (SGMP) RFC-1028 [37]
alsodefineda data structure. The parameter assignments used with
SGMPare included here for hist orical completeness.

The network management object identifiers are under the iso (1), org
(3),dod (6), internet (1), or 1.3.6.1, branch of the name space.

SMI Network Management Directory Codes:

    Prefix: 1.3.6.1.1.

DecimalName	Description	References
allReserved	Reserved for future use	[IANA]

SMI Network Management MGMT Codes:

    Prefix: 1.3.6.1.2.

DecimalName	Description	References
0Reserved	[IANA]	
1MIB	[149,KZM]	

    Prefix: 1.3.6.1.2.1. (mib-2)

DecimalName	Description	References
0Reserved	Reserved	[IANA]
1system	System	[150,KZM]
2interfaces	Interfaces	[150,KZM]

```
   3at         Address Translation        [150,KZM]
   4ip         Internet Protocol       [150,KZM]
   5icmp         Internet Control Message        [150,KZM]
   6tcp         Transmission Control Protocol     [150,KZM]
   7udp         User Datagram Protocol       [150,KZM]
   8egp         Exterior Gateway Protocol      [150,KZM]
   9cmot         CMIP overTCP        [150,KZM]
  10transmission  Transmission       [150,KZM]
  11snmp         Simple Network Management       [150,KZM]
  12GenericIF      Generic InterfaceExtensions [151,163,KZM]
  13Appletalk      AppletalkNetworking        [152,SXW]
  14ospf        Open Shortest Path First      [153,FB77]
  15bgp        Border Gateway Protocol      [154,SW159]
  16rmon         Remote Network Monitoring       [155,SXW]
  17bridge        Bridge Objects         [156,EXD]
  18DecnetP4       Decnet Phase 4
  19Character      CharacterStreams        [165,BS221]
  20snmpParties    SNMP Parties        [177,KZM]
  21snmpSecrets    SNMP Secrets        [177,KZM]
```

   Prefix: 1.3.6.1.2.1.10 (transmission)

```
   DecimalName         Description
   -----------       -----------
  7IEEE802.3       CSMACD--like Objects         [157,JXC]
  8IEEE802.4       Token Bus-like Objects    [158,163,KZM]
  9IEEE802.5       Token Ring-like Objects    [159,163,KZM]
 15FDDI        FDDI Objects       [160,JDC20]
 18DS1        T1 Carrier Objects   [161,163,FB77]
 30DS3        DS3 Interface Objects     [162,163,TXC]
 31SIP        SMDS Interface Objects        [164,TXC]
 32FRAME-RELAY   Frame Relay Objects        [168,CXB]
 33RS-232        RS-232 Objects        [166,BS221]
 34Parallel       Parallel Printer Objects       [167,BS221]
```

SMI Network Management Experimental Codes:

Prefix: 1.3.6.1.3.

```
      DecimalName         Description          References
      -----------         -----------          ----------
    0Reserved  [JKR1]
    1CLNS        ISO CLNS Objects   [GS2]
*   2T1-Carrier    T1 Carrier Objects  [FB77]
*   3IEEE802.3     Ethernet-like Objects   [JXC]
*   4IEEE802.5     Token Ring-like Objects    [EXD]
*   5DECNet-PHIV   DECNet Phase IV  [JXS2]
*   6Interface     Generic InterfaceObjects   [KZM]
*   7IEEE802.4     Token Bus-like Objects   [KZM]
*   8FDDI        FDDI Objects [JDC20]
    9LANMGR-1     LAN Manager V1 Objects  [JXG1]
   10LANMGR-TRAPS  LAN Manager Trap Objects  [JXG1]
   11Views       SNMP ViewObjects    [CXD]
   12SNMP-AUTH     SNMP Authentication Objects   [KZM]
*  13BGP        Border Gateway Protocol [SW159]
*  14Bridge       Bridge MIB  [FB77]
*  15DS3        DS3 Interface Type   [TXC]
*  16SIP        SMDS Interface Protocol   [TXC]
*  17Appletalk     AppletalkNetworking    [SXW]
   18PPP        PPP Objects  [FJK2]
*  19Character MIB CharacterMIB [BS221]
*  20RS-232 MIB    RS-232 MIB [BS221]
*  21Parallel MIB  Parallel MIB [BS221]
   22atsign-proxy  Proxy viaCommunity    [RXF]
*  23OSPF        OSPF MIB  [FB77]
   24Alert-Man     Alert-Man    [LS8]
   25FDDI-Synoptics FDDI-Synoptics  [DXP1]
*  26Frame Relay   Frame Relay MIB    [CXB]
*  27rmon        Remote Network ManagementMIB    [SXW]
   28IDPR        IDPR MIB [RAW44]
   29HUBMIB      IEEE 802.3 Hub MIB  [DXM5]
   30IPFWDTBLMIB    IP Forwarding Table MIB  [FB77]
   31LATM MIB    [TXC]
   32SONET MIB    [TXC]
   33IDENT    [MTR]
   34MIME-MHS    [MTR]
```

* = obsoleted

SMI Network Management Private Enterprise Codes:

Prefix: 1.3.6.1.4.1.

```
   Decimal Name            References
   ----------- ----------
 0 Reserved  [JKR1]
 1 Proteon  [JS28]
 2 IBM    [VXC]
 3 CMU    [SXW]
 4 Unix    [KXS]
 5 ACC   [AB20]
 6 TWG    [KZM]
 7 CAYMAN  [BP52]
 8 PSI    [MS9]
 9 cisco   [GXS]
10 NSC [GS123]
11 HP  [RDXS]
12 Epilogue   [KA4]
13 U of Tennessee [JDC20]
14 BBN   [RH6]
15 Xylogics, Inc.  [JRL3]
16 Timeplex  [LXB1]
17 Canstar   [SXP]
18 Wellfleet  [JCB1]
19 TRW    [HXL]
20 MIT [JR35]
21 EON    [MXW]
22 Spartacus   [YXK]
23 Excelan   [RXB]
24 Spider Systems   [VXW]
25 NSFNET   [HWB]
26 Hughes LAN Systems   [KZM]
27 Intergraph  [GS91]
28 Interlan   [BXT]
29 Vitalink Communications   [FXB]
30 Ulana   [BXA]
31 NSWC [SRN1]
32 Santa Cruz Operation  [KR35]
33 Xyplex    [BXS]
34 Cray    [HXE]
35 Bell Northern Research    [GXW]
36 DEC [RXB1]
37 Touch    [BXB]
38 Network Research Corp.    [BXV]
39 Baylor College of Medicine  [SB98]
40 NMFECC-LLNL   [SXH]
41 SRI [DW181]
```

```
42Sun Microsystems    [DXY]
433Com    [TB6]
44CMC    [DXP]
45SynOptics   [DXP1]
46Cheyenne Software    [RXH]
47Prime Computer    [MXS]
48MCNC/North Carolina Data Network    [KXW]
49Chipcom    [JXC]
50OpticalData Systems    [JXF]
51gated    [JXH]
52Cabletron Systems    [RXD]
53Apollo Computers    [JXB]
54DeskTalk Systems, Inc.    [DXK]
55SSDS    [RXS]
56Castle Rock Computing   [JXS1]
57MIPS Computer Systems    [CXM]
58TGV, Inc.    [KAA]
59SiliconGraphics, Inc.    [RXJ]
60University of British Columbia[DXM354]
61Merit    [BXN]
62FiberCom    [EXR]
63Apple Computer Inc   [JXH1]
64Gandalf    [HXK]
65Dartmouth    [PXK]
66David Systems   [KXD1]
67Reuter    [BXZ]
68Cornell [DC126]
69LMS [MLS34]
70Locus ComputingCorp.    [AXS]
71NASA   [SS92]
72Retix    [AXM]
73Boeing    [JXG]
74AT&T  [RXB2]
75Ungermann-Bass    [DXM]
76DigitalAnalysis Corp.    [SXK]
77LAN Manager    [DXK]
78Netlabs [JB478]
79ICL    [JXI]
80Auspex Systems    [BXE]
81Lannet Company    [EXR]
82NetworkComputing Devices [DM280]
83Raycom Systems   [BXW1]
84PirelliFocom Ltd.    [SXL]
85Datability Software Systems    [LXF]
86NetworkApplication Technology    [YXW]
87LINK (Lokales Informatik-Netz Karlsruhe)   [GXS]
88NYU  [BJR2]
89RND    [RXN]
```

```
 90InterCon Systems Corporation  [AW90]
 91LearningTree Systems  [JXG2]
 92WebsterComputer Corporation   [RXE]
 93Frontier Technologies Corporation   [PXA]
 94Nokia Data Communications   [DXE]
 95Allen-Bradely Company   [BXK]
 96CERN   [JXR]
 97Sigma Network Systems, Inc.   [KXV]
 98Emerging Technologies, Inc.  [DXB2]
 99SNMP Research [JDC20]
100Ohio State University  [SXA1]
101Ultra Network Technologies   [JXD]
102Microcom   [AXF]
103Martin MariettaAstronautic Group [DR137]
104Micro Technology   [MXE]
105ProcessSoftware Corporation  [BV15]
106Data General Corporation   [JXK]
107Bull Company   [AXB]
108Emulex Corporation  [JXF1]
109WarwickUniversity Computing Services   [IXD]
110NetworkGeneralCorporation  [JXD1]
111Oracle [JPH17]
112ControlData Corporation   [NXR]
113Hughes AircraftCompany   [KZM]
114Synernetics, Inc.  [JXP1]
115Mitre  [BM60]
116Hitachi, Ltd.   [HXU]
117Telebit  [MXL2]
118SalomonTechnology Services   [PXM]
119NEC Corporation   [YXA]
120Fibermux [KH157]
121FTP Software Inc.  [SXK1]
122Sony   [TXH]
123Newbridge Networks Corporation   [JXW]
124Racal-Milgo InformationSystems   [MXR]
125CR SYSTEMS  [SXS2]
126DSET Corporation   [DXS]
127Computone   [BXV]
128Tektronix, Inc. [DT167]
129Interactive Systems Corporation  [SXA2]
130Banyan Systems Inc.   [DXT]
131SintromDatanetLimited   [SXW]
132Bell Canada   [MXF]
133Crosscomm Corporation  [RXS1]
134Rice University   [CXF]
135T3Plus Networking, Inc.   [HXF]
136Concurrent Computer Corporation  [JRL3]
137Basser   [PXO]
```

```
138Luxcom    [RXB]
139Artel    [JXZ]
140Independence Technologies, Inc.(ITI)    [GXB]
141Frontier Software Development    [NXP]
142DigitalComputer Limited    [OXF]
143Eyring,Inc. [RH227]
144Case Communications    [PXK]
145Penril DataComm, Inc.   [KXH1]
146American Airlines  [BXK1]
147SequentComputer Systems  [SXH1]
148Bellcore    [KXT]
149KonkordCommunications    [KXJ]
150University of Washington    [CXW]
151Develcon    [SXM]
152SolarixSystems  [PXA1]
153Unifi Communications Corp.    [YXH]
154Roadnet    [DXS]
155NetworkSystemsCorp.    [NXE]
156ENE (European Network Engineering)    [PXC]
157Dansk Data Elektronik A/S    [PXH]
158MorningStar Technologies    [KXF]
159Dupont EOP    [OXR]
160Legato Systems,Inc.  [JXK1]
161Motorola SPS    [VXE]
162European Space Agency (ESA)    [EXX]
163BIM  [BXL2]
164Rad Data CommunicationsLtd.    [OXI]
165Intellicom    [PXS]
166Shiva Corporation    [NXL]
167Fujikura America    [DXR]
168Xlnt Designs INC (XDI) [MA108]
169Tandem Computers  [RXD3]
170BICC  [DXB3]
171D-Link Systems,Inc.    [HXN]
172AMP, Inc.  [RXD4]
173Netlink    [MXZ]
174C. ItohElectronics  [LXD1]
175Sumitomo Electric Industries (SEI)  [KXT1]
176DHL Systems, Inc.  [DXG2]
177NetworkEquipment Technologies  [MXT1]
178APTEC Computer Systems    [LXB]
179Schneider & Koch & Co.,Datensysteme GmbH  [TXR1]
180Hill Air Force Base    [RXW]
181ADC Kentrox  [BXK2]
182Japan Radio Co.    [NXK]
183Versitron    [MXH]
184Telecommunication Systems  [HXL1]
185Interphase  [GXW1]
```

```
186ToshibaCorporation    [MXA]
187Clearpoint Research Corp.   [FJK2]
188Ascom Gfeller Ltd.   [AXS1]
189FujitsuAmerica    [CXL]
190NetCom Solutions, Inc.    [DXC]
191NCR    [CXK]
192Dr. Materna GmbH    [TXB]
193Ericsson Business Communications    [GXN]
194Metaphor Computer Systems    [PXR]
195PatriotPartners    [PXR]
196The Software Group Limited (TSG) [RP211]
197Kalpana, Inc.   [AXB3]
198University of Waterloo   [RXW1]
199CCL/ITRI    [MXC]
200Coeur Postel   [PXK2]
201Mitsubish CableIndustries, Ltd.   [MXH1]
202SMC    [LXS]
203Crescendo Communication, Inc.    [PXJ]
204GoodallSoftware Engineering [DG223]
205Intecom    [BXP]
206Victoria University of Wellington   [JXS3]
207Allied Telesis,Inc.   [SXH2]
208Dowty Network Systems A/S  [HXE1]
209Protools    [GXA]
210Nippon Telegraph and Telephone Corp.  [TXS1]
211FujitsuLimited   [IXH]
212NetworkPeripherals Inc.    [CXC]
213Netronix, Inc.   [JXR3]
214University of Wisconsin- Madison [DW328]
215NetWorth, Inc.    [CXS]
216Tandberg Data A/S    [HXH]
217Technically Elite Concepts, Inc.   [RXD5]
218Labtam Australia Pty. Ltd.   [MXP1]
219Republic TelcomSystems, Inc.   [SXH3]
220ADI Systems, Inc.    [PXL]
221Microwave Bypass Systems, Inc.    [TXA]
222PyramidTechnology Corp.    [RXR]
223Unisys_Corp  [LXB2]
224LANOPTICS LTD. Israel  [IXD1]
225NKK Corporation    [JXY]
226MTrade UK Ltd.    [PXD]
227Acals  [PXC1]
228ASTEC, Inc.   [HXF1]
229Delmarva Power   [JXS4]
230Telematics International, Inc.   [KXS1]
231SiemensNixdorfInformations Syteme AG   [GXK]
232Compaq   [SXB]
233NetManage, Inc.    [WXD]
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234NCSU Computing Center   [DXJ]
235Empirical Toolsand Technologies   [KA4]
236SamsungGroup   [HXP]
237TakaokaElectric Mfg. Co., Ltd.   [HXH2]
238Netrix Systems Corporation   [EXM]
239WINDATA   [BXR]
240RC International A/S   [CXD1]
241Netexp Research   [HXB]
242Internode Systems Pty Ltd   [SXH4]
243netCS Informationstechnik GmbH   [OXK]
244Lantronix   [RXL]
245Avatar Consultants [KH157]
246Furukawa Electoric Co. Ltd.   [SXF]
247AEG Electrcom   [RXN2]
248RichardHirschmann GmbH& Co.   [HXN1]
249G2R Inc.   [KXH]
250University of Michigan   [TXH1]
251Netcomm, Ltd.   [WXS2]
252Sable Technology Corporation   [RXT]
253Xerox   [EXR3]
254ConwareComputer Consulting GmbH   [MXS2]
255Compatible Systems Corp. [JG423]
256Scitec Communications Systems Ltd.   [SXL1]
257Transarc Corporation   [PXB]
258Matsushita Electric Industrial Co., Ltd.   [NXM]
259ACCTON Technology [DXR1]
260Star-Tek, Inc. [CXM1]
261Codenoll Tech. Corp.   [DXW]
262Formation, Inc. [CXM2]
263Seiko Instruments, Inc.(SII) [YXW1]
264RCE (Reseaux deCommunication d'Entreprise S.A.)   [EXB]
265Xenocom, Inc.   [SXW2]
266AEG KABEL [HXT1]
267SystechComputer Corporation [BXP1]
268Visual   [BXO]
269SDD (Scandinavian Airlines DataDenmarkA/S)   [PXF]
270Zenith Electronics Corporation   [DXL]
271TELECOMFINLAND [PXJ1]
272BinTec Computersystems [MXS3]
273EUnet Germany [MXS4]
274PictureTel Corporation   [OXJ]
275Michigan State University   [LXW]
276GTE Telecom Incorporated   [LXO]
277CascadeCommunications Corp.   [CS1]
278HitachiCable, Ltd. [TXA1]
279Olivetti [MXF1]
280VitacomCorporation [PXR1]
281INMOS   [GXH]

282AIC Systems Laboratories Ltd.   [GXM1]
283Cameo Communications, Inc. [AXB4]
284Diab Data AB [MXL1]
285Olicom A/S   [LXP]
286Digital-KienzleComputersystems   [HXD]
287CSELT(Centro Studi E LaboratoriTelecomunicazioni)[PXC2]
288Electronic DataSystems   [MXH2]
289McData Corporation   [GXL]
290Harris ComputerSystemsDivision (HCSD)   [DXR2]
291Technology Dynamics, Inc.   [CXS1]
292DATAHOUSE Information Systems Ltd.   [KXL]
293DSIR Network Group   [TXP]
294Texas Instruments [BXS1]
295PlainTree Systems Inc.   [PXC3]
296Hedemann Software Development [SXH5]
297Fuji Xerox Co.,Ltd. [HXK1]
298Asante Technology   [HXM]
299Stanford University   [BXM]
300DigitalLink [JXT1]
301Raylan Corporation [MXL2]
302Datacraft   [AXL]
303Hughes   [KZM]
304Farallon Computing, Inc. [SXS3]
305GE Information Services [SXB2]
306Gambit ComputerCommunications   [ZXS]
307Livingston Enterprises,Inc. [SXW3]
308Star Technologies [JXM1]
309Micronics Computers Inc. [DXC1]
310Basis, Inc.   [HXS]
311Microsoft [JXB1]
312US WestAdvanceTechnologies   [DXH]
313University College London   [SXC]
314EastmanKodak Company [WXC1]
315NetworkResources Corporation [KXW1]
316Atlas Telecom [BXK2]
317Bridgeway   [UXV]
318American Power Conversion Corp.   [PXY]
319DOE AtmosphericRadiation Measurement Project [PXK3]
320VerSteeg CodeWorks   [BXV]
321Verilink Corp   [BXV]
322Sybus Corportation [MXB2]
323Tekelec   [BXG]
324NASA Ames Research Center   [NXC]
325Simon Fraser University   [RXU]
326Fore Systems, Inc. [EXC1]
327CentrumCommunications,Inc.   [VXL]
328NeXT Computer, Inc.   [LXL]
329Netcore, Inc. [SXM1]

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330Northwest Digital Systems    [BXD]
331Andrew Corporation    [TXT]
332DigiBoard   [DXK2]
333Computer Network Technology Corp.   [BXM1]
334Lotus Development Corp.   [BXF1]
335MICOM Communication Corporation   [DXB4]
336ASCII Corporation    [TXO]
337PUREDATA Research/USA   [BXF2]
338NTT DATA   [YXK1]
339Empros Systems International   [DXT1]
340KendallSquare Research(KSR)   [DXH1]
341Martin MariettaEnergy Systems   [GXH1]
342NetworkInnovations    [PXG]
343Intel Corporation   [CXT1]
344Proxar    [CXH]
345Epson Research Center   [RXS2]
346Fibernet   [GXS1]
347Box Hill Systems Corporation    [TXJ]
348American Express TravelRelatedServices   [JXC1]
349Compu-Shack    [TXV]
350Parallan Computer, Inc.   [CXD2]
351Stratacom    [CXI]
352Open Networks Engineering, Inc.   [RXB4]
353ATM Forum    [KZM]
354SSD Management,Inc.   [BXR1]
355Automated Network Management, Inc.    [CXV]
356Magnalink Communications Corporation   [DXK3]
357TIL Systems, Ltd.   [GXM2]
358SkylineTechnology, Inc.   [DXW1]
359Nu-MegaTechnologies, Inc.   [DXS4]
360Morgan Stanley & Co. Inc.    [VXK]
361Integrated Business Network   [MXB3]
362L & N Technologies, Ltd.   [SXL2]
363Cincinnati BellInformation Systems, Inc.   [DXM4]
364OSCOM International    [FXF]
365MICROGNOSIS   [PXA2]
366Datapoint Corporation   [LZ15]
367RICOH Co. Ltd.    [TXW]
368Axis Communications AB [MG277]
369Pacer Software    [WXT]
370Axon Networks Inc.    [RXI]
371BrixtonSystems, Inc.    [PXE]
372GSI  [PXB1]
373Tatung Co., Ltd.  [CXC1]
374DIS Research LTD  [RXC2]
375QuotronSystems, Inc.  [RXS3]
376Dassault Electronique    [OXC]
377Corollary, Inc.  [JXG3]
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378SEEL, Ltd.   [KXR]
379Lexcel   [MXE]
380W.J. Parducci &Associates, Inc.   [WXP]
381OST   [AXP1]
382Megadata Pty Ltd.   [AXM2]
383LLNL Livermore ComputerCenter   [DXN]
384Dynatech Communications [GXW2]
385SymplexCommunications Corp.   [CXA]
386Tribe Computer Works [KXF1]
387Taligent, Inc.   [LXA]
388Symbol Technology, Inc. [JXC2]
389Lancert [MXH3]
390Alantec   [PXV]
391Ridgeback Solutions   [EXG]
392Metrix,Inc.   [DXV]
393Excutive Systems/XTree Company [DXC2]
394NRL Communication Systems Branch [RXR1]
395I.D.E. Corporation [RXS4]
396Matsushita Electric Works, Ltd. [CXH1]
397MegaPAC   [IXG]
398Pilkington Communication Systems   [DXA]
440Amnet, Inc.   [RM1]
441Chase Research   [KXG]
442PEER Networks [TS566]
443GatewayCommunications,Inc.   [EXF]
444Peregrine Systems   [EXO]
445Daewoo Telecom   [SXO]
446Norwegian Telecom Research [PXY1]
447WilTel   [AXP]
448Ericsson-Camtec [SXP1]
449Codex [TXM1]
450Basis   [HXS]
451AGE Logic [SXL3]
452INDE Electronics [GXD1]
453ISODE Consortium [SH284]
454J.I. Case [MXO1]
455Trillium Digital Systems [CXC2]
456BacchusInc.   [EXG]
457MCC [DR48]
458StratusComputer   [KXC]
459Quotron [RXS3]
460Beame &Whiteside [CXB1]
461Cellular Technical Servuces [GXH2]

SGMPVendor SpecificCodes: [obsolete]

   Prefix: 1,255,

   DecimalName   References
   -----------   ----------
 0Reserved [JKR1]
 1Proteon [JS18]
 2IBM   [JXR]
 3CMU   [SXW]
 4Unix   [MS9]
 5ACC   [AB20]
 6TWG   [MTR]
 7CAYMAN   [BP52]
 8NYSERNET   [MS9]
 9cisco   [GS2]
10BBN   [RH6]
11Unassigned [JKR1]
12MIT [JR35]
    13-254Unassigned [JKR1]
255Reserved [JKR1]

MILNET LOGICAL ADDRESSES

The MILNET facility for "logical addressing"is described inRFC-878
[57]and RFC-1005 [109]. A portion of the possible logical addresses
are reservedfor standard uses.

There are 49,152 possible logical host addresses. Of these,256 are
reserved forassignment to well-known functions. Assignments for
well-known functionsare made by theIANA. Assignments for other
logical hostaddresses 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]

MILNET LINK NUMBERS

The word "link" hererefers to a field in the original MILNET
Host/IMP interface leader. The linkwas originally defined as an 8-
bit field. Later specifications defined this field as the "message-
id" with a length of12 bits. The name linknow refers to the high
order 8 bitsof this12-bit message-id field. The Host/IMP interface
is defined in BBN Report 1822 [2].

The low-order 4 bitsof the message-id fieldare 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 ignorethe
sub-link.

LinkAssignments:

    DecimalDescription   References
    -------------------   ----------
    0-63BBNCC Monitoring   [MB]
    64-149Unassigned   [JBP]
    150Xerox NS IDP   [133,XEROX]
    151Unassigned   [JBP]
    152PARC Universal Protocol   [8,XEROX]
    153TIP Status Reporting   [JGH]
    154TIP Accounting   [JGH]
    155Internet Protocol [regular]   [105,JBP]
    156-158Internet Protocol [experimental]   [105,JBP]
    159FigleafLink   [JBW1]
    160BlackerLocal Network Protocol   [DM28]
    161-194Unassigned   [JBP]
    195ISO-IP[64,RXM]
    196-247Experimental Protocols   [JBP]
    248-255NetworkMaintenance   [JGH]

MILNETX.25 ADDRESS MAPPINGS

All MILNET hosts areassigned addresses by the Defense Data Network
(DDN). The address of a MILNET hostmay be obtainedfrom the Network
Information Center (NIC), represented as an ASCII text string in what
is called "host table format". Thissectiondescribes the process by
which MILNETX.25 addresses may be derived from addresses inthe NIC
hosttable format.

A NIC host table address consists ofthe ASCII text string
representations of four decimal numbers separated byperiods,
corresponding to thefour octeted ofa thirty-two bit Internet
address. The four decimal numbers are referred to in this section as
"n","h' "l", and "i". Thus, a hosttable address may be represented
as: "n.h.l.i". Eachof these four numbers will haveeither one, two,
or three decimal digits and will never have a value greater than 255.
For example,in the host table, address: "10.2.0.124", n=10,h=2,
l=0,and i=124. To convert a host table address to a MILNETX.25
address:

    1. If h < 64, the host table address correspondsto the X.25
    physical address:

  ZZZZ F IIIHHZZ (SS)

    where:

 ZZZZ= 0000 as required

 F = 0 because the address is a physical address;

 III is a three decimal digit respresentation of
"i", right-adjusted and padded with leading
zerosif required;

 HH is a two decimal digit representationof "h",
right-adjusted and padded with leading zeros
if required;

 ZZ =00 and

 (SS) is optional

    In the example given above, the host table address 10.2.0.124
    corresponds to the X.25 physical address 000001240200.

2. If h > 64 or h =64, thehost table address corresponds to the X.25logicaladdress

   ZZZZ F RRRRRZZ (SS)

where:

ZZZZ = 0000   as required

F = 1   because the address is alogicaladdress;

RRRRR   is a five decimal digit representation of
      the result "r" of the calculation

r = h *256 + i

      (Note that the decimal representation of
      "r" willalways require five digits);

ZZ = 00   and

(SS)   is optional

      Thus, thehost table address 10.83.0.207 corresponds to the X.25
      logical address 000012145500.

   In both cases, the "n" and "l" fields of thehost table address are
   not used.

         IEEE 802NUMBERSOF INTEREST

    Someof the networksof all classes are IEEE802 Networks. These
    systems may use a Link Service Access Point (LSAP) field in much the
    sameway theMILNET uses the"link" field. Further,there is an
    extension ofthe LSAP headercalled the Sub-Network Access Protocol
    (SNAP).

    The IEEE likes to describe numbers in binaryin bit transmission
    order, whichis the oppositeof the big-endian orderused throughout
    the Internetprotocol documentation.

    Assignments:

       Link Service Access Point   Description   References
       -------------------------   -----------   ----------
       IEEE   Internet
       binary   binary decimal
       00000000 00000000   0   NullLSAP [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   Reserved (DOD IP)   [104,JBP]
       01110000 00001110   14   PROWAY-LAN [IEEE]
       01110010 01001110   78   EIA-RS 511 [IEEE]
       01111010 01011110   94   ISI IP   [JBP]
       01110001 10001110   142   PROWAY-LAN [IEEE]
       01010101 10101010   170   SNAP [IEEE]
       01111111 11111110   254   ISO CLNS IS 8473[64,JXJ]
       11111111 11111111   255   Global DSAP [IEEE]

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

    At an ad hocspecialsessionon "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 IPrelated
    protocols (such as the Address Resolution Protocol (ARP)) on802
    networks wasdeveloped, using the SNAP extension (see RFC-1042 [90]).

ETHERNETNUMBERSOF INTEREST

Manyof the networksof all classes are Ethernets (10Mb) or
ExperimentalEthernets (3Mb). Thesesystemsuse 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,Xerox
Systems Institute, 475 Oakmead Parkway, Sunnyvale, CA 94086,Attn:
Ms. Fonda Pallone, (415) 813-7164.

The following list is contributed unverifiedinformation from various
sources.

Assignments:

```
    EthernetExp. Ethernet Description        References
    ----------------------------------        ----------
    decimal   Hexdecimal octal
 000  0000-05DC   -    -IEEE802.3 Length Field [XEROX]
 257  0101-01FF   -    -Experimental [XEROX]
 512  0200   512 1000XEROX PUP (see 0A00)    [8,XEROX]
 513  0201   -   -PUP Addr Trans (see 0A01)[XEROX]
1536  0600   1536 3000XEROX NS IDP     [133,XEROX]
2048  0800   513 1001DOD IP          [105,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[88,JBP]
2055  0807   -   -XNS Compatability [XEROX]
2076  081C   -   -Symbolics Private  [DCP1]
2184  0888-088A   -   -Xyplex [XEROX]
2304  0900   -   -Ungermann-Bass net debugr[XEROX]
2560  0A00   -   -Xerox IEEE802.3PUP [XEROX]
2561  0A01   -   -PUP Addr Trans [XEROX]
2989  0BAD   -   -Banyan Systems [XEROX]
4096  1000   -   -Berkeley Trailer nego [XEROX]
4097  1001-100F   -   -Berkeley Trailer encap/IP[XEROX]
5632  1600   -   -Valid Systems [XEROX]
    16962   4242   -   -PCS Basic BlockProtocol [XEROX]
    21000   5208   -   -BBN Simnet [XEROX]
    24576   6000   -   -DEC Unassigned (Exp.) [XEROX]
    24577   6001   -   -DEC MOPDump/Load [XEROX]
    24578   6002   -   -DEC MOPRemote Console [XEROX]
    24579   6003   -   -DEC DECNET Phase IV Route[XEROX]
    24580   6004   -   -DEC LAT [XEROX]
    24581   6005   -   -DEC Diagnostic Protocol [XEROX]
```

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24582   6006    -   -DEC Customer Protocol [XEROX]
24583   6007    -   -DEC LAVC, SCA [XEROX]
24584   6008-6009   -   -DEC Unassigned [XEROX]
24586   6010-6014   -   -3Com Corporation [XEROX]
28672   7000    -   -Ungermann-Bass download [XEROX]
28674   7002    -   -Ungermann-Bass dia/loop [XEROX]
28704   7020-7029   -   -LRT [XEROX]
28720   7030    -   -Proteon [XEROX]
28724   7034    -   -Cabletron [XEROX]
32771   8003    -   -Cronus VLN      [131,DT15]
32772   8004    -   -Cronus Direct      [131,DT15]
32773   8005    -   -HP Probe [XEROX]
32774   8006    -   -Nestar [XEROX]
32776   8008    -   -AT&T [XEROX]
32784   8010    -   -Excelan [XEROX]
32787   8013    -   -SGI diagnostics    [AXC]
32788   8014    -   -SGI network games    [AXC]
32789   8015    -   -SGI reserved    [AXC]
32790   8016    -   -SGI bounce server    [AXC]
32793   8019    -   -Apollo Computers [XEROX]
32815   802E    -   -Tymshare [XEROX]
32816   802F    -   -Tigan, Inc. [XEROX]
32821   8035    -   -ReverseARP[48,JXM]
32822   8036    -   -Aeonic Systems [XEROX]
32824   8038    -   -DEC LANBridge [XEROX]
32825   8039-803C   -   -DEC Unassigned [XEROX]
32829   803D    -   -DEC Ethernet Encryption [XEROX]
32830   803E    -   -DEC Unassigned [XEROX]
32831   803F    -   -DEC LANTrafficMonitor [XEROX]
32832   8040-8042   -   -DEC Unassigned [XEROX]
32836   8044    -   -Planning Research Corp. [XEROX]
32838   8046    -   -AT&T [XEROX]
32839   8047    -   -AT&T [XEROX]
32841   8049    -   -ExperData [XEROX]
32859   805B    -   -Stanford V Kernel exp. [XEROX]
32860   805C    -   -Stanford V Kernel prod. [XEROX]
32861   805D    -   -Evans &Sutherland [XEROX]
32864   8060    -   -Little Machines [XEROX]
32866   8062    -   -Counterpoint Computers [XEROX]
32869   8065-8066   -   -Univ. of Mass. @ Amherst [XEROX]
32871   8067    -   -Veeco Integrated Auto. [XEROX]
32872   8068    -   -GeneralDynamics [XEROX]
32873   8069    -   -AT&T [XEROX]
32874   806A    -   -Autophon [XEROX]
32876   806C    -   -ComDesign [XEROX]
32877   806D    -   -Computgraphic Corp. [XEROX]
32878   806E-8077   -   -Landmark Graphics Corp. [XEROX]
32890   807A    -   -Matra [XEROX]
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32891   807B    -   -Dansk Data Elektronik [XEROX]
32892   807C    -   -Merit Internodal    [HWB]
32893   807D-807F   -   -Vitalink Communications [XEROX]
32896   8080    -   -Vitalink TransLAN III [XEROX]
32897   8081-8083   -   -Counterpoint Computers [XEROX]
32923   809B    -   -Appletalk [XEROX]
32924   809C-809E   -   -Datability [XEROX]
32927   809F    -   -Spider Systems Ltd. [XEROX]
32931   80A3    -   -NixdorfComputers [XEROX]
32932   80A4-80B3   -   -SiemensGammasonics Inc. [XEROX]
32960   80C0-80C3   -   -DCA Data Exchange Cluster[XEROX]
32966   80C6    -   -Pacer Software [XEROX]
32967   80C7    -   -Applitek Corporation [XEROX]
32968   80C8-80CC   -   -Intergraph Corporation [XEROX]
32973   80CD-80CE   -   -Harris Corporation [XEROX]
32974   80CF-80D2   -   -Taylor Instrument [XEROX]
32979   80D3-80D4   -   -Rosemount Corporation [XEROX]
32981   80D5    -   -IBM SNAServiceon Ether [XEROX]
32989   80DD    -   -Varian Associates [XEROX]
32990   80DE-80DF   -   -Integrated Solutions TRFS[XEROX]
32992   80E0-80E3   -   -Allen-Bradley [XEROX]
32996   80E4-80F0   -   -Datability [XEROX]
33010   80F2    -   -Retix [XEROX]
33011   80F3    -   -AppleTalk AARP (Kinetics)[XEROX]
33012   80F4-80F5   -   -Kinetics [XEROX]
33015   80F7    -   -Apollo Computer [XEROX]
33023   80FF-8103   -   -Wellfleet Communications [XEROX]
33031   8107-8109   -   -Symbolics Private [XEROX]
33072   8130    -   -Waterloo Microsystems [XEROX]
33073   8131    -   -VG Laboratory Systems [XEROX]
33079   8137-8138   -   -Novell,Inc. [XEROX]
33081   8139-813D   -   -KTI [XEROX]
33100   814C    -   -SNMP  [JKR1]
36864   9000    -   -Loopback [XEROX]
36865   9001    -   -3Com(Bridge) XNS Sys Mgmt[XEROX]
36866   9002    -   -3Com(Bridge) TCP-IP Sys [XEROX]
36867   9003    -   -3Com(Bridge) loop detect [XEROX]
65280   FF00    -   -BBN VITAL-LanBridge cache[XEROX]
```

   The standardfor transmission of IP datagrams over Ethernetsand
   ExperimentalEthernets is specified in RFC-894 [61] and RFC-895 [91]
   respectively.

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

   IEEEStandards Office, 345 East 47thStreet,New York, N.Y. 10017,
   Attn: Vince Condello. Phone: (212) 705-7092.

ETHERNET VENDOR ADDRESS COMPONENTS

Ethernet hardware addresses are 48 bits, expressed as 12 hexadecimal
digits (0-9,plus A-F, capitalized). These 12 hex digits consist of
the first/left 6 digits (which should match the vendor of the
Ethernet interface within the station) and the last/right 6 digits
which specify the interface serial number for that interfacevendor.

Ethernet addresses might be written unhyphenated (e.g.,
123456789ABC), or with one hyphen (e.g., 123456-789ABC), butshould
be written hyphenated by octets (e.g., 12-34-56-78-9A-BC).

These addresses are physicalstationaddresses, not multicast nor
broadcast, so the second hexdigit (reading from theleft) will be
even, not odd.

At present, it is not clear how the IEEE assigns Ethernet block
addresses. Whether in blocks of 2**24 or 2**25, andwhether
multicasts are assigned withthat block or separately. A portion of
the vendor block address is reportedly assigned serially, with the
other portion intentionally assignedrandomly. If there is a global
algorithm for which addresses are designatedto be physical (in a
chipset) versus logical (assigned insoftware), or globally-assigned
versus locally-assigned addresses, some of the knownaddresses do not
follow the scheme (e.g., AA0003; 02xxxx).

```
00000C  Cisco
00000F  NeXT
000010  Sytek
00001D  Cabletron
000020  DIAB(Data Intdustrier AB)
000022  Visual Technology
00002A  TRW
00005A  S & Koch
00005E  IANA
000065  Network General
00006B  MIPS
000077  MIPS
00007A  Ardent
000089  Cayman Systems  Gatorbox
000093  Proteon
00009F  Ameristar Technology
0000A2  Wellfleet
0000A3  Network Application Technology
0000A6  Network General (internal assignment, not for products)
0000A7  NCD   X-terminals
0000A9  Network Systems
0000AA  Xerox   Xerox machines
```

```
0000B3  CIMLinc
0000B7  Dove    Fastnet
0000BC  Allen-Bradley
0000C0  Western Digital
0000C6  HP Intelligent Networks Operation (formerly Eon Systems)
0000C8  Altos
0000C9  Emulex    Terminal Servers
0000D7  Dartmouth College (NED Router)
0000D8  3Com? Novell?   PS/2
0000DD  Gould
0000DE  Unigraph
0000E2  AcerCounterpoint
0000EF  Alantec
0000FD  HighLevel Hardvare (Orion, UK)
000102  BBN   BBN internalusage (not registered)
001700  Kabel
00802D  Xylogics, Inc.  Annex terminal servers
00808C  Frontier Software Development
0080C2  IEEE802.1 Committee
0080D3  Shiva
00AA00  Intel
00DD00  Ungermann-Bass
00DD01  Ungermann-Bass
020701  Racal InterLan
020406  BBN   BBN internalusage (not registered)
026086  Satelcom MegaPac (UK)
02608C  3Com    IBM PC; Imagen; Valid; Cisco
02CF1F  CMC   Masscomp; Silicon Graphics; Prime EXL
080002  3Com(Formerly Bridge)
080003  ACC (Advanced Computer Communications)
080005  Symbolics   Symbolics LISP machines
080008  BBN
080009  Hewlett-Packard
08000A  Nestar Systems
08000B  Unisys
080011  Tektronix, Inc.
080014  Excelan   BBN Butterfly, Masscomp, Silicon Graphics
080017  NSC
08001A  DataGeneral
08001B  DataGeneral
08001E  Apollo
080020  Sun   Sun machines
080022  NBI
080025  CDC
080026  Norsk Data (Nord)
080027  PCS ComputerSystemsGmbH
080028  TI    Explorer
08002B  DEC
```

```
08002E  Metaphor
08002F  Prime Computer  Prime 50-Series LHC300
080036  Intergraph   CAE stations
080037  Fujitsu-Xerox
080038  Bull
080039  Spider Systems
080041  DCA Digital Comm. Assoc.
080045  ????(maybe Xylogics, but they claimnot to know this number)
080046  Sony
080047  Sequent
080049  Univation
08004C  Encore
08004E  BICC
080056  Stanford University
080058  ???   DECsystem-20
08005A  IBM
080067  Comdesign
080068  Ridge
080069  Silicon Graphics
08006E  Excelan
080075  DDE (Danish Data Elektronik A/S)
08007C  Vitalink   TransLAN III
080080  XIOS
080086  Imagen/QMS
080087  Xyplex   terminal servers
080089  Kinetics   AppleTalk-Ethernet interface
08008B  Pyramid
08008D  XyVision   XyVision machines
080090  Retix Inc   Bridges
484453  HDS ???
800010  AT&T
AA0000  DEC   obsolete
AA0001  DEC   obsolete
AA0002  DEC   obsolete
AA0003  DEC   Global physical address for some DECmachines
AA0004  DEC   Local logical address for systems running
DECNET
```

ETHERNETMULTICAST ADDRESSES

Ethernet   Type
Address   Field   Usage

Multicast Addresses:

Ethernet Address	Type Field	Usage
01-00-5E-00-00-00- 01-00-5E-7F-FF-FF	0800	Internet Multicast (RFC-1112) [43]
01-00-5E-80-00-00- 01-00-5E-FF-FF-FF	????	Internet reserved byIANA
01-80-C2-00-00-00	-802-	Spanning tree (for bridges)
09-00-02-04-00-01?	8080?	Vitalink printer
09-00-02-04-00-02?	8080?	Vitalink management
09-00-09-00-00-01	8005	HP Probe
09-00-09-00-00-01	-802-	HP Probe
09-00-09-00-00-04	8005?	HP DTC
09-00-1E-00-00-00	8019?	Apollo DOMAIN
09-00-2B-00-00-00	6009?	DEC MUMPS?
09-00-2B-00-00-01	8039?	DEC DSM/DTP?
09-00-2B-00-00-02	803B?	DEC VAXELN?
09-00-2B-00-00-03	8038	DEC Lanbridge Traffic Monitor (LTM)
09-00-2B-00-00-04	????	DEC MAP End System Hello
09-00-2B-00-00-05	????	DEC MAP IntermediateSystem Hello
09-00-2B-00-00-06	803D?	DEC CSMA/CD Encryption?
09-00-2B-00-00-07	8040?	DEC NetBios Emulator?
09-00-2B-00-00-0F	6004	DEC Local Area Transport (LAT)
09-00-2B-00-00-1x	????	DEC Experimental
09-00-2B-01-00-00	8038	DEC LanBridge Copy packets (Allbridges)
09-00-2B-01-00-01	8038	DEC LanBridge Hello packets (Alllocal bridges) 1 packet persecond,sent bythe designated LanBridge
09-00-2B-02-00-00	????	DEC DNA Lev.2 Routing Layerrouters?
09-00-2B-02-01-00	803C?	DEC DNA Naming Service Advertisement?
09-00-2B-02-01-01	803C?	DEC DNA Naming Service Solicitation?
09-00-2B-02-01-02	803E?	DEC DNA TimeService?
09-00-2B-03-xx-xx	????	DEC default filtering by bridges?
09-00-2B-04-00-00	8041?	DEC Local Area Sys. Transport (LAST)?
09-00-2B-23-00-00	803A?	DEC ArgonautConsole?
09-00-4E-00-00-02?	8137?	Novell IPX
09-00-56-00-00-00- 09-00-56-FE-FF-FF	????	Stanford reserved
09-00-56-FF-00-00- 09-00-56-FF-FF-FF	805C	Stanford V Kernel, version 6.0
09-00-77-00-00-01	????	Retix spanning tree bridges
09-00-7C-02-00-05	8080?	Vitalink diagnostics

```
   09-00-7C-05-00-01   8080?   Vitalink gateway?
   0D-1E-15-BA-DD-06   ????    HP
   AB-00-00-01-00-00   6001    DEC Maintenance Operation Protocol
   (MOP) Dump/Load Assistance
   AB-00-00-02-00-00   6002    DEC Maintenance Operation Protocol
   (MOP) RemoteConsole
   1 System ID packet every 8-10 minutes,
   by every:
   DEC LanBridge
   DEC DEUNA interface
   DEC DELUA interface
   DEC DEQNA interface
   (in a certain mode)
   AB-00-00-03-00-00   6003    DECNET PhaseIV end node Hello
   packets 1 packet every 15 seconds,
   sentby eachDECNET host
   AB-00-00-04-00-00   6003    DECNET PhaseIV Router Hellopackets
   1 packet every 15 seconds, sent by
   the DECNET router
   AB-00-00-05-00-00   ????    Reserved DECthrough
   AB-00-03-FF-FF-FF
   AB-00-03-00-00-00   6004    DEC Local Area Transport (LAT) - old
   AB-00-04-00-xx-xx   ????    Reserved DECcustomer private use
   AB-00-04-01-xx-yy   6007    DEC Local Area VAX Cluster groups
   Sys.Communication Architecture (SCA)
   CF-00-00-00-00-00   9000    Ethernet Configuration Test protocol
   (Loopback)

   Broadcast Address:

   FF-FF-FF-FF-FF-FF   0600    XNS packets,Hello or gateway search?
   6 packets every 15 seconds, per XNS
   station
   FF-FF-FF-FF-FF-FF   0800    IP (e.g. RWHOD via UDP) as needed
   FF-FF-FF-FF-FF-FF   0804    CHAOS
   FF-FF-FF-FF-FF-FF   0806    ARP (for IP and CHAOS) as needed
   FF-FF-FF-FF-FF-FF   0BAD    Banyan
   FF-FF-FF-FF-FF-FF   1600    VALID packets, Helloor gateway
   search?
   1 packets every 30 seconds, per VALID
   station
   FF-FF-FF-FF-FF-FF   8035    Reverse ARP
   FF-FF-FF-FF-FF-FF   807C    Merit Internodal (INP)
   FF-FF-FF-FF-FF-FF   809B    EtherTalk
```

   XNSPROTOCOL TYPES

   Assigned well-known socket numbers

   Routing Information   1
   Echo   2
   Router Error   3
   Experimental   40-77

   Assigned internet packet types

   Routing Information   1
   Echo   2
   Error   3
   Packet Exchange   4
   Sequenced Packet   5
   PUP   12
   DoD IP   13
   Experimental   20-37

        PROTOCOL/TYPE FIELD ASSIGNMENTS

   Below are two tablesdescribing the arrangement of protocol fields or
   typefield assignments so that one could send NS Datagrams on the
   MILNET or Internet Datagramson 10MbEthernet, and also protocol and
   typefields so one could encapsulateeach kind of Datagram in the
   other.

lower \ upper	DoD IP	PUP	NS IP
3Mb Ethernet	Type 1001 octal	Type 1000 octal	Type 3000 octal
10 Mb Ethernet	Type 0800 hex	Type 0200 hex	Type 0600 hex
MILNET	Link 155 decimal	Link 152 decimal	Link 150 decimal

lower \ upper	DoD IP	PUP	NS IP
DoD IP		Protocol X decimal	Protocol 12 decimal	22
PUP		?	X	?
NS IP		Type 13 decimal	Type 12 decimal	X

PRONET 80 TYPE NUMBERS

Below is thecurrentlist ofPRONET 80 Type Numbers. Note: a
protocol that is on this list does not necessarily mean thatthere is
any implementation of it on ProNET.

Of these, protocols 1, 14, and 20 are the only ones that have ever
beenseen inARP packets.

For reference, the header is(one byte/line):

destination hardwareaddress
source hardware address
datalink header version (2)
datalink header protocol number
datalink header reserved (0)
datalink header reserved (0)

Someprotocols have been known to tuck stuffin the reservedfields.

Those who need a protocol number on ProNET-10/80 should contact John
Shriver (jas@proteon.com).

```
    1        IP
    2        IP with trailing headers
    3        Address Resolution Protocol
    4        Proteon HDLC
    5        VAX Debugging Protocol (MIT)
   10         Novell NetWare (IPX and pre-IPX) (old format,
3byte trailer)
   11        Vianetix
   12        PUP
   13        Watstar protocol (University of Waterloo)
   14        XNS
   15        Diganostics
   16        Echo protocol (link level)
   17        Banyan Vines
   20        DECnet (DEUNA Emulation)
   21        Chaosnet
   23        IEEE 802.2 or ISO8802/2 Data Link
   24        Reverse Address Resolution Protocol
   29        TokenVIEW-10
   31        AppleTalkLAP Data Packet
   33        Cornell Boot Server Location Protocol
   34        Novell NetWare IPX (new format, no trailer,
new XOR checksum)
```

POINT-TO-POINT PROTOCOL FIELDASSIGNMENTS

PPP DLLPROTOCOL NUMBERS

The Point-to-Point Protocol (PPP) Data Link Layer [146,147,175] contains a 16 bit Protocol field to identifythe theencapsulated protocol. The Protocol field is consistent with theISO 3309 (HDLC) extension mechanism for Address fields. AllProtocols MUST be assigned such that the leastsignificant bitof the most significant octet equals"0", and the least significant bit of the least significant octet equals "1".

Assigned PPP DLL Protocol Numbers

Value (in hex) Protocol Name

```
0001to 001f   reserved (transparency inefficient)
0021    Internet Protocol
0023    OSI Network Layer
0025    Xerox NS IDP
0027    DECnet PhaseIV
0029    Appletalk
002b    Novell IPX
002d    Van JacobsonCompressed TCP/IP
002f    Van JacobsonUncompressed TCP/IP
0031    Bridging PDU
0033    Stream Protocol (ST-II)
0035    Banyan Vines
0037    reserved (until 1993)
00ff    reserved (compression inefficient)

0201    802.1d HelloPackets
0231    Luxcom
0233    Sigma Network Systems

8021    Internet Protocol Control Protocol
8023    OSI Network Layer Control Protocol
8025    Xerox NS IDPControlProtocol
8027    DECnet PhaseIV Control Protocol
8029    Appletalk Control Protocol
802b    Novell IPX Control Protocol
802d    Reserved
802f    Reserved
8031    Bridging NCP
8033    Stream Protocol Control Protocol
8035    Banyan VinesControlProtocol
8037    reserved till 1993
80ff    reserved (compression inefficient
```

     c021   LinkControlProtocol
     c023   Password Authentication Protocol
     c025   LinkQualityReport
     c223   Challenge Handshake Authentication Protocol

     Protocol field values in the"0---" to "3---" range identifythe
     network-layer protocol of specific datagrams, and values in the "8--
     -" to "b---"range identify datagrams belonging to the associated
     Network Control Protocol (NCP), if any.

     It is recommended that values in the"02--" to "1e--" and "--01" to
     "--1f" ranges not beassigned, as they are compression inefficient.

     Protocol field values in the"4---" to "7---" range are usedfor
     protocols with low volume traffic which haveno associated NCP.

     Protocol field values in the"c---" to "e---" range identify
     datagrams asControlProtocols (suchas LCP).

PPP LCPAND IPCP CODES

     The Point-to-Point Protocol (PPP) Link Control Protocol (LCP) [146]
     and InternetProtocol Control Protocol (IPCP) [147] contain an 8 bit
     Codefield which identifies the typeof packet. These Codesare
     assigned as follows:

     Code   Packet Type
     ----   -----------
        1   Configure-Request
        2   Configure-Ack
        3   Configure-Nak
        4   Configure-Reject
        5   Terminate-Request
        6   Terminate-Ack
        7   Code-Reject
        8   * Protocol-Reject
        9   * Echo-Request
       10   * Echo-Reply
       11   * Discard-Request
       12   * RESERVED

     * LCP Only

PPP LCPCONFIGURATION OPTION TYPES

   The Point-to-Point Protocol (PPP) Link Control Protocol (LCP)
   specifies a number of Configuration Options [146] which are
   distinguished by an 8 bit Type field. TheseTypes are assigned as
   follows:

   Type   Configuration Option
   ----   --------------------
      1   Maximum-Receive-Unit
      2   Async-Control-Character-Map
      3   Authentication-Protocol
      4   Quality-Protocol
      5   Magic-Number
      6   RESERVED
      7   Protocol-Field-Compression
      8   Address-and-Control-Field-Compression
      9   FCS-Alternatives

PPP IPCP CONFIGURATION OPTION TYPES

   The Point-to-Point Protocol (PPP) Internet Protocol Control Protocol
   (IPCP) specifies a number ofConfiguration Options [147] which are
   distinguished by an 8 bit Type field. TheseTypes are assigned as
   follows:

   Type   Configuration Option
   ----   --------------------
      1   IP-Addresses (deprecated)
      2   IP-Compression-Protocol
      3   IP-Address

PPP BRIDGING CONFIGURATION OPTION TYPES

   The Point-to-Point Protocol (PPP) Extensionsfor Bridging specifies a
   number of Configuration Options [176] which are distinguished by an 8
   bit Type field. These Typesare assigned asfollows:

   Type   Configuration Option
   ----   --------------------
      1   Remote Ring Identification
      2   Line Identification
      3   MAC Type Selection
      4   Tinygram Compression
      5   LAN Identification

PPP BRIDGING MAC TYPES

   The Point-to-Point Protocol (PPP) Extensionsfor Bridging [176]
   contains an 8 bit MAC Type field which identifies the MAC
   encapsulated. TheseTypes are assigned as follows:

   Type   MAC
   ----   -----------
      0   Reserved
      1   IEEE 802.3/Ethernet
      2   IEEE 802.4
      3   IEEE 802.5
      4   FDDI

ADDRESS RESOLUTION PROTOCOL PARAMETERS

The Address Resolution Protocol (ARP) specified in RFC-826 [88] has several parameters.The assigned values forthese parameters are listed here.

Assignments:

Operation Code (op)

  1REQUEST
  2REPLY

Hardware Type (hrd)

```
   Type    Description   References
   ----    -----------   ----------
1    Ethernet (10Mb)[JBP]
2    Experimental Ethernet (3Mb)[JBP]
3    Amateur Radio AX.25[PXK]
4    Proteon ProNET Token Ring[JBP]
5    Chaos[GXP]
6    IEEE 802 Networks[JBP]
7    ARCNET[JBP]
8    Hyperchannel[JBP]
9    Lanstar [TU]
     10    Autonet Short Address        [MXB1]
     11    LocalTalk      [JKR1]
     12    LocalNet (IBM PCNet or SYTEK LocalNET)[JXM]
     13    Ultra link      [RXD2]
     14    SMDS      [GXC1]
     15    Frame Relay[AGM]
     16    Asynchronous Transmission Mode (ATM)       [JXB2]
```

Protocol Type (pro)

Use the same codes as listed in the section called "Ethernet Numbers of Interest" (allhardware types use thiscode set for the protocol type).

REVERSE ADDRESS RESOLUTIONPROTOCOL OPERATION CODES

The Reverse Address Resolution Protocol (RARP) specified in RFC-903 [48]has thefollowing operation codes:

Assignments:

Operation Code (op)

 3 request Reverse
 4 reply Reverse

 DYNAMIC REVERSE ARP

Assignments:

Operation Code (op)

 5 DRARP-Request
 6 DRARP-Reply
 7 DRARP-Error

For further information, contact: David Brownell (suneast!helium!db@Sun.COM).

INVERSE ADDRESS RESOULUTION PROTOCOL

The Inverse Address Resolution Protocol (IARP) specified in RFC-1293 [173] has the following operation codes:

Assignments:

Operation Code (op)

 8 InARP-Request
 9 InARP-Reply

   X.25 TYPE NUMBERS

CCITT defines the high ordertwo bits of thefirst octet of call user
dataas follows:

   00 - Usedfor other CCITTrecomendations (such asX.29)
   01 - Reserved foruse by "national" administrative
authorities
   10 - Reserved foruse by international administrative authoorities
   11 - Reserved forarbitrary use between consenting DTEs

   Call UserData (hex)   Protocol   Reference
   -------------------   --------   ---------

   01   PAD [GS2]
   C5   Blacker front-end descr dev [AGM]
   CC   IP   [69,AGM]*
   CD   ISO-IP [AGM]
   DD   Network Monitoring [AGM]

   *NOTE: ISO SC6/WG2 approved assignment inISO 9577 (January 1990).

 PUBLICDATA NETWORK NUMBERS

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

Assignments:

```
Internet    Public Data Net    Description    References
-------------- ----------------- ----------- ----------
      014.000.000.000    Reserved   [JBP]
      014.000.000.001 3110-317-0003500  PURDUE-TN    [TN]
      014.000.000.002 3110-608-0002700  UWISC-TN    [TN]
      014.000.000.003 3110-302-0002400  UDEL-TN    [TN]
      014.000.000.004 2342-192-0014923  UCL-VTEST    [PK]
      014.000.000.005 2342-192-0030023  UCL-TG    [PK]
      014.000.000.006 2342-192-0030025  UK-SATNET    [PK]
      014.000.000.007 3110-608-0002400  UWISC-IBM  [MS56]
      014.000.000.008 3110-213-0004500  RAND-TN    [MO2]
      014.000.000.009 2342-192-0030023  UCL-CS    [PK]
      014.000.000.010 3110-617-0002500  BBN-VAN-GW  [JD21]
      014.000.000.011 2405-015-5030000  CHALMERS    [UXB]
      014.000.000.012 3110-713-0016500  RICE   [PAM6]
      014.000.000.013 3110-415-0026100  DECWRL   [PAM6]
      014.000.000.014 3110-408-0005100  IBM-SJ   [SXA3]
      014.000.000.015 2041-117-0100000  SHAPE    [JFW]
      014.000.000.016 2628-153-9007500  DFVLR4-X25    [GB7]
      014.000.000.017 3110-213-0003200  ISI-VAN-GW  [JD21]
      014.000.000.018 2624-522-8090052  FGAN-SIEMENS-X25    [GB7]
      014.000.000.019 2041-170-1000000  SHAPE-X25    [JFW]
      014.000.000.020 5052-737-2000050  UQNET    [AXH]
      014.000.000.021 3020-801-0005750  DMC-CRC1    [VXT]
      014.000.000.022 2624-522-8032902  FGAN-FGANFFMVAX-X25    [GB7]
      014.000.000.023 2624-589-0090801  ECRC-X25    [PXD]
      014.000.000.024 2342-905-2424283  UK-MOD-RSRE  [JXE2]
      014.000.000.025 2342-905-2424282  UK-VAN-RSRE    [AXM]
      014.000.000.026 2624-522-8032905  DFVLRSUN-X25    [GB7]
      014.000.000.027 2624-457-1101590  SELETFMSUN-X25    [BXD]
      014.000.000.028 3110-408-0014600  CDC-SVL [RAM57]
      014.000.000.029 2222-551-0440000  SUN-CNUCE   [ABB2]
      014.000.000.030 2222-551-0450000  ICNUCEVM-CNUCE   [ABB2]
      014.000.000.031 2222-551-0460000  SPARE-CNUCE   [ABB2]
      014.000.000.032 2222-551-0470000  ICNUCEVX-CNUCE   [ABB2]
      014.000.000.033 2222-551-0452400  CISCO-CNUCE   [ABB2]
      014.000.000.034 2342-313-0026090  SPIDER-GW  [AD67]
      014.000.000.035 2342-313-0026091  SPIDER-EXP  [AD67]
      014.000.000.036 2342-225-0010122  PRAXIS-X25A    [TXR]
      014.000.000.037 2342-225-0010123  PRAXIS-X25B    [TXR]
```

```
014.000.000.038 2403-712-3025000   DIAB-TABY-GW    [FXB]
014.000.000.039 2403-715-3010000   DIAB-LKP-GW    [FXB]
014.000.000.040 2401-881-2403800   DIAB-TABY1-GW    [FXB]
014.000.000.041 2041-170-1006000   STC  [TC27]
014.000.000.042 2222-551-0065260   CNUCE  [TC27]
014.000.000.043 2422-510-0590000   Tollpost-Globe AS    [OXG]
014.000.000.044 2422-670-0890000   Tollpost-Globe AS    [OXG]
014.000.000.045 2422-516-0100000   Tollpost-Globe AS    [OXG]
014.000.000.046 2422-450-0080000   Tollpost-Globe AS    [OXG]
014.000.000.047 2422-610-0020000   Tollpost-Globe AS    [OXG]
014.000.000.048 2422-310-0030000   Tollpost-Globe AS    [OXG]
014.000.000.049 2422-470-0880000   Tollpost-Globe AS    [OXG]
014.000.000.050 2422-210-0460000   Tollpost-Globe AS    [OXG]
014.000.000.051 2422-130-2890000   Tollpost-Globe AS    [OXG]
014.000.000.052 2422-310-2720000   Tollpost-Globe AS    [OXG]
014.000.000.053 2422-250-0580000   Tollpost-Globe AS    [OXG]
014.000.000.054 2422-634-0590000   Tollpost-Globe AS    [OXG]
014.000.000.055 2422-670-0880000   Tollpost-Globe AS    [OXG]
014.000.000.056 2422-430-0740000   Tollpost-Globe AS    [OXG]
014.000.000.057 2422-674-0780000   Tollpost-Globe AS    [OXG]
014.000.000.058 2422-230-1690000   Tollpost-Globe AS    [OXG]
014.000.000.059 2422-518-0290000   Tollpost-Globe AS    [OXG]
014.000.000.060 2422-370-0310000   Tollpost-Globe AS    [OXG]
014.000.000.061 2422-516-0340000   Tollpost-Globe AS    [OXG]
014.000.000.062 2422-616-0440000   Tollpost-Globe AS    [OXG]
014.000.000.063 2422-650-2350000   Tollpost-Globe AS    [OXG]
014.000.000.064 2422-330-0250000   Tollpost-Globe AS    [OXG]
014.000.000.065 2422-350-0190000   Tollpost-Globe AS    [OXG]
014.000.000.066 2422-410-0070000   Tollpost-Globe AS    [OXG]
014.000.000.067 2422-539-0620000   Tollpost-Globe AS    [OXG]
014.000.000.068 2422-630-0720000   Tollpost-Globe AS    [OXG]
014.000.000.069 2422-470-1230000   Tollpost-Globe AS    [OXG]
014.000.000.070 2422-470-1300000   Tollpost-Globe AS    [OXG]
014.000.000.071 2422-170-0460000   Tollpost-Globe AS    [OXG]
014.000.000.072 2422-516-0430000   Tollpost-Globe AS    [OXG]
014.000.000.073 2422-530-0070000   Tollpost-Globe AS    [OXG]
014.000.000.074 2422-650-1880000   Tollpost-Globe AS    [OXG]
014.000.000.075 2422-450-2450000   Tollpost-Globe AS    [OXG]
014.000.000.076 2062-243-1563100   DPT-BXL-DDC  [LZ15]
014.000.000.077 2062-243-1565100   DPT-BXL-DDC2  [LZ15]
014.000.000.078 3110-312-0043100   DPT-CHI  [LZ15]
014.000.000.079 3110-512-0013500   DPT-SAT-ENG  [LZ15]
014.000.000.080 2080-941-9055000   DPT-PAR  [LZ15]
014.000.000.081 4545-511-3060000   DPT-PBSC  [LZ15]
014.000.000.082 4545-513-3090000   DPT-HONGKONG  [LZ15]
014.000.000.083 4872-203-5500000   UECI-TAIPEI  [LZ15]
014.000.000.084 2624-551-1040020   DPT-HANOVR  [LZ15]
014.000.000.085 2624-569-0040199   DPT-FNKFRT  [LZ15]
```

```
      014.000.000.086 3110-512-0013400   DPT-SAT-SUPT  [LZ15]
      014.000.000.087 4602-3010-010320   DU-X25A  [JK64]
      014.000.000.088 4602-3010-010321   FDU-X25B  [JK64]
      014.000.000.089 2422-150-3370000   Tollpost-Globe AS   [OXG]
      014.000.000.090 2422-271-0710000   Tollpost-Globe AS   [OXG]
      014.000.000.091 2422-516-0010000   Tollpost-Globe AS   [OXG]
      014.000.000.092 2422-650-1880000   Norsk Informas.   [OXG]
      014.000.000.093 2422-250-3040000   Tollpost-Globe AS   [OXG]
      014.000.000.094-014.255.255.254    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 [69].

TELNET OPTIONS

The Telnet Protocol hasa number of options that may benegotiated.
These options are listed here."IAB Official Protocol Standards" [62]
provides more detailed information.

```
   Options  Name          References
   -------  ----------------------  ----------
      0     Binary Transmission      [110,JBP]
      1     Echo        [111,JBP]
      2     Reconnection[42,JBP]
      3     Suppress GoAhead         [114,JBP]
      4     Approx Message SizeNegotiation      [133,JBP]
      5     Status       [113,JBP]
      6     Timing Mark       [115,JBP]
      7     Remote Controlled Trans andEcho       [107,JBP]
      8     Output LineWidth[40,JBP]
      9     Output PageSize[41,JBP]
     10     Output Carriage-Return Disposition[28,JBP]
     11     Output Horizontal Tab Stops[32,JBP]
     12     Output Horizontal Tab Disposition[31,JBP]
     13     Output Formfeed Disposition[29,JBP]
     14     Output Vertical Tabstops[34,JBP]
     15     Output Vertical TabDisposition[33,JBP]
     16     Output Linefeed Disposition[30,JBP]
     17     Extended ASCII       [136,JBP]
     18     Logout[25,MRC]
     19     Byte Macro[35,JBP]
     20     Data Entry Terminal    [145,38,JBP]
     22     SUPDUP      [26,27,MRC]
     22     SUPDUP Output[51,MRC]
     23     Send Location       [68,EAK1]
     24     Terminal Type       [128,MS56]
     25     Endof Record        [103,JBP]
     26     TACACS UserIdentification [1,BA4]
     27     Output Marking        [125,SXS]
     28     Terminal Location Number[84,RN6]
     29     Telnet 3270Regime        [116,JXR]
     30     X.3PAD       [70,SL70]
     31     Negotiate About Window Size     [139,DW183]
     32     Terminal Speed       [57,CLH3]
     33     Remote FlowControl        [58,CLH3]
     34     Linemode[9,DB14]
     35     X Display Location        [75,GM23]
     36     EnvironmentOption   [DB14]
     37     Authentication Option  [DB14]
     38     Encryption Option  [DB14]
    255     Extended-Options-List       [109,JBP]
```

MAILENCRYPTION TYPES

RFC-822 specifies that Encryption Types for mail maybe assigned.
There are currently no RFC-822 encryption types assigned. Please use
instead the Mail Privacy procedures defined in [71,72,66].

MIME TYPES

RFC-1341 [169] specifies that Content Types, Content Subtypes, Character
Sets, Access Types, andConversion values for MIME mailwill beassigned
and listed by the IANA.

    Content Types and Subtypes

    Type   Subtype   Description   Reference
    ----   -------   -----------   ---------
    text   plain   [169,NSB]
    richtext

    multipart   mixed   [169,NSB]
    alternative
    digest
    parallel

    message   rfc822   [169,NSB]
    partial
    external-body

    application   octet-stream   [169,NSB]
    postscript
    oda

    image   jpeg   [169,NSB]
    gif

    audio   basic   [169,NSB]

    video   mpeg   [169,NSB]

    Character Sets

    Type   Description   Reference
    ----   -----------   ---------
    US-ASCII   the default characterset   [169,NSB]
    ISO-8859-1   see ISO_8859-1:1987 below   [169,NSB]
    ISO-8859-2   see ISO_8859-2:1987 below   [169,NSB]
    ISO-8859-3   see ISO_8859-3:1988 below   [169,NSB]
    ISO-8859-4   see ISO_8859-4:1988 below   [169,NSB]
    ISO-8859-5   see ISO_8859-5:1988 below   [169,NSB]
    ISO-8859-6   see ISO_8859-6:1987 below   [169,NSB]
    ISO-8859-7   see ISO_8859-7:1987 below   [169,NSB]

ISO-8859-8 see ISO_8859-8:1988 below   [169,NSB]
ISO-8859-9 see ISO_8859-9:1989 below   [169,NSB]

Access Types

Type	Description	Reference
FTP		[169,NSB]
ANON-FTP		[169,NSB]
TFTP		[169,NSB]
AFS		[169,NSB]
LOCAL-FILE		[169,NSB]
MAIL-SERVER		[169,NSB]

Conversion Values

Conversion values orContentTransfer Encodings.

Type	Description	Reference
7BIT		[169,NSB]
8BIT		[169,NSB]
BASE64		[169,NSB]
BINARY		[169,NSB]
QUOTED-PRINTABLE		[169,NSB]

CHARACTERSETS

```
Character Set        Reference
-------------        ---------
ISO_646.basic:1983      [170,KXS2]
INVARIANT       [170,KXS2]
ISO_646.irv:1983        [170,KXS2]
BS_4730         [170,KXS2]
ANSI_X3.4-1968      [170,KXS2]
NATS-SEFI       [170,KXS2]
NATS-SEFI-ADD       [170,KXS2]
NATS-DANO       [170,KXS2]
NATS-DANO-ADD       [170,KXS2]
SEN_850200_B        [170,KXS2]
SEN_850200_C        [170,KXS2]
JIS_C6220-1969-jp       [170,KXS2]
JIS_C6220-1969-ro       [170,KXS2]
IT      [170,KXS2]
PT      [170,KXS2]
ES      [170,KXS2]
greek7-old      [170,KXS2]
latin-greek     [170,KXS2]
DIN_66003       [170,KXS2]
NF_Z_62-010_(1973)      [170,KXS2]
Latin-greek-1       [170,KXS2]
ISO_5427        [170,KXS2]
JIS_C6226-1978      [170,KXS2]
BS_viewdata     [170,KXS2]
INIS        [170,KXS2]
INIS-8      [170,KXS2]
INIS-cyrillic       [170,KXS2]
ISO_5427:1981       [170,KXS2]
ISO_5428:1980       [170,KXS2]
GB_1988-80      [170,KXS2]
GB_2312-80      [170,KXS2]
NS_4551-1       [170,KXS2]
NS_4551-2       [170,KXS2]
NF_Z_62-010     [170,KXS2]
videotex-suppl      [170,KXS2]
PT2     [170,KXS2]
ES2     [170,KXS2]
MSZ_7795.3      [170,KXS2]
JIS_C6226-1983      [170,KXS2]
greek7      [170,KXS2]
ASMO_449        [170,KXS2]
iso-ir-90       [170,KXS2]
JIS_C6229-1984-a        [170,KXS2]
JIS_C6229-1984-b        [170,KXS2]
```

```
JIS_C6229-1984-b-add      [170,KXS2]
JIS_C6229-1984-hand       [170,KXS2]
JIS_C6229-1984-hand-add   [170,KXS2]
JIS_C6229-1984-kana       [170,KXS2]
ISO_2033-1983      [170,KXS2]
ANSI_X3.110-1983      [170,KXS2]
ISO_8859-1:1987      [170,KXS2]
ISO_8859-2:1987      [170,KXS2]
T.61-7bit      [170,KXS2]
T.61-8bit      [170,KXS2]
ISO_8859-3:1988      [170,KXS2]
ISO_8859-4:1988      [170,KXS2]
ECMA-cyrillic      [170,KXS2]
CSA_Z243.4-1985-1      [170,KXS2]
CSA_Z243.4-1985-2      [170,KXS2]
CSA_Z243.4-1985-gr      [170,KXS2]
ISO_8859-7:1987      [170,KXS2]
ISO_8859-6:1987      [170,KXS2]
T.101-G2      [170,KXS2]
ISO_8859-8:1988      [170,KXS2]
CSN_369103      [170,KXS2]
JUS_I.B1.002      [170,KXS2]
ISO_6937-2-add      [170,KXS2]
IEC_P27-1      [170,KXS2]
ISO_8859-5:1988      [170,KXS2]
JUS_I.B1.003-serb      [170,KXS2]
JUS_I.B1.003-mac      [170,KXS2]
ISO_8859-9:1989      [170,KXS2]
KS_C_5601-1987      [170,KXS2]
greek-ccitt      [170,KXS2]
NC_NC00-10:81      [170,KXS2]
ISO_6937-2-25      [170,KXS2]
GOST_19768-74      [170,KXS2]
ISO_8859-supp      [170,KXS2]
ISO_10367-box      [170,KXS2]
latin6      [170,KXS2]
latin-lap      [170,KXS2]
JIS_X0212-1990      [170,KXS2]
DS_2089      [170,KXS2]
us-dk      [170,KXS2]
dk-us      [170,KXS2]
JIS_X0201      [170,KXS2]
KSC5636      [170,KXS2]
DEC-MCS      [170,KXS2]
hp-roman8      [170,KXS2]
macintosh      [170,KXS2]
IBM037      [170,KXS2]
IBM038      [170,KXS2]
```

```
IBM273       [170,KXS2]
IBM274       [170,KXS2]
IBM275       [170,KXS2]
IBM277       [170,KXS2]
IBM278       [170,KXS2]
IBM280       [170,KXS2]
IBM281       [170,KXS2]
IBM284       [170,KXS2]
IBM285       [170,KXS2]
IBM290       [170,KXS2]
IBM297       [170,KXS2]
IBM420       [170,KXS2]
IBM423       [170,KXS2]
IBM424       [170,KXS2]
IBM437       [170,KXS2]
IBM500       [170,KXS2]
IBM850       [170,KXS2]
IBM851       [170,KXS2]
IBM852       [170,KXS2]
IBM855       [170,KXS2]
IBM857       [170,KXS2]
IBM860       [170,KXS2]
IBM861       [170,KXS2]
IBM862       [170,KXS2]
IBM863       [170,KXS2]
IBM864       [170,KXS2]
IBM865       [170,KXS2]
IBM868       [170,KXS2]
IBM869       [170,KXS2]
IBM870       [170,KXS2]
IBM871       [170,KXS2]
IBM880       [170,KXS2]
IBM891       [170,KXS2]
IBM903       [170,KXS2]
IBM904       [170,KXS2]
IBM905       [170,KXS2]
IBM918       [170,KXS2]
IBM1026      [170,KXS2]
EBCDIC-AT-DE      [170,KXS2]
EBCDIC-AT-DE-A     [170,KXS2]
EBCDIC-CA-FR      [170,KXS2]
EBCDIC-DK-NO      [170,KXS2]
EBCDIC-DK-NO-A     [170,KXS2]
EBCDIC-FI-SE      [170,KXS2]
EBCDIC-FI-SE-A     [170,KXS2]
EBCDIC-FR      [170,KXS2]
EBCDIC-IT      [170,KXS2]
EBCDIC-PT      [170,KXS2]
```

```
EBCDIC-ES        [170,KXS2]
EBCDIC-ES-A       [170,KXS2]
EBCDIC-ES-S       [170,KXS2]
EBCDIC-UK        [170,KXS2]
EBCDIC-US        [170,KXS2]
```

MACHINE NAMES

These are the Official Machine Namesas theyappear in the Domain Name
System HINFOrecordsand theNIC Host Table. Their use is describedin
RFC-952 [53].

A machine name or CPU type may be upto 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 witha letter
or digit.

```
ALTO     DEC-1080
ALTOS-6800     DEC-1090
AMDAHL-V7     DEC-1090B
APOLLO     DEC-1090T
ATARI-104ST     DEC-2020T
ATT-3B1     DEC-2040
ATT-3B2     DEC-2040T
ATT-3B20     DEC-2050T
ATT-7300     DEC-2060
BBN-C/60     DEC-2060T
BURROUGHS-B/29     DEC-2065
BURROUGHS-B/4800     DEC-FALCON
BUTTERFLY     DEC-KS10
C/30     DEC-VAX-11730
C/70     DORADO
CADLINC     DPS8/70M
CADR     ELXSI-6400
CDC-170     EVEREX-386
CDC-170/750     FOONLY-F2
CDC-173     FOONLY-F3
CELERITY-1200     FOONLY-F4
CLUB-386     GOULD
COMPAQ-386/20     GOULD-6050
COMTEN-3690     GOULD-6080
CP8040     GOULD-9050
CRAY-1     GOULD-9080
CRAY-X/MP     H-316
CRAY-2     H-60/68
CTIWS-117     H-68
DANDELION     H-68/80
DEC-10     H-89
DEC-1050     HONEYWELL-DPS-6
DEC-1077     HONEYWELL-DPS-8/70
```

```
        HP3000      ONYX-Z8000
        HP3000/64      PDP-11
        IBM-158      PDP-11/3
        IBM-360/67      PDP-11/23
        IBM-370/3033      PDP-11/24
        IBM-3081      PDP-11/34
        IBM-3084QX      PDP-11/40
        IBM-3101      PDP-11/44
        IBM-4331      PDP-11/45
        IBM-4341      PDP-11/50
        IBM-4361      PDP-11/70
        IBM-4381      PDP-11/73
        IBM-4956      PE-7/32
        IBM-6152      PE-3205
        IBM-PC      PERQ
        IBM-PC/AT      PLEXUS-P/60
        IBM-PC/RT      PLI
        IBM-PC/XT      PLURIBUS
        IBM-SERIES/1      PRIME-2350
        IMAGEN      PRIME-2450
        IMAGEN-8/300      PRIME-2755
        IMSAI      PRIME-9655
        INTEGRATED-SOLUTIONS      PRIME-9755
        INTEGRATED-SOLUTIONS-68K      PRIME-9955II
        INTEGRATED-SOLUTIONS-CREATOR      PRIME-2250
        INTEGRATED-SOLUTIONS-CREATOR-8      PRIME-2655
        INTEL-386      PRIME-9955
        INTEL-IPSC      PRIME-9950
        IS-1      PRIME-9650
        IS-68010      PRIME-9750
        LMI      PRIME-2250
        LSI-11      PRIME-750
        LSI-11/2      PRIME-850
        LSI-11/23      PRIME-550II
        LSI-11/73      PYRAMID-90
        M68000      PYRAMID-90MX
        MAC-II      PYRAMID-90X
        MASSCOMP      RIDGE
        MC500      RIDGE-32
        MC68000      RIDGE-32C
        MICROPORT      ROLM-1666
        MICROVAX      S1-MKIIA
        MICROVAX-I      SMI
        MV/8000      SEQUENT-BALANCE-8000
        NAS3-5      SIEMENS
        NCR-COMTEN-3690      SILICON-GRAPHICS
        NEXT/N1000-316      SILICON-GRAPHICS-IRIS
        NOW      SGI-IRIS-2400
```

```
SGI-IRIS-2500       SUN-3/50
SGI-IRIS-3010       SUN-3/60
SGI-IRIS-3020       SUN-3/75
SGI-IRIS-3030       SUN-3/80
SGI-IRIS-3110       SUN-3/110
SGI-IRIS-3115       SUN-3/140
SGI-IRIS-3120       SUN-3/150
SGI-IRIS-3130       SUN-3/160
SGI-IRIS-4D/20      SUN-3/180
SGI-IRIS-4D/20G     SUN-3/200
SGI-IRIS-4D/25      SUN-3/260
SGI-IRIS-4D/25G     SUN-3/280
SGI-IRIS-4D/25S     SUN-3/470
SGI-IRIS-4D/50      SUN-3/480
SGI-IRIS-4D/50G     SUN-4/60
SGI-IRIS-4D/50GT    SUN-4/110
SGI-IRIS-4D/60      SUN-4/150
SGI-IRIS-4D/60G     SUN-4/200
SGI-IRIS-4D/60T     SUN-4/260
SGI-IRIS-4D/60GT    SUN-4/280
SGI-IRIS-4D/70      SUN-4/330
SGI-IRIS-4D/70G     SUN-4/370
SGI-IRIS-4D/70GT    SUN-4/390
SGI-IRIS-4D/80GT    SUN-50
SGI-IRIS-4D/80S     SUN-100
SGI-IRIS-4D/120GTX    SUN-120
SGI-IRIS-4D/120S    SUN-130
SGI-IRIS-4D/210GTX    SUN-150
SGI-IRIS-4D/210S    SUN-170
SGI-IRIS-4D/220GTX    SUN-386i/250
SGI-IRIS-4D/220S    SUN-68000
SGI-IRIS-4D/240GTX    SYMBOLICS-3600
SGI-IRIS-4D/240S    SYMBOLICS-3670
SGI-IRIS-4D/280GTX    SYMMETRIC-375
SGI-IRIS-4D/280S    SYMULT
SGI-IRIS-CS/12      TANDEM-TXP
SGI-IRIS-4SERVER-8    TANDY-6000
SPERRY-DCP/10       TEK-6130
SUN     TI-EXPLORER
SUN-2       TP-4000
SUN-2/50        TRS-80
SUN-2/100       UNIVAC-1100
SUN-2/120       UNIVAC-1100/60
SUN-2/130       UNIVAC-1100/62
SUN-2/140       UNIVAC-1100/63
SUN-2/150       UNIVAC-1100/64
SUN-2/160       UNIVAC-1100/70
SUN-2/170       UNIVAC-1160
```

```
        UNKNOWN
        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
        WYSE-386
        XEROX-1108
        XEROX-8010
        ZENITH-148
```

SYSTEM NAMES

These are the Official System Names as they appear in the Domain Name
System HINFOrecordsand theNIC Host Table. Their use is described
in RFC-952 [53].

A system name may beup to 40 characters taken from the set of upper-
caseletters, digits, and the three punctuation characters hyphen,
period, and slash. It must start with a letter, andend with a
letter or digit.

```
AEGIS      LISP       SUN OS 3.5
APOLLO     LISPM       SUN OS 4.0
AIX/370    LOCUS       SWIFT
AIX-PS/2    MACOS       TAC
BS-2000    MINOS       TANDEM
CEDAR    MOS       TENEX
CGW     MPE5      TOPS10
CHORUS     MSDOS        TOPS20
CHRYSALIS     MULTICS        TOS
CMOS     MUSIC      TP3010
CMS     MUSIC/SP       TRSDOS
COS     MVS      ULTRIX
CPIX     MVS/SP      UNIX
CTOS     NEXUS      UNIX-BSD
CTSS     NMS      UNIX-V1AT
DCN     NONSTOP      UNIX-V
DDNOS     NOS-2      UNIX-V.1
DOMAIN     NTOS      UNIX-V.2
DOS     OS/DDP      UNIX-V.3
EDX     OS/2      UNIX-PC
ELF     OS4      UNKNOWN
EMBOS     OS86      UT2D
EMMOS     OSX      V
EPOS     PCDOS      VM
FOONEX     PERQ/OS       VM/370
FUZZ     PLI      VM/CMS
GCOS     PSDOS/MIT       VM/SP
GPOS     PRIMOS      VMS
HDOS     RMX/RDOS        VMS/EUNICE
IMAGEN     ROS      VRTX
INTERCOM     RSX11M       WAITS
IMPRESS     RTE-A      WANG
INTERLISP     SATOPS       WIN32
IOS     SCO-XENIX/386       X11R3
IRIX     SCS      XDE
ISI-68020     SIMP       XENIX
ITS     SUN
```

PROTOCOL AND SERVICE NAMES

   These are the Official Protocol Names as they appearin the Domain
   NameSystem WKS records and the NIC Host Table. Their use is
   described inRFC-952[53].

   A protocol or service may beup to 40 characters taken from the set
   of uppercaseletters, digits, and the punctuation character hyphen.
   It must start with aletter,and endwith a letter or digit.

```
   ARGUS         - ARGUS Protocol
   ARP          - Address Resolution Protocol
   AUTH         - AuthenticationService
   BBN-RCC-MON        - BBN RCC Monitoring
   BL-IDM        - Britton Lee Intelligent Database Machine
   BOOTP        - Bootstrap Protocol
   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 SYSMAINT
   CLOCK        - DCNET Time Server Protocol
   CMOT         - CommonMgmnt Info Ser and Protover TCP/IP
   COOKIE-JAR          - AuthenticationScheme
   CSNET-NS         - CSNET Mailbox Nameserver Protocol
   DAYTIME         - Daytime Protocol
   DCN-MEAS         - DCN Measurement Subsystems Protocol
   DCP        - DeviceControlProtocol
   DGP        - Dissimilar Gateway Protocol
   DISCARD         - Discard Protocol
   DMF-MAIL          - DigestMessageFormat for Mail
   DOMAIN        - DomainName System
   ECHO         - Echo Protocol
   EGP         - Exterior Gateway Protocol
   EHF-MAIL          - Encoding Header Field for Mail
   EMCON         - Emission Control Protocol
   EMFIS-CNTL         - EMFIS Control Service
   EMFIS-DATA         - EMFIS Data Service
   FINGER         - FingerProtocol
   FTP         - File Transfer Protocol
   FTP-DATA          - File Transfer ProtocolData
   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 GroupManagement Protocol
IGP       - Interior Gateway Protocol
IMAP2      - Interim Mail Access Protocol version 2
INGRES-NET       - INGRES-NET Service
IP      - Internet Protocol
IPCU       - Internet Packet Core Utility
IPPC       - Internet Pluribus Packet Core
IP-ARC      - Internet Protocol on ARCNET
IP-ARPA      - Internet Protocol on ARPANET
IP-CMPRS      - Compressing TCP/IP Headers
IP-DC      - Internet Protocol on DC Networks
IP-DVMRP      - Distance Vector Multicast Routing Protocol
IP-E      - Internet Protocol on Ethernet Networks
IP-EE      - Internet Protocol on Exp. Ethernet Nets
IP-FDDI      - Transmission of IP over FDDI
IP-HC      - Internet Protocol on Hyperchannnel
IP-IEEE      - Internet Protocol on IEEE 802
IP-IPX      - Transmission of 802.2 over IPXNetworks
IP-MTU      - IP MTUDiscovery Options
IP-NETBIOS      - Internet Protocol overNetBIOSNetworks
IP-SLIP      - Transmission of IP over SerialLines
IP-WB      - Internet Protocol on Wideband Network
IP-X25      - Internet Protocol on X.25 Networks
IRTP      - Internet Reliable Transaction Protocol
ISI-GL      - ISI Graphics Language Protocol
ISO-TP4      - ISO Transport ProtocolClass 4
ISO-TSAP      - ISO TSAP
LA-MAINT      - IMP Logical Address Maintenance
LARP      - Locus Address Resoultion Protocol
LDP      - LoaderDebugger Protocol
LEAF-1      - Leaf-1Protocol
LEAF-2      - Leaf-2Protocol
LINK      - Link Protocol
LOC-SRV      - Location Service
LOGIN      - Login Host Protocol
MAIL      - Formatof Electronic Mail Messages
MERIT-INP      - MERIT Internodal Protocol
METAGRAM      - Metagram Relay
MIB      - Management InformationBase
MIT-ML-DEV      - MIT MLDevice
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        - RemoteJob Service
NI-FTP        - NI File Transfer Protocol
NI-MAIL        - NI Mail Protocol
NICNAME        - Who IsProtocol
NFILE        - A FileAccess Protocol
NNTP        - Network News Transfer Protocol
NSW-FE        - NSW User System Front End
NTP        - Network Time Protocol
NVP-II        - Network Voice Protocol
OSPF        - Open Shortest Path First Interior GW Protocol
PCMAIL        - PcmailTransport Protocol
POP2        - Post Office Protocol -Version2
POP3        - Post Office Protocol -Version3
PPP        - Point-to-PointProtocol
PRM        - PacketRadio Measurement
PUP        - PUP Protocol
PWDGEN        - Password Generator Protocol
QUOTE        - Quote of the Day Protocol
RARP        - A Reverse Address Resolution Protocol
RATP        - Reliable Asynchronous TransferProtocol
RE-MAIL-CK        - RemoteMail Checking Protocol
RDP        - Reliable Data Protocol
RIP        - Routing Information Protocol
RJE        - RemoteJob Entry
RLP        - Resource Location Protocol
RTELNET        - RemoteTelnet Service
RVD        - RemoteVirtualDisk Protocol
SAT-EXPAK        - Satnetand Backroom EXPAK
SAT-MON        - SATNETMonitoring
SEP        - Sequential Exchange Protocol
SFTP        - SimpleFile Transfer Protocol
SGMP        - SimpleGatewayMonitoring Protocol
SNMP        - SimpleNetworkManagement Protocol
SMI        - Structure of Management Information
SMTP        - SimpleMail Transfer Protocol
SQLSRV        - SQL Service
ST        - StreamProtocol
STATSRV        - Statistics Service
```

```
     SU-MIT-TG        - SU/MITTelnet Gateway Protocol
     SUN-RPC         - SUN Remote Procedure Call
     SUPDUP        - SUPDUPProtocol
     SUR-MEAS         - SurveyMeasurement
     SWIFT-RVF         - RemoteVirtualFile Protocol
     TACACS-DS         - TACACS-Database Service
     TACNEWS        - TAC News
     TCP        - Transmission Control Protocol
     TCP-ACO         - TCP Alternate ChecksumOption
     TELNET          - TelnetProtocol
     TFTP        - Trivial File Transfer Protocol
     THINWIRE         - Thinwire Protocol
     TIME        - Time Server Protocol
     TP-TCP         - ISO Transport Service on top of the TCP
     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         - ActiveUsers Protocol
     UUCP-PATH          - UUCP Path Service
     VIA-FTP         - VIA Systems-File Transfer Protocol
     VISA         - VISA Protocol
     VMTP        - Versatile Message Transaction 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 TerminalType Names. Their use is described in
RFC-930[128].The maximum length of aname is40 characters.

A terminal names may beup to 40 characters taken from the set of upper-
case letters, digits, and the two punctuation characters hyphenand
slash.It muststart with a letter, and end with a letter or digit.

```
    ADDS-CONSUL-980 DATAMEDIA-1521
    ADDS-REGENT-100 DATAMEDIA-2500
    ADDS-REGENT-20 DATAMEDIA-3025
    ADDS-REGENT-200 DATAMEDIA-3025A
    ADDS-REGENT-25 DATAMEDIA-3045
    ADDS-REGENT-40 DATAMEDIA-3045A
    ADDS-REGENT-60 DATAMEDIA-DT80/1
    ADDS-VIEWPOINT DATAPOINT-2200
    ADDS-VIEWPOINT-60 DATAPOINT-3000
    AED-512 DATAPOINT-3300
    AMPEX-DIALOGUE-210 DATAPOINT-3360
    AMPEX-DIALOGUE-80 DEC-DECWRITER-I
    AMPEX-210 DEC-DECWRITER-II
    AMPEX-230 DEC-GIGI
    ANDERSON-JACOBSON-510 DEC-GT40
    ANDERSON-JACOBSON-630 DEC-GT40A
    ANDERSON-JACOBSON-832 DEC-GT42
    ANDERSON-JACOBSON-841 DEC-LA120
    ANN-ARBOR-AMBASSADOR DEC-LA30
    ANSI DEC-LA36
    ARDS DEC-LA38
    BITGRAPH DEC-VT05
    BUSSIPLEXER DEC-VT100
    CALCOMP-565 DEC-VT101
    CDC-456 DEC-VT102
    CDI-1030 DEC-VT125
    CDI-1203 DEC-VT131
    C-ITOH-101 DEC-VT132
    C-ITOH-50 DEC-VT200
    C-ITOH-80 DEC-VT220
    CLNZ DEC-VT240
    COMPUCOLOR-II DEC-VT241
    CONCEPT-100 DEC-VT300
    CONCEPT-104 DEC-VT320
    CONCEPT-108 DEC-VT340
    DATA-100 DEC-VT50
    DATA-GENERAL-6053 DEC-VT50H
    DATAGRAPHIX-132A DEC-VT52
    DATAMEDIA-1520 DEC-VT55
```

```
   DEC-VT61 HP-2626
   DEC-VT62 HP-2626A
   DELTA-DATA-5000 HP-2626P
   DELTA-DATA-NIH-7000 HP-2627
   DELTA-TELTERM-2 HP-2640
   DIABLO-1620 HP-2640A
   DIABLO-1640 HP-2640B
   DIGILOG-333 HP-2645
   DTC-300S HP-2645A
   DTC-382 HP-2648
   EDT-1200 HP-2648A
   EXECUPORT-4000 HP-2649
   EXECUPORT-4080 HP-2649A
   FACIT-TWIST-4440 IBM-1050
   FREEDOM-100 IBM-2741
   FREEDOM-110 IBM-3101
   FREEDOM-200 IBM-3101-10
   GENERAL-TERMINAL-100A IBM-3151
   GENERAL-TERMINAL-101 IBM-3179-2
   GIPSI-TX-M IBM-3180-2
   GIPSI-TX-ME IBM-3196-A1
   GIPSI-TX-C4 IBM-3275-2
   GIPSI-TX-C8 IBM-3276-2
   GSI IBM-3276-3
   HAZELTINE-1420 IBM-3276-4
   HAZELTINE-1500 IBM-3277-2
   HAZELTINE-1510 IBM-3278-2
   HAZELTINE-1520 IBM-3278-3
   HAZELTINE-1552 IBM-3278-4
   HAZELTINE-2000 IBM-3278-5
   HAZELTINE-ESPRIT IBM-3279-2
   HITACHI-5601 IBM-3279-3
   HITACHI-5603 IBM-3477-FC
   HITACHI-5603E IBM-3477-FG
   HITACHI-5603EA IBM-5081
   HITACHI-560X IBM-5151
   HITACHI-560XE IBM-5154
   HITACHI-560XEA IBM-5251-11
   HITACHI-560PR IBM-5291-1
   HITACHI-HOAP1 IBM-5292-2
   HITACHI-HOAP2 IBM-5555-B01
   HITACHI-HOAP3 IBM-5555-C01
   HITACHI-HOAP4 IBM-6153
   HP-2392 IBM-6154
   HP-2621 IBM-6155
   HP-2621A IBM-AED
   HP-2621P IBM-3278-2-E
   HP-2623 IBM-3278-3-E
```

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    IBM-3278-4-E TEC
    IBM-3278-5-E TEKTRONIX-4006
    IBM-3279-2-E TEKTRONIX-4010
    IBM-3279-3-E TEKTRONIX-4012
    IMLAC TEKTRONIX-4013
    INFOTON-100 TEKTRONIX-4014
    INFOTON-400 TEKTRONIX-4023
    INFOTONKAS TEKTRONIX-4024
    ISC-8001 TEKTRONIX-4025
    LSI-ADM-1 TEKTRONIX-4027
    LSI-ADM-11 TEKTRONIX-4105
    LSI-ADM-12 TEKTRONIX-4107
    LSI-ADM-2 TEKTRONIX-4110
    LSI-ADM-20 TEKTRONIX-4112
    LSI-ADM-22 TEKTRONIX-4113
    LSI-ADM-220 TEKTRONIX-4114
    LSI-ADM-3 TEKTRONIX-4115
    LSI-ADM-31 TEKTRONIX-4125
    LSI-ADM-3A TEKTRONIX-4404
    LSI-ADM-42 TELERAY-1061
    LSI-ADM-5 TELERAY-3700
    MEMOREX-1240 TELERAY-3800
    MICROBEE TELETEC-DATASCREEN
    MICROTERM-ACT-IV TELETERM-1030
    MICROTERM-ACT-V TELETYPE-33
    MICROTERM-ERGO-301 TELETYPE-35
    MICROTERM-MIME-1 TELETYPE-37
    MICROTERM-MIME-2 TELETYPE-38
    MICROTERM-ACT-5A TELETYPE-40
    MICROTERM-TWIST TELETYPE-43
    NEC-5520 TELEVIDEO-910
    NETRONICS TELEVIDEO-912
    NETWORK-VIRTUAL-TERMINAL TELEVIDEO-920
    OMRON-8025AG TELEVIDEO-920B
    PERKIN-ELMER-550 TELEVIDEO-920C
    PERKIN-ELMER-1100 TELEVIDEO-925
    PERKIN-ELMER-1200 TELEVIDEO-955
    PERQ TELEVIDEO-950
    PLASMA-PANEL TELEVIDEO-970
    QUME-SPRINT-5 TELEVIDEO-975
    QUME-101 TERMINET-1200
    QUME-102 TERMINET-300
    SOROC TI-700
    SOROC-120 TI-733
    SOUTHWEST-TECHNICAL-PRODUCTS-CT82 TI-735
    SUN TI-743
    SUPERBEE TI-745
    SUPERBEE-III-M TI-800
```

        TYCOM
        UNIVAC-DCT-500
        VIDEO-SYSTEMS-1200
        VIDEO-SYSTEMS-5000
        VOLKER-CRAIG-303
        VOLKER-CRAIG-303A
        VOLKER-CRAIG-404
        VISUAL-200
        VISUAL-55
        WYSE-30
        WYSE-50
        WYSE-60
        WYSE-75
        WYSE-85
        XEROX-1720
        XTERM
        ZENITH-H19
        ZENITH-Z29
        ZENTEC-30

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Security Considerations

    Security issues are not discussed inthis memo.

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