Protocol Information

This file contains information on the various protocols in the ARPA Network. An effort will be made to keep the information current, but this depends on the cooperation of the users of this file to convey any information about protocol developments, or corrections to this information to Jon Postel at SRI-ARC.

This is a compendium of all the protocol related activity and most of this activity is with experimental protocols, for those protocols which are official standards the designation "[Official]" will be appended to the name.

Much of the documentation of protocols appears as Requests for Comments (RFCs) and many of these are available on line. When a document is accessible on line a pointer to that source will be given. Also note that recent RFCs are on line at Office-1 in directory <NETINFO> with names of the form RFCnnn.TXT where nnn is replaced by the RFC number.

This file is on line as:

Pathname: /SRI-ARC/<POSTEL>PROTOCOL-INFORMATION.TXT

and also /SRI-ARC/<POSTEL>PROTOCOL-INFORMATION.NLS
IMP-IMP

Surface

Contact:

McKenzie, Alex. (MCKENZIE@BBN)

Documents:


People:

John McQuillan (MCQUILLAN@BBN)

Schedule:

Recent developments:

Satellite

Contact:

Randy Rettberg (RETBERG@BBN)

Documents:

People:

Kahn, Robert. (KAN@ISI)

Schedule:

Recent developments:
IMP-HOST

IMP-Host (Official)

Contact:

Mckenzie, A. (Mckenzie@BBN)

Documents:


McQuillan, J. "Host Alive/Dead Logic," BBN Memorandum to Technical Liaisons, 16-July-74.


People:

Mckenzie (MCKENZIE@BBN)
Walden (WALDEN@BBN)
Postel (POSTEL@SRI-ARC)
Burchfield (BURCHFIELD@BBN)
McQuillan (MCQUILLAN@BBN)

Schedule:

Recent developments:

The "link number" field has been extended from 8 to 12 bits and renamed the "message identification" field.

Message type 6 now is used to indicate a reason for a type 7 (destination dead) message. (See BBN1022).

There has been some recent changes to the Ready line interpretation by the IMP for deciding the alive/dead status of a host.

Important changes to the IMP and IMP/HOST Interface announced in RFC 660 23-Oct-74.
HOST-HOST

ncp - standard host-to-host (Official)

Contact:

Postel, Jon. (POSTEL@SRI-ARC)

Documents:


People:

Postel, Jon. (POSTEL@SRI-ARC)

McKenzie, Alex. (MCKENZIE@BBN)

Schedule:

Recent developments:

ncp - standard host-to-host (Experimental)

Contact:

Postel, Jon. (POSTEL@SRI-ARC)

Documents:


People:

Postel, Jon. (POSTEL@SRI-ARC)

McKenzie, Alex. (MCKENZIE@BBN)

Burchfiel, Jerry (Burchfiel@BBN)

Valgen, Dave (WALDEN@BBN)

Schedule:
Recent developments:

The BBN TIP and TENEX groups have specified and are implementing additional protocol commands with the intention of providing better reliability and survivability over system malfunctions. The additional protocol commands are for cleaning up partly closed connections and resynchronizing the allocation values on open connections. (See RFC 636).

tcp - Transmission Control Protocol

Contact:

Cerf, Vint. (CERF@ISI)

Documents:


/parc-maxc/cerf/TOPSPEC3.NLS


/ISI/CERF>TCP-CHANGES.

People:

Cerf at SU-DSL

Tomlinson at BBN

Kirstein at London

Postel at SRI-ARC

Schedule:

Some experiments now running.
implementation of full protocol to begin by 15-Oct-74.

Recent developments:

Specification completed August 4th, but some work still in progress on handling of single message conversations. A new sequencing scheme (proposed by Tomlinson) may be utilized. The addressing field is now used as 4 bit format, 8 bit network, 16 bit TCP, and 24 bit process/port.

Crocker has suggested a 64 bit path address to be parsed and reformatted by the gateways along the route. There is reluctance to experiment with too many things at once though.
(28-Oct-74) A file indicating some of the changes in the specifications since the 5-Aug-74 document is now available as [ISI]<CRF> TCP-CHANGES. The areas of change are "Initial Sequence Number", "Socket definition", "Additional User System Calls", Packet Format", and "Discussion of opening and closing (SYN, RST)".

(23-Nov-74) Specifications for test implementation are now said to be ready on 1-Dec-74, and a implementation completed by 1-Feb-74.

nvp = Network Voice Protocol

Contact:

Cohen, Danny. (COHEN@ISI)

Documents:

The current specification is in an on-line file at ISI in the directory voice as nvp.lst.

pathname = [ISI]<voice>nvp.lst

"Specifications for the Network Voice Protocol (NVP)" NSC Note 43

people:

Recent developments:


"Specifications for the Network Voice Protocol (NVP)" NSC Note 43

Packet radio

Contact:

Kahn, Robert. (KAHN@ISI)

Documents:

People:

Schedule:

Recent developments:

Network Debugging Protocol

Contact:
Eric Mader (Mader@BBN)

Documents:


People:

Schedule:

Recent Developments:

This is a protocol for a PDP-11 cross-network debugger.
HOST-FRONTEND

Host-Front End

Contact:

Michael Padlipsky (MAP@CASE-10)

Documents:


[Office-1/NETINFO>RFC647.TXT

People:

Padlipsky at MITRE Washington (MAP@CASE-10)

Postel at SRI-ARC (POSTEL@SRI-ARC)

McConnell at Iliac (JOHN@Iliac-TENEX)

Schedule:

Recent developments:

This is a suggested simple protocol for connecting host to front end computers which are in turn connected to the network.
IOP - Initial Connection Protocol (Official)

Contact:
Postel, Jon. (POSTEL@SRI-ARC)

Documents:

People:
Postel at SRI-ARC

Schedule:
Recent developments:

Old Telnet

Contact:
Postel, Jon. (POSTEL@SRI-ARC)

Documents:

People:
Schedule:
Recent developments:

New Telnet (Official)

Contact:
Postel at SRI-ARC

Documents:
NIC 18639 "TELNET Protocol Specifications" AUG 73
NIC 18640 "Telnet Option Specification" Aug '73

Telnet Options

NIC 15389 "Binary Transmission"
NIC 15390 "Echo"
NIC 15391 Reconnection"
NIC 15392 "Suppress Go Ahead Option"
NIC 15393 "Approximate Message Size Negotiation"

[Office-1]<NETINFO>RFC651.TXT

NIC 16236 "Timing Mark"
NIC 19859 "Remote Controlled Transmission and Echoing" 1-Nov-73.
NIC 20196 "Output Line Width" 13-Nov-73.
NIC 20197 "Output Page Size" 13-Nov-73.

[Office-1]<NETINFO>RFC652.TXT

NIC 31156 "Output Horizontal Tab Stops" RFC 653 25-Oct-74.

[Office-1]<NETINFO>RFC653.TXT


[Office-1]<NETINFO>RFC654.TXT

NIC 31156 "Output Form Feed Disposition" RFC 655 25-Oct-74.

[Office-1]<NETINFO>RFC655.TXT

NIC 31159 "Output Vertical Tab Stops" RFC 656 25-Oct-74.

[Office-1]<NETINFO>RFC656.TXT

Protocol Information

Office-1\NETINFO\RFC657.TXT

NIC 31161 "Output Line Feed Disposition" RFC 658

Office-1\NETINFO\RFC658.TXT

NIC 16239 "Extended Options List"

People:

Jon Postel at Sri-Arc (POSTEL@SRI-ARC)
Alex McKenzie at BBN (MCKENZIE@BBN)
Doug Dodds at BBN (DODDS@BBN)
Dave Crocker at UCLA-NMC (DCROCKER@ISI)
Kurt Barthelmes at UCSD (BOWLES@ISI)

Schedule:

All hosts were to have been running the new Telnet (both
user and server) by 1 January 1974.

Recent developments:

A significant number of server systems now have new telnet
implementations. (See RFC 702).

Note: the server program is to be available on socket 23
decimal (27 octal).

The Status Option has been revised to take advantage of the
Subcommand feature and to reduce the amount of data
transmitted to report the option status.

Seven new options have been defined to allow control of the
format effectors Carriage Return, Line Feed, Form Feed,
Horizontal Tab, and Vertical Tab.

FTP

Old File Transfer

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:

McKenzie, A. "File Transfer Protocol," NIC 14333, RFC 454,
16-Feb-73.
Recent developments:

New File Transfer

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:


People:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Nancy Neigus at BBN (NEIGUS@BBN)

Ken Pogran at MIT-Multics (Pogran.P@MIT-Multics)

Wayne Hathaway at NASA Ames (Hathaway@AMES-67)

Mark Krilnovich at UCSB (Krilanovich@UCSB-MOD75)

Kurt Barthelmess at UCSD (BOWLES@ISI)

Schedule:

Recent developments:

Patnames

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:


People:

Dave Crocker at UCLA-NMC (DCROCKER@ISI)

Schedule:
Recent developments:

File Access Protocol

Contact:

John Day (Day.CAC@MIT-Multics)

Documents:


People:

Ken Pogran (Pogran.CompNet@MIT-Multics)

Schedule:

Recent developments:

Mail

Current Mail

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:

page 26 of RFC 454 (see old file transfer).

Bhusnan, A. "Standardizing Network Mail headers," NIC 10516, RFC 561, 5-Sep-73


People:

Julie Sussman at bbn (SUSSMAN@BBN)

Bob Thomas at bbn (BTHOMAS@BBN)

Schedule:

Recent developments:

Concern over the authentication of the author of network
messages has led to the concept of an authorized mail sending process (see RFC 644).

Proposed Mail

Contact:

Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:


People:

Jim White at SRI-ARC (WHITE@SRI-ARC)

Postel at SRI-ARC (POSTEL@SRI-ARC)

Schedule:

Recent developments:

RJE - Remote Job Entry

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

Documents:


People:

Schedule:

Recent developments:

RJS - CCNs Remote Job Service

Contact:
Robert Braden at UCLA-CON (BRADEN@UCLA-CON)

Documents:

- Braden, R. "Interim NETRJS Specification," RFC 18@nic @july-71.

People:

- Robert Braden (BRADEN@UCLA-CON)
- Steve Wolfe (WOLFE@UCLA-CON)

Schedule:

Recent developments:

Graphics

Contact:

Robert Sproull (SPROULL@PARC-MAXC)

Documents:


People:

- Robert Sproull (SPROULL@PARC-MAXC)
- Elaine Thomas (Thomas@MIT-Multics)
- James Michener at MIT-DMS (JCM@MIT-DMS)

Schedule:

Recent developments:

New document available from Robert Sproull.

Data Reconfiguration Service

Contact:

Jon Postel at SRI-ARC (POSTEL@SRI-ARC)

documents:

Peah, "Data Reconfiguration Service at UCSB," RFC 437, NIC 13701, 30-June-74.

People:

Schedule:

Recent Developments:

RSEEXEC

Contact:

Thomas, Bob. (BTHOMAS@BBN)

Documents:

People:

Schedule:

Recent developments:

Line Processor Protocol

Contact:

Don Andrews at SRI-ARC (ANDREWS@SRI-ARC)

Documents:

[SRI-ARC]<hardy>lpprot,nis

[SRI-ARC]<HARDY>prot.txt

People:

Martin Hardy at SRI-ARC (HARDY@SRI-ARC)

Don Andrews at SRI-ARC (ANDREWS@SRI-ARC)

Schedule:

Recent developments:
PROGRAMS

Neted - Network Standard Editor (Official)

Contact:

Michael Padlipsky (MAP@CASE-10)

Documents:

Padlipsky, M. "NETED: A Common Editor for The ARPA Network,"
RFC 569, NIC 18972, 15-Oct-73.

People:

Padlipsky at MITRE (MAP@CASE-10)
Postel at SPI-ARC (POSTEL@SRI-ARC)
Hathway at AMES (HATHAWAY@AMES-67)

Schedule:

Recent developments:
The National Software Works is developing a set of protocols for its use of the APFA Network, other uses of these protocols is encouraged.

The procedure call protocol is intended to facilitate the sharing of resources in the network at the subroutine level. The procedure call protocol will be used to split NLS into a front end and back end components. Procedure call protocol is also to be used in the NSW as the basis for communication between the works manager, the tool bearing hosts, and front desk procedure packages.

The documents cited below give a view of the Procedure Call Protocol and its use.

contact:

Jim White (WHITE@SRI-ARC)
Jon Postel (POSTEL@SRI-ARC)

Documents:

These documents are the second published version of the Procedure Call Protocol and NSW protocol -- PCP/NSW Version 2. Version 2 is SUBSTANTIALLY different than Version 1; it and all intermediate, informally distributed PCP/NSW documents are obsoleted by this release.

The first document, PCP, is the place the interested reader should start. It gives the required motivation for the Protocol and states the substance of the Protocol proper. The reader may then, if he chooses, read the next three documents: PLP, PGP, and PMP. The latter has the most to offer the casual reader; the programmer faced with coding in the PCP environment should read all three. The next three documents -- PCPFMT, PCPHST, and PCPPROK -- are of interest only to the PCP implementer. The next document -- HOST -- is a preliminary thought about how the NSW might use the standard HOST-HOST protocol NCP. The last four documents -- EXEC, FILE, BATCH, and IDDEBUG -- describe procedure packages needed to carry out NSW functions, but such packages may well be useful in other contexts.

Version 2 consists of the following documents. Each is available on-line in two forms: as an NLS file and as a formatted text file. The Journal number (e.g. 24459) refers to the former, of course, and the pathname (e.g. (SRI-ARC/NLS>PCP.TXT) to the latter, accessible via FTP using USER=ANONYMOUS and PASSWORD=GUEST (no account required). Hardcopy is being forwarded by US Mail to all those who have expressed an interest in PCP. If you don't receive a copy and would like one of this and/or future releases, send a note to that effect to WHITE@SRI-ARC.
PCP (24459,) "The Procedure Call Protocol"

This document describes the virtual programming environment provided by POP, and the inter-process exchanges that implement it.

Pathname: /SRI-ARC/NLS>POP.TXT

PIF (24460,) "The Procedure Interface Package"

This document describes a package that runs in the setting provided by POP and that serves as a procedure-call-level interface to POP proper. It includes procedures for calling, resuming, interrupting, and aborting remote procedures.

Pathname: /SRI-ARC/NLS>PIF.TXT

PSF (24461,) "The PCP Support Package"

This document describes a package that runs in the setting provided by POP and that augments POP proper, largely in the area of data store manipulation. It includes procedures for obtaining access to groups of remote procedures and data stores, manipulating remote data stores, and creating temporary ones.

Pathname: /SRI-ARC/NLS>PSF.TXT

PMF (24462,) "The Process Management Package"

This document describes a package that runs in the setting provided by POP and that provides the necessary tools for interconnecting two or more processes to form a multi-process system (e.g., NWS). It includes procedures for creating, deleting, logically and physically interconnecting processes, and for allocating and releasing processors.

Pathname: /SRI-ARC/NLS>PMF.TXT

PCFPMT (24576,) "PCP Data Structure Formats"

This document defines formats for PCP data structures, each of which is appropriate for one or more physical channel types.

Pathname: /SRI-ARC/NLS>PCFPMT.TXT

PCPHST (24577,) "PCP ARPANET Inter-Host IPC Implementation"

This document defines an implementation, appropriate for mediating communication between Tenex forks, of the IPC primitives required by POP.
Pathname: /SRI-ARC/<NLS>PCPHST.TXT

PCPPKR (24578) "PCP Tenex Inter-fork IPC Implementation"

This document defines an implementation, appropriate for mediating communication between processes on different hosts within the ARPANET, of the IPC primitives required by PCP.

Pathname: /SRI-ARC/<NLS>PCPPKR.TXT

HOST (24581) "NSW Host Protocol"

This document describes the host level protocol used in the NSW. The protocol is a slightly constrained version of the standard ARPANET host to host protocol. The constraints affect the allocation, RFNM wait, and retransmission policies.

Pathname: /SRI-ARC/<NLS>HOST.TXT

EXEC (24580) "The Executive Package"

This document describes a package that runs in the setting provided by PCP. It includes procedures and data stores for user identification, accounting, and usage information.

Pathname: /SRI-ARC/<NLS>EXEC.TXT

FILE (24582) "The File Package"

This document describes a package that runs in the setting provided by PCP. It includes procedures and data stores for opening, closing, and listing directories, for creating, deleting, and renaming files, and for transferring files and file elements between processes.

Pathname: /SRI-ARC/<NLS>FILE.TXT

BATCH (24583) "The Batch Job Package"

This document describes a package that runs in the setting provided by PCP. It includes procedures for creating and deleting batch jobs, obtaining the status of a batch job, and communicating with the operator of a batch processing host. This package is implemented at the host that provides the batch processing facility.

Pathname: /SRI-ARC/<NLS>BATCH.TXT

LLDDUG (24579) "The Low-Level Debug Package"

This document describes a package that runs in the
setting provided by PCP. It includes procedures for a remote process to debug at the assembly-language level, any process known to the local process. The package contains procedures for manipulating and searching the process' address space, for manipulating and searching its symbol tables, and for setting and removing breakpoints from its address space. Its data stores hold process characteristics and state information, and the contents of program symbol tables.

File name: /SRI-ARC/NLS/LLDBG.TXT

People:

Schedule:

A demonstration of the National Software Works concept is to be performed in July 1975.

Recent developments:

The set of documents cited above is available.