Network Working Group
Request for Comments: 661
NIC: 31203

J. Postel
SRI-ARC

November 1974

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 online. When a document is accessible online, a pointer to that source will be given. Also note that recent RFCs are online at Office-1 in directory <NETINFO> with names of the form RFCnnn.TXT where nnn is replaced by the RFC number.

This file is online 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:

Heart, F. et. Al. "The Interface Message Processor for the ARPA Computer Network," AFIPS Conference Proceedings, 36:551-567, SJCC 1970.

People:

John McQuillan (MCQUILLAN@BBN)

Schedule:

Recent developments:

satellite

Contact:

Randy Rettberg (RETTEBERG@BBN)

Documents:

People:

Kahn, Robert. (Kahn@ISI)

Schedule:

Recent developments:

IMP-HOST

IMP-Host [Official]

Contact:

McKenzie, A. (McKenzie@BBN)

Documents:

"Specification for the Interconnection of a Host and an IMP," BBN Report 1822, Revised March 1974.

McQuillan, J. "Host Alive/Dead Logic," BBN Memorandum to Technical Liaisons, 18-July-74.

Burchfiel, J. "Ready Line Philosophy and Implementation," NIC 30872, RFC 642, 5-July-74.

Walden, D. "Some Changes to the IMP and the IMP/HOST Interface," RFC 660, 23-Oct-74.

[Office-1 <NETINFO> RFC660.TXT

People:

McKenzie (MCKENZIE@BBN)

Walden (WALDEN@BBN)

Postel (POSTEL@SRI-ARC)

Burchfiel (BURCHFIEL@BBN)

McQuillan (MCQUILLAN@BBN)

Schedule:

Recent developments:

The "link number" filed 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 BBN1822).

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:

McKenzie, A. "Host/Host Protocol for the ARPA Network," NIC 8246. Jan 1972.

Postel, J. "Assigned Link Numbers," RFC604, NIC21186, 26-Dec-73.

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:

McKenzie, A. "Host/Host Protocol for the ARPA Network," NICE 3246. Jan 1972.

Postel, J. "Assigned Link Numbers," RFC604, NIC22186, 26-Dec-73.

Burchfiel, et. Al. "Tip-Tenex Reliability Improvements" RFC 636 NIC 30490 June 1974.

People:

Postel, Jon. (POSTEL@SRI-ARC)

McKenzie, Alex. (MCKENZIE@BBN)

Burchfiel, Jerry (BURCHFIEL@BBN)

Walden, 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:

Cert, V. and R. Kahn. "A Protocol for Packet Network Intercommunication," IEEE Transactions on Communication Vol COM-22 No 5, May 1974.

[parc-maxc] <cerf> TCPSPEC3.NLS

Mader, E. "A Protocol Experiment," RFC 700, NIC 31020.

[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, 4-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 one though.

(28-Oct-74) A file indicating some of the changes in the specifications since the 4-Aug-74 document is now available as [ISI] <CERF> 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,REL)".

(23-NOV-74) Specifications for test implementation are now said to be ready on 1-DEC-74, and an implementation completed by 1-FEB-74.

nvp - Network Voice Protocol

Contact:

Cohen, Danny. (COHEN@ISI)

Documents:

The current specification is in an online file at isi in the directory voice as nvp.lst.

Pathname = [isi] <voice> nvp.lst

People:

Recent developments:

New specification document available (10-Oct-74).

"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:

Mader, E. "Network Debugging Protocol," NIC 30873, RFC 643, July-74.

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:

Padlipsky, M. "A Proposed Protocol for Connecting Host Computers to ARPA-Like Networks via Front-End Processors," RFC 647, NIC 31117, 12-Nov-74.

[Office-1] <NETINFO>RFC647.TXT

People:

Padlipsky at MITRE Washington (MAP@CASE-10)

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

McConnell at Illiac (JOHN@I4-TENEX)

Schedule:

Recent developments:

This is a suggested simple protocol for connecting to host to front end computers, which are in turn connected to the network.

PROCESS-PROCESS

ICP - Initial Connection Protocol [Official]

Contact:

Postel, Jon. [POSTEL@SRI-ARC)

Documents:

Postel, J. "Official Initial Connection Protocol," NIC 7101 11-June-71.

Wolfe, S. [no title] RFC 202 NIC 7155 26-July-71.

Postel, J. "Official Telnet-Logger Initial Connection Protocol," NIC 7103 15-June-71.

People:

Postel at Sri-arc

Schedule:

Recent developments:

Telnet

Old Telnet

Contact:

Postel, Jon. (POSTEL@SRI-ARC)

Documents:

Postel, J. "Telnet Protocol," RFC 318 3-April-72.

People:

Schedule:

Recent developments:

New Telnet [Official]

Contact:

Postel at SRI-ARC

Documents:

NIC 18639 "TELNET Protocol Specifications" AUG 73

NIC 1864C "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"

NIC 31154 "Status" RFC 65125-Oct-74.

[Office] <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.

NIC 31155 "Output Carriage Return Disposition" RFC 652 25-Oct-74.

[Office-1] <NETINFO>RFC652.TXT

NIC 31157 "Output Horizontal Tab Disposition" RFC 654 25-Oct-74.

[Office-1] <NETINFO>RFC653.TXT

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

[Office-1] <NETINFO>RFC653.TXT

NIC31157 "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

NIC 31160 "Output Vertical Tab Disposition" RFC 657 25-Oct-74

[Office-1] <NETINFO>RFC657.TXT

NIC 31161 "Output Line Feed Disposition" RFC 658 25-Oct-74.

[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 Barthelmess 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.

People:

Schedule:

Recent developments:

New File Transfer

Contact:

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

Documents:

Neigus, N. "File Transfer Protocol," NIC 17759 RFC 542 12-July-73.

Postel, J. "Revised FTP Reply codes," NIC 30843 RFC 640 5-June-74.

People:

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

Nancy Neigus at BBN (NEIGUS@BBN)

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

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

Mark Krilanovich at UCSB (Krilanovich@UCSB-MOD75)

Kurt Barthelmess at UCSD (BOWLES@ISI)

Schedule:

Recent developments:

Pathnames

Contact:

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

Documents:

Crocker, D. "Network Standard Data Specification Syntax," RFC 645, NIC 30899, Jul-74.

People:

Dave Crocker at UCLA-NMC (DCROCKER@ISI)

Schedule:

Recent developments:

File Access Protocol

Contact:

John Day (Day. CAC@MIT-Multics)

Documents:

Day, J. "Memo to FTP Group: File Access Protocol," RFC 520, NIC 16819, 25-Jun-73

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).

Bhushan, A. "Standardizing Network Mail Headers," NIC 18516, RFC 561, 5-Sep-73

Sussman, J. "FTP Error Code Usage for More Reliable Mail Service," RFC 630, NIC 30874, RFC 644, 22-July-74.

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:

White, J. "A Proposed Mail Protocol," NIC 17140, RFC 524, 13-Jun-73.

Crocker, D. "Thoughts on the Mail Protocol Proposed in RFC 524," NIC 17644, RFC 539, 7-July-73.

White, J. "Response to Critiques of the Proposed Mail Protocol," NIC 17993, RFC 555, 27-July-73.

People:

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

Postel at Sri-ARC (POSTEL@SIR-ARC)

Schedule:

Recent developments:

RJE - Remote Job Entry

Contact:

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

Documents:

Bressler, B. "Remote Job Entry Protocol," RFC 407, NIC 12112, 16-Oct-72

Krilanovich, M. "Announcement of RJS at UCSB," RFC 436, NIC 13700, 10-Jan-73.

People:

Schedule:

Recent developments:

RJS - CCNs Remote Job Service

Contact:

Robert Braden at UCLA-CCN (BRADEN@UCLA-CCN)

Documents:

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

Braden, R. "Update on NETRJS," RFC 599, NIC 20854, 13-Dec-73.

People:

Robert Braden (BRADEN@UCLA-CCN)

Steve Wolfe (WOLFE@UCLAL-CCN)

Schedule:

Recent developments:

Graphics

Contact:

Robert Sproull (SPROULL@PARC-MAXC)

Documents:

Sproull, R, and E. Thomas. "A Networks Graphics Protocol," NIC 24308, 16-Aug-74.

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:

Anderson, B. "Status Report on Proposed Data Reconfiguration Service," NIC 6715, RFC 138, 28-April-71.

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

People:

Schedule:

Recent developments:

RSEXEC

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>1pprot.nls

[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 SRI-ARC (POSTEL@SRI-ARC0

Hathaway at AMES (HATHAWAY@AMES-67)

Schedule:

Recent developments:

NATIONAL SOFTWARE WORKS

The National Software Works is developing a set of protocols for its use of the ARPA 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@SIR-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 ready should start. It gives the required motivation for the use Protocol and states the substance of the Protocol proper. The ready may then, if he chooses, read the next three documents: PIP, PSP, and PMP. The latter has the most to offer the casual reader; the programmer faced with coding in the PCP environment should ready all three. The next three documents - PCPFMT,

PCPHST, and PCPFRK - 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 LLDBUG - 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 online 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-ARI] <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 PCP, and the inter-process exchanges that implement it.

Pathname: [SRI-ARC] <NLS>PCP.TXT

PIP (24460,) "The Procedure Interface Package"

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

Pathname: [SRI-ARC] <NLS>PIP.TXT

PSP (24461,) "The PCP Support Packages"

This document describes a package that runs in the setting provided by PCP and that augments PCP 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>PSP.TXT

PMP (24462,) "The Process Management Package"

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

Pathname: [SRI-ARC] <NLS>PMP.TXT

PCPFMT (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>POPFMT.TXT

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

This document defines an implementation, appropriate for mediating communication between Tenex folks, of the IPC primitives required by PCP.

Pathname: [SRI-ARC] <NLS.PCPHST.TXT

PCPFRK (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.PCPFRK.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

LLDBUG (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.

Pathname: [SRI-ARC] <NLS>LLDBUG.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.