NBSIR 83-2796

Proceedings of the Fourth LAN-Transport Workshop

Report of the Fourth Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Institute for Computer Sciences and Technology
Systems and Network Architecture Division
Washington, DC 20234

October 27 - 28, 1983

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NATIONAL BUREAU OF STANDARDS

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U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

ABSTRACT

The National Bureau of Standards Institute for Computer Sciences and Technology (ICST) has prepared specifications for the International Organization for Standardization's (ISO) Class 4 Transport Protocol. At the request of a number of companies, ICST organized a workshop series for implementors of these specifications using local area networking technology. The first workshop focused on implementation techniques and strategies so that a multivendor demonstration of these protocols can occur at a major computer conference in 1984 targeted for the NCC 1984. Primarily the details of CSMA/CD and Transport Class 4 were discussed and parameters were selected. A second workshop focused on token bus LANS and file transfer applications to be run at the targeted 1984 demonstration. Agreements on the specifics of the file transfer protocol were reached at the third workshop. This report documents the fourth workshop in the series of LAN-Transport workshops. The fourth workshop covered further refinements to the file transfer protocol, testing procedures, and demonstration details.

Keywords: communication protocols, computer networks, file transfer protocol, local area networks.

SUMMARY

This report documents the fourth workshop of the LAN-Transport Workshop Series for implementors of the ICST specification of the ISO Class 4 Transport Protocol over IEEE 802 compatible LANs using local area networking technology.

At the fourth workshop, agreements to date were reviewed and further refinements to the file transfer protocol were made. FTP testing was discussed and a base set of criteria for FTP tests was developed. In addition, a number of demonstration details were discussed including booth etiquette, advertising, staffing, and so on.

The participants agreed to the need for a fifth workshop, to be held as earlier planned in February, in Gaithersburg, Maryland. An announcement will be mailed to the current LAN-Transport Workshop Series distribution list in the near future.

CONTENTS

1. Participants

The fourth workshop, chaired by Mr. Maris Graube, Tektronix, was attended by the following.

Kenneth Aird
Hewlett Packard
3404 E. Harmony Road
Ft. Collins, CO 80525
(303)-226-3800

Pat Amaranth
General Motors
GM Tech Center-ME&D
Dept. 69 EA-BLD9
Warren, MI 48090
(315)-575-0808

Gary Baczkowski
Allen-Bradley
747 Alpha Drive
Highland Hts., OH 44118
(216)-449-6700 X4218

James Berets
Bolt, Beranek, & Newman
10 Moulton Street
Cambridge, MA 02238
(617)-497-2593

Bob Blanc
National Bureau of Standards
Technology Building Room A231
Washington, DC 20234
(301)-921-3817

Gerald Brinda
NCR Comten
2700 Snelling Ave N
Roseville, MN 55113
(612)-638-7685

Laurie Bride
Boeing Computer Services
P O Box 24346 MS 7F-01
Seattle, WA 98124
(206)-763-5744

Allen Brown
Gould, Inc., CSD
6901 W. Sunrise Blvd.
Ft. Lauderdale, FL
(305)-587-2900 X5198

Roy Cadwallader
ICL
West Avenue/Kinsgrove
Stoke-on-Trent ST7 1TL UK
44 782 29681 X3806

A. Lyman Chapin
Data General Corp.
4400 Computer Drive
Westborough, MA 01746
(617)-366-8911 X3056

Michael Chernick
National Bureau of Standards
Technology Building
Washington, DC 20234
(301)-921-3516

John Davidson
Ungermann-Bass Inc.
2560 Mission College Blvd.
Santa Clara, CA 95050
(408)-496-0111

Ed Deenihan
General Motors
GM Technical Center B/MD-66
Warren, MI 48090-9040
(313)-575-0892

Emmanuel G. Delahostria
Allen-Bradley
747 Alpha Drive
Highland Hts., OH 44143
(216)-449-6700

Edward Efron
Able Computer
1732 Reynolds Avenue
Irvine, CA 92714
(714)-979-7030

Robert W. Franklin
Motorola Microsystems
2900 South Diablo Way
Tempe, AZ 85282
(602)-829-3013

John Heafner
National Bureau of Standards
Technology Building Room B218
Washington, D.C. 20234
(301)-921-3537

Rebecca Hutchings
Honeywell
7900 Westpark Drive
McLean, VA 22066
(703)-827-3982

Maris Graube
Tektronix
Box 500, MS 50-473
Beaverton, OR 97077

Navindra Jain
Excelan
2180 Fortune Drive
San Jose, CA 95131
(408)-945-9526

D. Janetzky
Siemens
P O Box 211080
7500 Karlsruhe
West Germany
721 595 2350

Vadivelu Jeyabalan
Ford Motor Company
Room E-1174 Scientific Res. Lab
P O Box 2053
Dearborn, MI 48121
(313)-322-3952

Ken Kanaby
General Motors, APMES
GM Technical Ctr MD-57
Warren, MI 48090-9040
(313)-575-0899

Mr. Kreppel
Siemens
Guenther-Scharowsky-Str.
D-8520 Erlangen
West Germany
9131 7 31759

Chak Lai
Digital Equipment Corporation
21333 Haggerty
Novi, MI 48050
(313)-348-8900

Aldrin Leung
Integrated Microcomputer Systems
5320 Marinelli Road
Rockville, MD 20852
(301)-984-8343

Jerry Linn
National Bureau of Standards
Technology Building Room B212
Washington, DC 20234
(301)-921-2601

Andy Luque
Tektronix
131 SE Salmon
Redmond, OR 97756
(503)-923-0333

Joseph R. Maixner
Advanced Computer Consultants (ACC)
2901 Park Avenue
Santa Cruz, CA 95073
(408)-425-0937

Ronald M. Martin
Industrial Technology Inst.
P O Box 1485
Ann Arbor, MI 48106
(313)-763-9482

Douglas McCallum
NBI, Inc.
P O Box 9001
Boulder, CO 80301
(303)-444-5710

Kevin Mills
National Bureau of Standards
Technology Building Room B212
Washington, DC 20234
(301)-921-2601

Jose Ramiro Montealegre
Carleton University
180 Argyle Street Rm 1524
Ottawa, Ontario, CANADA K2P-1B7
(613)-237-1320 X542

James Moulton
National Bureau of Standards
Technology Building Room B212
Washington, DC 20234
(301)-921-2601

Pat Mulvey
IBM
21Q/B231-1
P. O. Box 1328
Boca Raton, FL 33432
(305)-998-1561

Fran Nielsen
National Bureau of Standards
Technology Building Room B212
Washington, DC 20234
301-921-2601

D. J. Power
ICL
Arndale Centre
Manchester, UK

James Quigley
IBM
P O Box 10500
Palo Alto, CA 94304
(415)-855-7124

Don Rippy
National Bureau of Standards
Technology Building Room A231
Washington, DC 20234
(301)-921-2948

Allen Rochkind
Intel Corporation
3065 Bowers Avenue
Santa Clara, CA 95051
(408)-987-7817

Rob Rosenthal
National Bureau of Standards
Technology Building Room B226
Washington, DC 20234
(301)-921-3516

Robert L. Sangroniz
Tektronix, Inc.
Box 1000 MS 63-489
Wilsonville, OR 97070
(503)-685-3816

Alan Sciacca
The Foxboro Co.
Dept 341
38 Newponset Avenue
Foxboro, MA 02035
(617)-549-3190

Inder M. Singh
Excelan
2180 Fortune Drive
San Jose, CA 95131
(408)-945-9526

Rita J. Stubler
Digital Equipment Corp.
21333 Haggerty Road
Novi, MI 48050
(313)-348-8900

Dick Swee
Charles River Data Systems
983 Concord Street
Framingham, MA 01701
(617)-626-1101

Ken Swenson
Boeing Computer Services
P O Box 24346 MS 7A-05
Seattle, WA 98124
(206)-763-5385

Roger F. Thompson
IBM
1501 California Avenue
Palo Alto, CA 94306
(415)-855-7235

Shack Toms
Allen-Bradley
747 Alpha Drive
Highland Hts., OH 44143
(216)-449-6700 X4652

Lyle Weiman
Hewlett Packard - IND
19446 Pruneridge Avenue
Cupertion, CA 95014
(408)-725-8111

Ronald Yara
Intel Corporation
3200 Lakeside Drive
Santa Clara, CA 95051
(408)-496-7703

Prentiss Yates
Cincinnati Milacrom
Route 48 & Mason Road
Lebanon, OH 45236
(513)-494-5426

2. Introduction and Opening Remarks

Mr. Rob Rosenthal, NBS, welcomed the attendees to the fourth LAN-Transport workshop and introduced Dr. John Heafner, NBS, temporary stand-in for Mr. Maris Graube, workshop chairperson. The agenda was reviewed and two additions were made to ~~Friday's~~ schedule - a presentation bv National Trade Productions and a discussion of booth etiquette.

2.1 Agreements to Date

The following agreements about the NCC demo were reviewed:

i. IEEE 802.3 CSMA/CD and 802.4 Token Bus will be used, XID and TEST will not be sent.

ii. No internet will be used.

iii. Transport agreements -

- Volume 3 of NBS Transport Specification (February 1983) will be used.
- 31 bit sequence space will be used.
- Expedited will not be used.
- Unit data will not be used.
- Expedited will not be used.

The base document will be modified to allow a service without expedited. If expedited is unsupported, the requestor should propose no expedited service in the CR, following ISO rules for negotiation; it will be a protocol error to use expedited.

- TSAP (transport suffix) will be two octets.
- Application TSAPs defined in the Proceedings of the Second LAN-Transport Workshop are still valid:

00FF	file transfer,
00FE	file transfer/NAPLPS data,
00FD	programmable control applications,
00FC	messaging.

iv. File Transfer

The following agreements, reached at the third workshop were incorporated into the August 1983 file transfer protocol document:

- maximum size of files to be transferred will be 64K, bytes;
  larger files may be transferred by mutual agreement of more than one vendor,
- even number of PCI octets was eliminated,
- file type supported by all vendors will be ASCII data, with carrriage return <cr> and line feed <lf>

contained in the file,
- applications not supporting lower case ASCII should expect to see and convert lower case,
- other file types (such as NAPLPS graphics, 3270, binary, Regis graphics) may be transferred by mutual agreement of more than one vendor,
- receiving entity will abort on receipt of protocol errors,
- least significant octet will be presented first, and
- receipt of ABORT, CANCEL, or DISCONNECT will result in data loss.

3. File Transfer Protocol

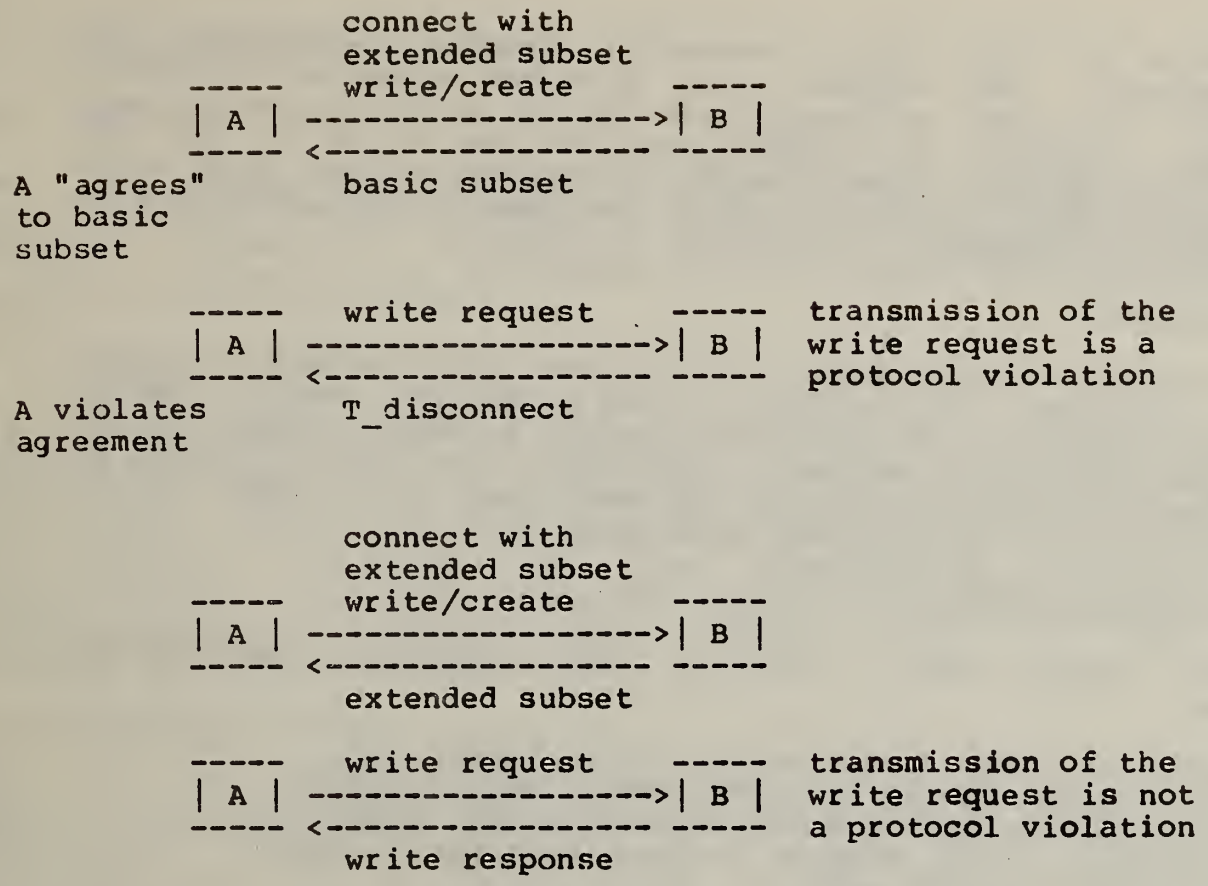
After discussion, it was agreed that only two file types will be supported for the demo: binary and public ASCII. The only control characters to be recognized in public ASCII will be <cr> and <lf> and these characters must appear together. Attachment 1 is a copy of the vugraph detailing this agreement. It was agreed not to use mixed data types for the NCC demo.

Proposal for file management services -

Mr. Allen Rochkind, Intel, presented a proposal for file management services needed for the intervendor demo. Allen described the FILEDIR directory, which will contain the list of all files on the server accessible by other nodes; NETDIR, which will contain the filestore name/48 bit host address translation table for each node recognized by the consumer; and the FCOPY and NETDIR Maintenance utilities. FCOPY will facilitate copying remote vendors' files onto the server for later access by other nodes and will update the FILEDIR. The NETDIR Maintenance utility, whose name at each consumer node is implementation dependent, will update the NETDIR directory file when new nodes are added to the network. In answer to a question on the need for local pathnames in the FILEDIR, it was suggested that these pathnames be deleted from the FILEDIR.

Write/Create -

Discussion of write/create centered on whether these services should be mandatory or optional. Four service primitives have been added to the specification to include write/ create. These primitives, in addition to those contained in the original specification, comprise the extended file transfer service subset. Consensus was reached that write/create would be negotiated as pictured:



The FTP document will be revised to reflect the above agreement and will be sent to attendees. Several vendors indicated they may implement write/create for the NCC demo.

The following list of protocol issues was defined:

i. File type vs. data type,
ii. Deadlock,
iii. Encoding Questions,
iv. Subset IDs,
v. Formal Description and Miscellaneous Questions.

i. File type vs. data type -

Mr. Allen Rochkind, Intel, reviewed his File Management Services document in which the FILEDIR service lists the type of data contained in the file. He suggested that, since the FILEDIR contains the data type of the file, the information is not needed in the protocol. The FILEDIR will be an ASCII text file. Since the local pathname field will be optional, knowing the local pathname cannot be a constraint. Local pathnames would be useful for allowing users to create files on one system and view the files on other systems. An incomplete strawvote showed that seven vendors wanted to remove file type/data type from the file transfer protocol; there was no indication of how many wanted to retain the information in the protocol.

Discussion of file type frequently became a discussion of applications. For example, the question arose as to whether creating files would be dynamic (at the NCC demo) or static, and, therefore, whether the FILEDIR would be used at NCC or just for system development. These issues, along with the file type discussion, was postponed until the applications meetings in November and December.

ii. Deadlock -

Since there are states within the protocol which cannot be exited until responses are received, it was questioned whether timeout functions should be included to handle possible deadlocks if responses are not received. Consensus was that this is an implementation issue, that the FTP can send an F_abort if a response is not received when expected.

iii. Encoding Questions -

Mr. Jim Berets, BBN, clarified some encoding questions as follows:

-- the length field includes the header length, and
-- there are two octets for the header length because under certain circumstances the header may exceed 255 octets. (For example, a diagnostic string alone may be 255 octets long.)

It was decided that no further modifications should be made to the file transfer protocols since there are time constraints. Vendors will use the NBS problem/failure report form to report problems with the FTP specification and NBS will circulate copies of the reports.

iv. Subset IDs -

There was a request to include a transaction service subset which could be used with a messaging application, but since there is a different TSAP for messaging, this service subset was deemed unnecessary.

v. Formal Description and Miscellaneous Questions -

Mr. Jim Berets, BBN, fielded several questions on the formal description of the file transfer protocol, including clarification of a typographical error in the comments describing transition 22. Another question concerned the behavior of the protocol if a T_disconnect was received on a connection which had already been disconnected. The behavior of the protocol, in that case, would be a local implementation issue. A new version of the FTP document will be sent to participants.

4. Demonstration Particulars

4.1 Trade Show Support -

Mr. Ron Yara, Intel, gave an overview of vendor and participating company responsibilities for the NCC booth for CSMA/CD. A copy of his vugraphs is attachment 2. He also showed a booth rendering as an example of how the NCC demo booth for CSMA/CD could be designed.

4.2 GM Status Report -

Ed Deenihan, GM, presented a status report of GM's efforts to date on their NCC booth. A copy of his vugraphs is attachment 3. GM proposed that each of the six vendors have two terminals in the booth. GM has scheduled a meeting, November 15, to finalize the messaging protocol for the programmable controller application. Each vendor must have successfully tested a set of test scenarios, currently being selected, prior to testing on-site at the GM Technical Center.

4.3 NBS Status Report -

Mr. Rob Rosenthal, NBS, presented a status report of the CSMA/CD demo (attachment 4). Several vendors have made commitments to particpate. In order to participate, vendors must submit a purchase order, not to exceed $20,000, to NBS. Costs of the demo will be charged against this purchase order. The booth will be built and displayed at NBS prior to the NCC. To coordinate both booths and have commonality of design and motifs, it was suggested that, if possible, GM work with the organization chosen by the NBS to provide the CSMA/CD booth.

4.4 Connections to Foreign Booths -

Connections to foreign booths will not be allowed in the GM demo. As for the CSMA/CD booth, some vendors expressed a desire to interconnect their booth with the common intervendor booth. There was a consensus vote (14 yes, 3 no) to allow, if any foreign connections, only those having point-to-point repeaters over standard cable, whose equipment has gone through full verification at NBS, and which can be switched off from the main demo booth. The pros and cons of allowing foreign booths were stated as follows:

PRO - More participants,
- More equipment interconnection,
- Greater public relation,

CON - Uncertainty of network security,
- Increase in testing effort,
- Increase in financial obligation.

Those participants interested in having foreign booths connected to the multivendor booth must convince other participants, at the

December 1 CSMA/CD meeting, that foreign booths should be allowed.

4.5 Booth Etiquette -

Mr. Ron Yara, Intel, led the discussion of booth etiquette. He stated the importance of having a marketing person available for the December CSMA/CD group meeting to provide inputs. Concerns will be:

- fairness in the booth (equal space, no product specific discussions or literature, and so on),
- consistent responses from personnel staffing the booth,
- continued emphasis on standards. (Visitors should be directed to particular vendors booths, if questions or discussion becomes unrelated to standards activities.)

4.6 Advertising -

NBS will schedule an open press day for token bus and CSMA/CD participants. Trade editors will be notified prior to the NCC to show editors what to expect; press packages will be prepared.

4.7 Able Announcement -

Mr. Ed Efron, Able, announced the Easyway Ethernet Port which is a board containing protocols of layers one through four.

4.8 Parallel Discussions on Demo Details

4.8.1 GM/Token Bus Demo -

Transport Testing

General Motors will test its transport implementation remotely with NBS Transport over Telenet. GM's transport package will be used to test test transports against a subset of the NBS scenarios, locally at the GM Technical Center. Vendors must validate their transport implementations with NBS prior to coming on-site at GM; no remote testing will be provided to vendors by GM. GM should have further definition of on-site testing procedures and the scenario subset at the multi-vendor demo meeting to be held at the GM Technical Center on November 15, 1983.

FTP

Preliminary discussions on a mechanism for vendor FTP testing indicated a need for definite procedures and central arbitration. Concern was expressed that consistency in this area be maintained between the CSMA/CD and token bus demonstrations.

Ideas for the "attendee" interface to FTP were discussed; GM

requested that the vendors develop lists of desirable "user" functions, to be discussed at the November 15 meeting.

Programmable Controller Protocol

The programmable controller data format, known as the "GM standard message," is firm for the NCC demo. A transaction oriented protocol has been proposed by Allen-Bradley which is being distributed for review by participants. Final decision on this proposal will be made at the November 15, multivendor meeting.

4.8.2 CSMA/CD Demo -

Mr. Rob Rosenthal, NBS, presented the NCC time schedule (attachment 4). The LAN-Transport group will allow NBS to accept vendors' contributions and offers of service in return for NBS assurance of being fair and equitable in acceptance of such offers. Each vendor will supply a contact person whom NBS will poll on major decisions; names of contact persons should be submitted to Rob Rosenthal by c.o.b. Monday, October 31. NBS will submit timely reports of progress and status of the contract to contact persons. NBS must have vendors' letters of commitment (or purchase orders not to exceed $20,000) by November 15, 1983. These should be sent to Ms. JoAnn Brooks, National Bureau of Standards, Technology Building Room A231, Washington, D.C. 20234. If a company "drops out," it is still committed to paying a share (not to exceed $20,000) of the expenses associated with the NCC booth. Vendors will be billed for their share in the second or third quarter of 1984.

The following organizations indicated their interest in adding their names to the list of participants in the CSMA/CD demo:

Able	Joe Devita
Assoc. Computer Consultants	Joseph Maixner
Charles River Data Systems	Dick Swee
Codenoll	John Balen
Data General	A. Lyman Chapin
Excelan	Inder Singh

Ms. Laurie Bride will investigate the possibility that Boeing Computer Services can expedite a contract to provide the booth for the NCC. NBS will continue the RFP process in parallel with Ms. Bride's investigation. If Boeing can offer a contract earlier than NBS, then Boeing will do the contracting for the NCC booth.

There will be a meeting December 1 and 2 in Seattle, hosted by Boeing Computer Services, to discuss themes and coordination of the booth; a tentative agenda is attachment 5.

5. Testing

Jerry Linn reviewed the base set of documents, attachment 6,

relating to testing. Vendors should inform NBS if testing with other vendors is desired.

6. FTP Testing

NBS will not implement or test FTP prior to the NCC; NBS will be a measurment node in the CSMA/CD booth.

Ms. Pat Amaranth, GM, presented some FTP testing issues to be resolved (attachment 8). The central issue, as yet unresolved, is whether FTP should be tested via a formally defined scenario set (as is the case with Transport) or whether a combined FTP and application test constitutes sufficient testing. Proponents of testing FTP simply by exercising the applications cite expediency as justification. Proponents of formal, separate FTP tests believe that the combined testing will be inadequate. Mr. Maris Graube, Tektronics, suggested the DEC implementation as a possible FTP reference implementation; DEC will investigate that possibility.

Mr. Jim Berets, BBN, presented a set of FTP test procedures, attachment 7, for each vendor to perform at the vendor's site. The token bus group is developing a common set of functions that the user would see; it was suggested that the CSMA/CD group should take the same approach. All participants are asked to write two lists of functions, specific and common, for the demo. All FTP applications and lists of user functions should be sent to Ms. Vicki Howard, National Bureau of Standards, Technology Building Room B218, Washington, D.C. 20234, by November 15. NBS will extract information from these inputs, will exchange information with GM, and will then distribute this information to the mailing list.

It was agreed to work from the BBN test suggestion as a base and augment the base with a test of the transfer of binary information.

7. Technical Session at NCC

Mr. Rob Rosenthal, NBS, reported that NBS has offered NCC a technical panel session. The panel will discuss multivendor protocols and, in particular, what standards can and cannot cover and what experiences vendors had with the multivendor demonstration. The panel is thus far composed of Mr. Tony Lauck, DEC, Mr. Jim Quigley, IBM, and Mr. Allen Rochkind, Intel. If other vendors wish to participate, they should contact Mr. Bob Blanc, NBS.

8. Newcomers

Mechanisms for allowing new participants are needed. Constraints on adding these newcomers would be that their participation must be "standards oriented," that they submit a purchase order (not to exceed $20,000), and that a limited number of participants can be accommodated in the booth.

9. After NCC

9.1 National Trade Productions -

Mr. Sam Smith and Mr. Joe Rupple, both from National Trade Productions, gave a brief overview of INTEC and requested that the LAN-Transport group consider bringing the NCC demo to the INTEC conference in October, 1984. Participants in the NCC demo were asked to contact their marketing people to determine whether there is interest in taking the LAN-Transport demo to other shows.

9.2 Follow-on Demonstration of IP -

Dr. John Heafner gave a brief overview of the status of the draft proposed ISO internetwork protocol (IP). He expressed the NBS interest in a follow-on global demonstration using internet to show the interconnection of networks. A show of hands indicated that vendors were also interested in internet; therefore, there will be follow-on meetings to discuss this protocol after the NCC demo.

9.3 Additional High Level Protocols -

In addition to internet, the complete ISO file transfer protocol will be a candidate for a follow-on demonstration. (The file transfer protocol being used at the 1984 NCC demo is a subset of the current, as yet incomplete, ISO protocol.) Dr. John Heafner, NBS, stated that NBS has specifications for message handling facilities and will have specifications for file transfer after the protocol stablizes within ISO. Mr. Jim Moulton, NBS, informed the group that an ISO draft proposed basic class virtual terminal protocol is expected by the end of 1984. GM mentioned their need for a transaction protocol to be used for device control; Dr. Heafner suggested that GM check the NBS messaging format standard, FIPS 98. It was also suggested that those vendors who are interested in high level protocols exchange information among themselves and investigate what other vendors are doing. After January, GM will make available their MAP protocol specifications, which include specifications for file transfer, virtual terminal, management, and directory services.

Mr. Moulton announced that ISO session has progressed to the draft international standard stage and that most likely NBS will issue session as a guideline rather than as a standard. It is hoped that some functions now in the session layer will be pushed upward to the common application sublayer as that is developed. He stated that the ISO presentation layer group is working towards a language to describe a common syntax, targeted for draft proposed standard status in early 1985. Groups interested in presentation layer protocols should make their needs known to ANSI X3T5.5, the national committee working on layer 6 protocols for open systems interconnection.

9.4 Gateway CSMA/CD - Token Bus -

The discussion of gateways evolved into a discussion of addressing. Mr. James Moulton, NBS, announced that addressing, designed to accommodate subnetworks in place today, will become a draft proposed standard after the March 1984 SC6 WG2 meeting. He also volunteered to give a status report of ISO and NBS standards at the next LAN-Transport workshop.

10. Follow-on Meetings

The token bus meeting will be held at the GM Technical Center, November 15. Boeing will host a meeting of the CSMA/CD group in Seattle, December 1 and 2. A tentative agenda of that meeting is attachment 5. The next LAN-Transport workshop will be held in mid-February; NBS will send meeting details to all participants.

ATTACHMENT 1
presented by John Heafner

CONSENSUS ON FILE TYPES

TWO FILE TYPES

- PUBLIC ASCII
- BINARY

PUBLIC ASCII

EXPECTED

- UPPER/LOWER CASE ALPH
- SPACES
- NUMBERS/MATH OPERATORS
- ENGLISH PUNCTUATION
- CR/LF (must appear together)

UNEXPECTED

ACTION TAKEN IS AT THE RECEIVER'S DISCRETION.

presented by Ron Yara, Intel

ATTACHMENT 2

intel®

NCC BOOTH OVERVIEW

ISO TRANSPORT WORKSHOP

OCTOBER 27, 1983

OEM COMMUNICATIONS OPERATION

intel

AGENDA

- VENDOR RESPONSIBILITIES
- PARTICIPATING COMPANY RESPONSIBILITIES
- CRITICAL ITEMS
- VENDOR SELECTION

intel®

VENDOR RESPONSIBILITIES

- PHYSICAL BOOTH DEVELOPMENT
  - CREATIVE INPUT FOR LAYOUT, LIGHTING, ETC
  - RENT VERSUS BUILD
  - EQUIPMENT SIZE, POWER REQUIREMENTS, ETC
- BOOTH GRAPHICS
  - CREATIVE INPUT FOR STYLE, LAYOUT
  - COMMON "LOOK" BASED ON CENTRAL BOOTH THEME AND SUPPORTING MESSAGES

intel

VENDOR RESPONSIBILITIES

- SHOW SERVICES
  - BOOTH TRANSPORTATION, DRAYAGE (IN/OUT OF HALL) AND SET-UP/DISMANTLE
  - ELECTRICAL SERVICES, INCLUDING POWER, TELEPHONES AND REMOTE BOOTH CONNECTIONS
  - PLANTS, CARPETS AND CLEANING SERVICES
  - HOSTESS FOR LITERATURE REQUEST AREA
  - STAGING AND TESTING ARRANGEMENTS ON NCC FLOOR
- PROGRAM MANAGER
  - DEVELOP SCHEDULES AND PUSH FOR EXECUTION TO SCHEDULE

intel®

PARTICIPATING COMPANY RESPONSIBILITIES

- GRAPHICS INPUT
  - CENTRAL THEME OF BOOTH AND KEY MESSAGES
  - INPUTS FOR COMMON PANELS AND INDIVIDUAL COMPANY PANELS
- EQUIPMENT
  - SPACE AND POWER REQUIREMENTS
  - TRANSPORTATION TO AND FROM THE SHOW FLOOR
  - SET-UP AND TEAR-DOWN AT THE SHOW

intel®

PARTICIPATING COMPANY RESPONSIBILITIES

- LITERATURE
  - A COMMON HAND-OUT DESCRIBING THE MULTI-COMPANY DEMO
  - PRODUCT SPECIFIC FOLLOW-UP LITERATURE VIA REGISTRATION
- PREVIEW BOOTH, GRAPHICS AT VENDOR SITE
- STAGING AT NCC AND PRE-SHOW CHECKOUT
- BOOTH WALK THROUGH, Q & As AND BRIEFING FOR SHOW PERSONNEL

NEED INDIVIDUAL COMPANY "OWNERS"

- SINGLE CONTACT AND COORDINATOR

intel

CRITICAL ITEMS

- GRAPHICS INPUTS AND EQUIPMENT INFORMATION TO VENDOR
  - CENTRAL THEME AND PANELS
  - INDIVIDUAL COMPANY PANELS
- SHIPPING EQUIPMENT TO/FROM NCC FLOOR
- WIRING REMOTE BOOTHS
- MUST LIMIT THE NUMBER OF PARTICIPANTS IN THE COMMON BOOTH
- MUST START WITH VENDOR BY DECEMBER

intel®

VENDOR SELECTION

- FULL SERVICE VENDOR IS A MUST
  - SINGLE POINT OF COORDINATION FROM START TO FINISH
- SELECTION CRITERIA
  - ACTUAL COSTS CANNOT BE DETERMINED UNTIL NUMBER OF PARTICIPANTS DETERMINED, BOOTH STYLE, LAYOUT AND GRAPHICS AGREED TO, ETC.
  - THE ABOVE DETAILS REQUIRE CLOSE WORK WITH THE VENDOR
- BOOTH PROPOSAL: GILTSPUR

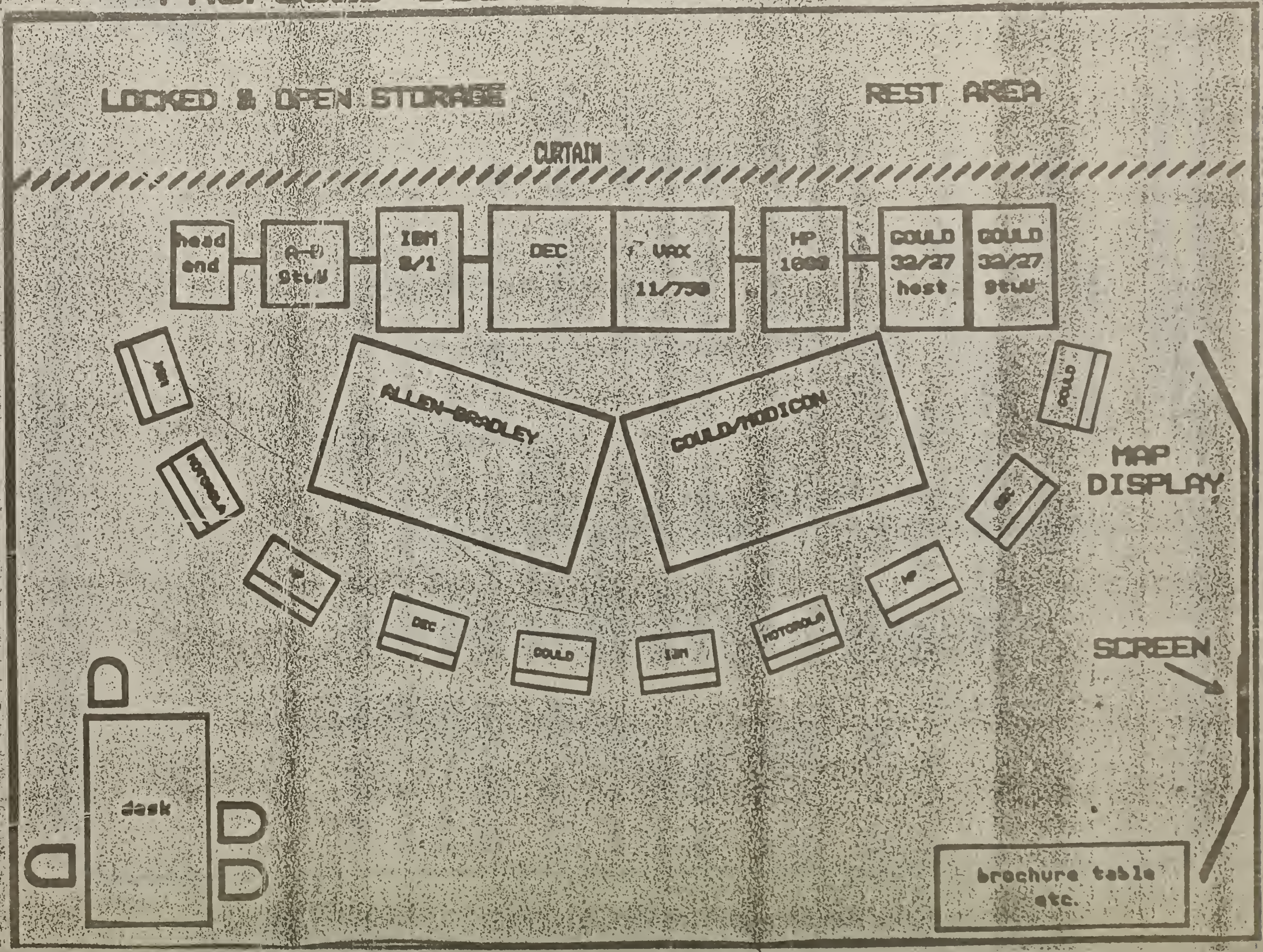
ATTACHMENT 3
Presented by Ed Deenihan, GM

TOKEN BUS DEMO

Schedule for NCC '84 GM LAN DEMO

WK Oct 17 1983	Install CDS Testbed Modems at GM (was late September 1983)
WK Oct 24 1983	Begin Acceptance Test of CDS Modens at GM (was October 1, 1983)
Nov 14 1983	Install UNIX at Tech Center Begin NBS Transport Testing at Tech Center
Nov 15 1983	Third Multi-vendor Workshop at GM Tech Center
Nov 16 1983	(Tentative) Concord Data System's Workshop at Tech Center
Nov 1983	Final FTP Specification Published by NBS
Dec 1983	Host-802 Interface Testing at Vendor Site
Dec 12 1983	Receive and Install VAX 11/780, Move UNIX to New System
Feb-Apr 1984	Transport Testing at GM (Individual Testing) (Was Jan-Mar 1984)
Apr-Jun 1984	Multi-vendor FTP and Demo Testing at GM
June 20 1984	Package and Ship Hardware to NCC
WK Jul 2 1984	Install Network and Test at Las Vegas
Jul 9-12 1984	1984 National Computer Conference

PROPOSED BOOTH LAYOUT: 1984 NCC



ATTACHMENT 3 (Cont.)

presented by Ed Deenihan, AM

ATTACHMENT 4

presented by Pob Posenthal, NBS

CSMA/CD Booth -- Status Report

- Booth Reservation Confirmed Late December
- Vendor Commitments and Specifications
  DEC, Honeywell, ICL, INTEL, NBS, Tektronix
- NBS Contract
  Concept, Rendering
  Design, Fabrication
- Printing

presented by Rob Rosenthal, NBS

NCC '84 TIME SCHEDULE

Receipt of specifications from vendors	09-30-83
Followup on request for specifications from vendors	10-07-83
Telephone calls to vendors requesting purchase orders NTE $20,000 based on proportionate amount of total costs of exhibit	10-07-83
LAN Workshop with vendors at Marriott	10-27/28-83
RFP for both design & fabrication issued for 30 days	11-01-83
Award of booth design & fabrication contract	02-01-84
Preliminary booth design concept from contractor to NBS for review and approval	02-22-84
Meeting in Washington with vendors participating in NCC '84 to approve booth design concept	03-14-84
One-page writeups for NCC '84 brochure received from vendors	03-30-84
Delivery of booth on-site (NBS) of exhibit at Booth Mock-up location	05-30-84
Press Release issued on exhibit at NCC '84	06-08-84
Booth and vendor equipment shipped to Las Vegas	06-25-84
Begin setting up vendor equipment and arranging for electrical and cable hook-ups of all equipment	07-03-84
Opening day of exhibit at NCC '84	07-09-84
Last day of exhibit at NCC '84	07-13-84
Arrangements for shipment of NBS equipment and booth to NBS Gaithersburg facility	07-14-84

ATTACHMENT 5

Tentative Agenda for CSMA/CD Group Meeting
December 1 - 2, 1983
Seattle, Washington

I. Agenda Approval

II. Review November 15 Token Passing Meeting

III. Booth Theme

- application
- key messages

IV. Booth Merchandising

- logo
- literature (brochures)
- press release
- follow-on p. r.
- common literature request form with participants names
- availability of IEEE 802 and ISO Specifications

V. Remote Booth Proposals

- guidelines

VI. Booth Staffing

- guidelines

VII. FTP

- typing recommendation
- testing

ATTACHMENT 6 presented by Jerry Linn, NBS

BASE SET OF DOCUMENTS RELATING TO TESTING

Transport Specification: 6 volumes, Ref. No. ICST/HLNP 83-1,2,3,4,5,6

NOTE: Volumes 1, 3, 5 are base level for testing class 4

Testing of OSI Protocols: A Compendium of Papers, Ref. No. ICST/SNA 83-1

Users Guide to the Testing System for Implementations of the ICST Transport Protocol, Ref. No. ICST/SNA 83-2

A Test Suite for Implementations of the ICST Transport Protocols, Ref. No. ICST/SNA 83-3

NOTE: Seven scenarios have been added that use disconnect rather than graceful close for the purposes of this workshop.

Specification of a Remote Scenario Interprter for the Implementation of the ICST Transport Protocols, Ref. No. ICST/SNA 83-4

ATTACHMENT 7

Suggested Demonstration FTP Test Procedures

. Tests of normal operation.
    1. Transfer file between like machines.
        1. Transfer file from machine A2 <- A1.
            1. Establish connection.
            2. Establish file selection.
            3. Open file.
            4. Read file contents.
            5. Close file.
            6. Deselect file.
            7. Disconnect.
        2. Transfer file from machine A1 <- A2.
            1. Establish connection.
            2. Establish file selection.
            3. Open file.
            4. Read file contents.
            5. Close file.
            6. Deselect file.
            7. Disconnect.
        3. Compare the original file on A1 with the new file on A1.
        4. Compare the original file on A1 with the new file on A2.
    2. Transfer file between different machines.
        1. Transfer file from machine B1 <- A1.
            1. Establish connection.
            2. Establish file selection.
            3. Open file.
            4. Read file contents.
            5. Close file.
            6. Deselect file.
            7. Disconnect.
        2. Transfer file from machine A1 <- B1.
            1. Establish connection.
            2. Establish file selection.
            3. Open file.
            4. Read file contents.
            5. Close file.
            6. Deselect file.
            7. Disconnect.
        3. Compare the original file on A1 with the new file on A1.
        4. Compare the original file on A1 with the new file on B1.

2. Suggested Test Files

These files use ASCII representation with the parity bit set to zero. An explicit <cr><nl> should appear in the file at the end of each line.

1. The ASCII character set:

<nul><soh><stx><etx><eot><enq><ack><bel>
<bs><ht><nl><vt><np><cr><so><si>
<dle><dc1><dc2><dc3><dc4><nak><syn><etb>
<can><sub><esc><fs><gs><rs><us>
<sp>!"#$%&'
()*+,-./
01234567
89:;<=>?
@ABCDEFG
HIJKLMNO
PQRSTUVW
XYZ[]^_
`abcdefg
hijklmno
pqrstuvw
xyz{|}~<del>

2. A slightly larger file:

1
12
123
1234
12345
123456
1234567
12345678
123456789
1234567890
12345678901
123456789012
1234567890123
12345678901234
123456789012345
1234567890123456
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ATTACHMENT 7 (cont)

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3. Tests of robustness.
    1. Robustness tests between like machines.
        1. Attempt connection to a non-existant machine.
        2. Attempt connection to an inoperative machine.
        3. Attempt selection of a non-existant file.
        4. Attempt to open a file already in use.
        5. Cancel a partially completed transfer.
        6. Abort a partially completed transaction.
        7. Send an out-of-order PDU.
    2. Robustness tests between different machines.
        1. Attempt connection to a non-existant machine.
        2. Attempt connection to an inoperative machine.
        3. Attempt selection of a non-existant file.
        4. Attempt to open a file already in use.
        5. Cancel a partially completed transfer.
        6. Abort a partially completed transaction.
        7. Send an out-of-order PDU.

4. Additional Suggestions

    1. To facilitate debugging, include in the implementation the ability to log incoming and outgoing PDUs and parameters.

    2. To facilitate debugging, include in the implementation the ability to send or receive a PDU, then display the contents of the variables of the protocol machine.

ATTACHMENT 8
Presented by Pat Amaranth, GM

FTP TESTING ISSUES
(TO RESOLVE)

UNIFORMITY ACROSS DEMOS

1) ARBITRATION DECISIONS APPLY TO BOTH

2) TEST PROCEDURES ARE UNIFORM

3) NO CURRENT COMMITMENT TO DEVELOP A "STANDARD" FTP IMPLEMENTATION

* * * * *

INTER-VENDOR TESTING

1) ALL MUST TEST TO ALL

   - TIMING

2) FULL TESTING --->

   - "ATTENDEE" INTERFACE
   - FILE UTILITIES
   - LOADING
   - PRIVATE VENDOR AGREEMENTS

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Gary Baczkowski
747 Alpha Drive
Highland Heights, Ohio 44143

Bob Jones
747 Alpha Drive
Highland Heights, Ohio 44143

David C. Sweeton
747 Alpha Drive
Highland Heights, Ohio 44143

Shack Toms
747 Alpha Drive
Highland Heights, Ohio 44143

American Bell

A. A. Akiwpelu
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Lincroft, New Jersey 07738

Michael Herrick
307 Middletown/Lincroft Road
Lincroft, New Jersey 07738

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John Long
International Support
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McLean, Virginia 22102

Roger S. Novack
7915 Jones Branch Drive
McLean, Virginia 22102

Boeing Computer Services Company

Sheldon Blauman
P.O. Box 24346
Seattle, Washington 98124

Lorie Bride
P.O. Box 24336 MS 7F-01
Seattle, Washington 98124

Chris Dunlap
7980-90 Gallows Road
Vienna, Virginia 22180

Ken Swenson
P.O. Box 24346 MS 7A-05
Seattle, Washington 98124

Bolt, Beranek, & Newman

James Berets
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Cambridge, Massachussetts 02238

John Burruss
50 Moulton Street
Cambridge, Massachussetts 02238

Ross Callon
50 Moulton Street
Cambridge, Massachusetts 02238

Burroughs Corporation

Scott A. Stein
CNG/Tredyffrin Plan
P.O. Box 203
Paoli, Pennsylvania 19301

Carleton University

Jose Ramiro Montealegre
180 Argyle Street
Room 1524
Ottawa, Ontario Canada K2P-1B7

Charles River Data Systems

Dick Swee
983 Concord Street
Framingham, Massachusetts 01701

Cincinnati Milacrom

Prentiss Yates
Route 48 & Mason Road
Lebanon, Ohio 45236

Contel Information Systems

Samuel E. Clopper, Jr.
Government Systems Division
11781 Lee Jackson Highway
Fairfax, Virginia 22033

Concord Data Systems

Ross Seider
303 Bear Hill Road
Waltham, Massachusetts 02154

Control Data Corporation

J. L. Nading
4201 N. Lexington Avenue
Arden Hills, Minnesota 55112

B. S. Sekhon
4201 N. Lexington Avenue
Arden Hills, Minnesota 55112

3Com Corporation

Pamela Lawson
1390 Shorebird Way
Mountain View, California 94043

Greg Shaw
1390 Shorebird Way
Mountain View, California 94043

Data General

Lyman Chapin
4400 Computer Drive
Westborough, Massachusetts 01746

Digital Equipment Corporation

Chak Lai
21333 Haggerty Road
Novi, Michigan 48050

Anthony G. Lauck
1925 Andover Street
Tewksbury, Massachusetts 01876

Jeff Schriesheim
1925 Andover Street
Tewksbury, Massachusetts 01876

Rita Stubler
21333 Haggerty Road
Novi, Michigan 48050

E-Systems

Marvin Jenkel
7700 Arlington Blvd.
Falls Church, Virginia 22046

William Livingston
7700 Arlington Blvd.
Falls Church, Virginia 22046

William Miller
7700 Arlington Blvd.
Falls Church, Virginia 22046

Excelan

Navindar Jain
2180 Fortune Drive
San Jose, California 95131

Inder M. Singh
2180 Fortune Drive
San Jose, California 95131

Federal Bureau of Investigation

Jerry Smith
Room 8391, TL-245
10th & Pennsylvania Avenue, NW
Washington, D. C. 20535

Fisher Body

Charles D. Groff
30001 Van Dyke Avenue
Warrent, Michigan 48090

Ford Motor Company

Richard Batty
Room 890 WHQ
The American Road
Dearbord, Michigan 48121-1899

Shaun Devlin
Room S-2097, Scientific Research Lab
P.O. Box 2053
Dearborn, Michigan 48121-1899

Melvin Gable
Room E-1174, Scientific Research Lab
P.O. Box 2053
Dearborn, Michigan 48121-1899

Vadivelu Jeyabalan
Room E-1174 Scientific Res. Lab.
P.O. Box 2053
Dearborn, Michigan 48121

Foxboro Company, The

Alan Sciacca
Department 341
38 Newpost Ave.
Foxboro, Massachusetts 02035

General Motors Corporation

Pat Amaranth
GM Tech. Center-ME&D
Department 69 EA-BLD9

Warren, Michigan 48090
Ed Deenihan
GM Tech. Center B/MD-66
Warren, Michigan 48090

Ronald Floyd
GMME&D-MD/66
GM Technical Center
Warren, Michigan 48090-9040

Ken Kanaby
Technical Center, MD-66
Warren, Michigan 48090-9040

Mike Kaminski
Manufacturing Development
Technical Center
Warren, Michigan 48090-9040

Dale F. Larson
GM Technical Center
12 MI&MOUND-N2-GMECC
Warren, Michigan 48080-9040

Gould, Inc.

Rao Cherukuri
6901 Sunrise Blvd.
Ft. Lauderdale, Florida 33310

Allen Brown
6901 W. Sunrise Blvd.
Ft. Lauderale, FL

Hewlett Packard

Ken Aird
3404 E. Harmony Road
Ft. Collins, Colorado 80525

Atul Garg
19420 Homestead Road
Cupertino, California 95014

June Nishimoto
246 Edlee Avenue
Palo Alto, California 94306

Lyle Weiman
19446 Pruneridge Ave.
Cupertino, California 95014

Honeywell Information Systems

Rebecca Hutchings
7900 Westprak Drive
McLean, Virgina 22066

William Stallings
7900 Westpark Drive
McLean, Virginia 22102

IBM Corporation

G. A. Deaton, Jr.
IBM Communications Products Division
E87/651
P.O. Box 12195
Research Triangle Park, North Carolina 27709

J. J. Quigley
IBM Systems Products Division
24E/037
P.O. Box 10500
Palo Alto, California 94304

Pat Mulvey
24V B231-1
P.O. Box 1328
Boca Raton, Florida

Perry Taylor
2747 Franklin Road
Bloomfield Hills, Michigan 48013

Roger Thompson
1501 California Avenue
Palo Alto, California 94304

ICL

J. R. Cadwallader
West Avenue
Kidsgrove
Stoke-on-Trent ST7 1TL
United Kingdom

John Salter
West Avenue
Kidsgrove
Stoke-on-Trent ST7 1TL
United Kingdom

D.J. Power
Arndale Center
Manchester, United Kingdom

K. J. Turner
West Avenue
Kidsgrove
Stoke-on-Trent ST7 1TL

Inco. Inc.

Paul Styger
C3I Systems Division
8260 Greensboro Drive
McLean, Virginia 22102

Thomas Trump
C3I Systems Division
8260 Greensboro Drive
McLean,Virginia 22102

Industrial Technology Institute

P. David Fisher
2901 Baxter Road
Ann Arbor, Michigan 48109

Ronald M. Martin
P.O. Box 1485
Ann Arbor, Michigan 48109

Integrated Microcomputer Systems, Inc.

Aldrin Leung
5320 Marinelli Road
Rockville, Maryland 20852

Kenneth Lindsay
1235 Jefferson Davis Highway
Suite 1408
Arlington, Virginia 22202

Howell Mei
1235 Jefferson Davis Highway
Suite 1408
Arington, Virginia 22202

Intel Corporation

Allen Rochkind
SC6-056
3200 Lakeside Drive
Santa Clara, California 95051

Ronald Yara
3200 Lakeside Dr.
Santa Clara, California 95014

INTERLAN, Inc.

David Potter
3 Lyberty Way
Westford, Massachusetts 01886

Jonathan Taylor
3 Lyberty Way
Westford, Massachusetts 01886

InterSil Systems

Dr. Ted Britton
1275 Hammerwood Ave.
Sunnyvale, California 94086

Los Alamos National Laboratory

Don Tolmie
Los Alamos, New Mexico 87545

Mitre Corporation

Paul J. Brusil
P.O. Box 208
Bedford, Massachusetts 01730

David Oppenheim
P.O. Box 208
Bedford, Massachusetts 01730

Motorola

Robert Franklin
South Diablo Way
Tempe, Arizona 85282

Bruce Loyer
P.O. Box 2953
Phoenix, Arizona 85062

NBI, Inc.

Douglas McCallum
P.O. Box 9001
Boulder, Colorado 80301

Conrad Geiger
P.O. Box 9001
Boulder, Colorado 80301

National Bureau of Standards

Robert Blanc
Institute for Computer
Sciences & Technology
Room A231, Building 225
Washington, D. C. 20234

Dennis Branstad
Institute for Computer
Sciences & Technology
Room A219, Building 225
Washington, D. C. 20234

Robert Carpenter
Institute for Computer
Sciences & Technology
Room A219, Building 225
Washington, D. C. 20234

Michael Chernick
Institute for Computer
Sciences & Technology
Room B226, Building 225
Washington, DC 20234

John Heafner
Institute for Computer
Sciences & Technology
Room B218, Building 225
Washington, D. C. 20234

Jerry Linn
Institute for Computer
Sciences & Technology
Room B212, Building 225
Washington, D. C. 20234

William Majurski
Institute for Computer
Sciences & Technology
Room A219, Building 225
Washington, D. C. 20234

Kevin Mills
Institute for Computer
Sciences & Technology
Room B212, Building 225
Washington, D. C. 20234

James Moulton
Institute for Computer
Sciences & Technology
Room B212, Building 225
Washington, D. C. 20234

Fran Nielsen
Institute for Computer
Sciences & Technology
Room B212, Buliding 225
Washington, DC 20234

Don Rippy
Institute for Computer
Sciences & Technology
Room A231
Washington, DC 20234

Robert Rosenthal
Institute for Computer
Sciences & Technology
Room B226, Building 225
Washington, D. C. 20234

Shirley Watkins
Institute for Computer
Sciences & Technology
Room B226, Building 225
Washington, D. C. 20234

NCR Comten

Gerald Brinda
2700 Snelling Ave. N.
Roseville, Minnesota 55113

David W. Tillman
2700 Snelling Avenue North
St. Paul, Minnesota 55113

North Carolina State University

Bill Chimiak
School of Physical and Mathematic
Sciences & School of Engineering
Box 5490
Raliegh, North Carolina 27650

Phillips Information Systems

Rene Archambault
5250 Ferrier
Montreal, Canada H4B1L4

Seimens AG

Dittmar Janetzky
P.O. Box 211080
7500 Karlsfuhe, Germany

Mr. Kreppel
Guenther-Scharowsky-Str.
D-8520 Erlangen
West Germany
9131 7 31759

Tektronix, Inc.

Maris Graube
P.O. Box 500
Beaverton, Oregon 97077

Andy Luque
P.O. Box 500
Beaverton, Oregon 97077

Robert L. Sangroniz
Box 1000 MS/63-489
Wilsonville, Oregon 97070

University of Michigan & Industrial Technology Institute

Douglas B. Smith
Ann Arbor, Michigan 48109

Ungerman-Bass

John M. Davidson
2560 Mission College Blvd.
Santa Clara, CA 95050

Xerox Corporation

Juan Bulnes
OPD Office Systems Business Unit
3450 Hillview Avenue
Palo Alto, California 94304

Solosystems

Der-Hwa Gan
670 Gail Avenue #E-27
Sunnyvale, California 94086

Source Telecomputing

Leslie Spira
1616 Anderson Road
McLean, Virginia

Sperry Univac

Jim McNulty
P.O. Box 500
Blue Bell, Pennsylvania 19124

Mike Wolfersperger
P.O. Box 500
Blue Bell, Pennsylvania 19124

Sytek, Inc.

William C. Taylor
6000 Executive Blvd.
Suite 205A
Rockville, Maryland 20852

Systems Architects, Inc.

Ashok Kuthyar
510 W. Annandale Road
Falls Church, Virginia 22046

BIBLIOGRAPHY

"Multi-Vendor Demonstration File Transfer Protocol," National Bureau of Standards, August, 1983.

"Multi-Vendor Demonstration File Transfer Protocol Formal Description," National Bureau of Standards, September, 1983.

"Multi-Vendor Demonstration File Transfer Protocol Supplement," National Bureau of Standards, September, 1983.

Proceedings of the First LAN-Transport Workshop, NBSIR 83-2673, National Bureau of Standards, Washington, D.C., February 1 - 2, 1983.

Proceedings of the Second LAN-Transport Workshop, NBSIR 83-2717, National Bureau of Standards, Washington, D.C., May 5 - 6, 1983

Proceedings of the Third LAN-Transport Workshop, NBSIR 83-2757, National Bureau of Standards, Washington, D.C., July 18 - 20, 1983

Rochkind, Allen B. "Proposal for File Management Services Used for the Intervendor Demo," Intel, August, 1983.

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10. SUPPLEMENTARY NOTES

[ ] Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

The National Bureau of Standards Institute for Computer Sciences and Technology (ICST) has prepared specifications for the International Organization for Standardization's (ISO) Class 4 Transport Protocol. At the request of a number of companies, ICST organized a workshop series for implementors of these specifications using local area networking technology. The first workshop focused on implementation techniques and strategies so that a multivendor demonstration of these protocols can occur at a major computer conference in 1984 targeted for the NCC 1984. Primarily the details of CSMA/CD and Transport Class 4 were discussed and parameters were selected. A second workshop focused on token bus LANs and file transfer applications to be run at the targeted 1984 demonstration. Agreements on the specifics of the file transfer protocol were reached at the third workshop. This report documents the fourth workshop in the series of LAN-Transport workshops. The fourth workshop covered further refinements to the file transfer protocol, testing procedures, and demonstration details.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

communication protocols; computer networks; file transfer protocol; local area networks.

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