TCP Meeting Notes - 29 January 1979

OPENING REMARKS - Postel, Cerf

Jon welcomed the group to ISI and pointed out the facilities. Vint provided a quick overview of the status of TCP as a basis for a DOD standard. Jon gave a brief summary of the TCP testing session which preceeded the meeting. Due to the need to have the specification edited and published very soon, it was decided to overturn the agenda and devote the main part of the day to editing sessions.

DISCUSSION OF TCP ISSUES

a. TCP Data and Control Sequence Spaces

The suggestion that data and control should have distinct sequence spaces is rejected.

b. DATA and SYN

It is acceptable to send data with a SYN segment.

c. Zero Window Arithmetic

A proposal to treat a zero window as a window of size one for purposes of sequence number checking is rejected; the four-way test now in the description is retained.

d. Addressing

Whether ports are best located in TCP or IN header was discussed. This is a continued outstanding issue. For now, ports remain in TCP header. Biba and Cohen are to have a small group meeting to discuss Multiplexing and Addressing and report their conclusion at the next meeting.

e. Pseudo Program

The use of a program of sorts as a specification device was reviewed. The feeling was that while of value, it should be an appendix rather than the main specification. Also, considerable concern was expressed over publishing any program containing bugs.

f. Close

Some feel "CLOSE" is too strong a word for the mild-mannered termination procedure currently defined. The requirement to continue reading data after issuing the CLOSE request bothers some users. Possibly, it would be useful to change the names of ABORT and CLOSE to Immediate and Deferred Close. Not clear there was any resolve to actually change anything.

g. Rubber EOL

Much discussion of purpose of Rubber EOL. Some unhappiness was expressed about the name. Seems to be a way of making the sender's letter and the receiver's buffers into transaction units. There was a call for an investigation into other mechanisms to provide transaction-oriented transmission. It would help the discussion and motivation to have a specific detailed transaction-oriented application in mind.

EDITING THE SPECIFICATION

At this point, the meeting divided into small groups to edit the specification in sections.

DISCUSSION OF TCP ISSUES REVISITED

After several hours of editing, the meeting reconvened, and issues that came up during the editing were discussed.

a. FIN processing when Buffer Size is not one.

In any case, FIN implies EOL.

If FIN is in same letter with EOL or in a separate segment which arrives when on a buffer boundary, then the FIN does not cause an additional EOL. If in a segment with data and no EOL, then it causes one EOL action.

b. Letter Combination

If the sender knows that an EOL will fall on the receiver's buffer boundary, then the sender can combine additional data into the same segment and erase that letter boundary.

That is, if there is no "phantom data", then letters may be combined.

c. Order of Processing

The order of processing of the elements of a segment should be clarified in the specification.

There is a special case for processing RST in the right way to avoid entering ESTABLISHED state.

d. Implementation

It is suggested that section 5 be deleted with perhaps a few descriptions of mechanisms retained. Perhaps some notes, such as Plummer's note on sequence space arithmetic could be retained or inserted.

e. Options

It is now official that there are no unchecksummed option in TCP or IN.

For both TCP and IN options, the format will be TYPE first, LENGTH second.

TYPE = ZERO   is end of option list

TYPE = ONE   is NOP or padding

TYPE = 2 or more has LENGTH and length-2 arguments octets

f. OPEN User Call

The LISTEN and CONNECT user calls will be replaced by one call named OPEN which will have an active/passive flag.

g. STATE DIAGRAM

The state diagram should be made more accurate. For example, it should include RST events and local ABORT calls.

h. Window Policy

Backward motion of the window is allowed but strongly discouraged.

TCP Meeting Notes

TCP TESTING RESULTS

Jon summarized the TCP Testing results. The players were:

    Mike Wingfield   - Unix "C"
    Jack Haverty   - Unix MACRO-11
    Bob Braden   - UCLA 360/91
    Bill Plummer   - Tenex
    Dave Clark   - MIT-Multics
    Jim Mathis   - LSI-11

Every implementation could talk to itself.

In general, the programs could talk to all the other programs; in a few cases, the connections were not verified due to a lack of time. When checksums were in force, the programs were considerably less compatible. Work was done the second day of testing, and much of this problem was overcome.

The testing involved (in addition to direct connection) the use of a special "testing" gateway. This gateway is set up to purposely discard, delay, duplicate, or introduce errors into the datagrams that it handles.

The TCP testing was based on a scoring procedure to focus activity on actually making as many inter-program contacts as possible, and to test some unusual features of TCP. In several ways, the scoring procedure was not fair, and all the participants did very well. In any case, the order of the finish according to the score sheet was:

    Wingfield
    Clark
    Plummer
    Haverty
    Mathis
    Braden

While this session was very successful, further testing is needed.

MAY DEMONSTRATION

There will be an "Internet Demo" on 11 May at BBN. This is really a demonstration of TCP's and user programs interacting through several networks. Dave Clark will serve as a focal point for further testing of TCP's on the east coast.

NEXT MEETING

Vint will take a poll in early March for inputs and status on TCP's. He will then determine the date of the next TCP meeting.

ACTION FOR NEXT TIME

a. Postel – Reissue Specification

b. Biba, Cohen – Report on Multiplexing and Addressing

c. Implementors – Report TCP Information

d. Postel – IEN listing all OPTIONS

MEMOS DISTRIBUTED

1. Meeting Agenda

2. Internet Experimental Note (IEN) Index – Postel

3. IEN-71 "User Datagram Protocol" – Reed & Postel

4. IEN-72 "Multiplexing Protocol" – Postel

5. IEN-73 "A TCP Implementation Issue" – Abramovitz, Padlipsky, and Biba

6. IEN-74 "Sequence Number Arithmetic" – Plummer

7. IEN-75 "The TCP Reset Mechanism" – Plummer

8. List of Attendees

Postel

ATTENDEES

Jack Haverty	BBN	JHAVERTY@BBND
William W. Plummer	BBN	PLUMMER@BBN
Ray Tomlinson	BBN	TOMLINSON@BBN
Mike Wingfield	BBN	WINGFIELD@BBND
Vint Cerf	DARPA	CERF@ISIA
Ed Cain	DCA	CAIN@EDN-UNIX
Ray McFarland	DOD	MCFARLAND@ISIA
Gary Grossman	DTI	grg@dti
Norman Abramovitz	FORD	ABRAMOVITZ@SRI-KL
Ken Biba	FORD	BIBA@SRI-KL
Danny Cohen	ISI	COHEN@ISIB
Jon Postel	ISI	POSTEL@ISIB
Noel Cniappa	MIT	JNC@MIT-AI
David Clark	MIT	DClark@MIT-AI
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Brain Davies	RSRE	JTAYLOR@ISIA
Paul Masterman	RSRE	JTAYLOR@ISIA
David Kaufman	SDC	KAUFMAN@ISIE
Jim Mathis	SRI	MATHIS@SRI-KL
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