Set II

BOLT BERANEK AND NEWMAN INC

CONSULTING • DEVELOPMENT • RESEARCH

Report No. 1925

QUARTERLY MANAGEMENT REPORT

Fourth

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK

PERIOD: 1 October 1969 - 31 December 1969

Principal Investigator: Mr. Frank E. Heart
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Sponsored by
Advanced Research Projects Agency
ARPA Order No. 1260

Contract No. DAHC15-69-C-0179
Effective Date: 2 January 1969
Expiration Date: 31 December 1970
Contract Amount: $1,430,093.00

Submitted to:

Director
Advanced Research Projects Agency
Washington, D. C. 20301

Attn: Dr. L. G. Roberts

BOLT BERANEK AND NEWMAN INC
CONSULTING DEVELOPMENT RESEARCH

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12 January 1970

Director
Advanced Research Projects Agency
Washington, D. C. 20301

Sir:

This is the fourth in a series of management reports that Bolt Beranek and Newman Inc. submits quarterly to ARPA. The report outlines progress in the development of Interface Message Processors (IMPs) for the ARPA computer network, under Contract Number DAHC15-69-C-0179. Under this contract, BBN is responsible for the design, fabrication, test, and delivery of IMPs to four ARPA sites, and for initial network testing of the resulting four-node test network. Both standard and special design IMP hardware are being supplied by the Honeywell Computer Control Division under subcontract to BBN.

BBN Proposal P70-IST-1 dated 15 July 1969 proposes an extension of our contract to include delivery of IMPs to a total of ten ARPA sites; although this contract has still not been negotiated, BBN has received authorization and release of funds to initiate hardware procurement. From a technical point of view, BBN is now proceeding on the assumption that this extension will be negotiated.

We are adhering closely to the program plan summarized in BBN Report No. 1765 and described in detail in BBN Proposal P69-IST-5, Proposal Amendment P69-IST-5A, and Proposal P70-IST-1.

This report covers the period 1 October 1969 - 31 December 1969. Within this period, we have:

1. Delivered production IMP #2 to SRI on 6 October. The IMP came up in one day and within two weeks, the Host/IMP communication was operating.

2. Delivered production IMP #3 to UCSB on October 30. The IMP came up in two days. However, connection to the Host interface uncovered a logic error in the IMP which has been corrected for all IMPs.

3. Delivered production IMP #4 to Utah on December 1.

4. Received production IMP #5 at BBN (Cambridge) on December 31. This is the first of six machines authorized to be built under the contract extension. It will be shipped to Rand on 16 February 1970. Drawings for the system have been updated to the #5 level which will be the point of departure for future modifications.

5. Established an initial network control center at UCLA. We have run a series of phone line test from the center, and we are in a position to monitor behavior of the four-node net.

6. Issued a revision of BBN Report No. 1822, "Host Specifications", incorporating new software formats to include the IMP/Host discard message and incomplete transmission message as well as to clarify the section on initialization of Host/IMP communication.

7. Prepared the first draft of the IMP operating manual which includes installation and testing instructions as well as operating instructions.

8. Completed checkout and shipped the November 15 version of the operational IMP program to all four initial sites; recalled and destroyed all September (initial) versions. The November 15 version makes the statistics, trace, and status features available and includes an experimental version of the ability to load the operational program from the network.

9. Completed the investigation of a Host/IMP interface capable of driving long cables.

10. Prepared and submitted a paper for the forthcoming SJCC. This paper summarizes the IMP design and the considerations leading to that design as well as the hardware, the software and the projected system performance.

11. Participated in a panel discussion on Advanced Networks at the ACM Symposium on Problems in Optimization of Data Communication Systems held in Pine Mountain, Georgia, October 13 - 16, 1969.

We have made headway on the problem of quality control of IMPs coming from Honeywell to BBN by requiring a vigorous running of test programs and a witness of machine performance by BBN personnel before release for shipment from Honeywell. This procedure applied to production #5 has resulted in a running machine upon delivery at BBN. The next quality issue which we will tackle with Honeywell is in the field maintenance area where we are trying to understand what their plans and planned maintenance procedures are in detail.

Our experience with phone line installation has been good with circuits in and up on time. However, equipment installations at the sites vary widely from site to site showing an apparent lack of standard designs for cabinets, cabinet content, cabinet location restrictions and the like. The arguments which come up at each site on these issues could be eliminated and site installation greatly simplified if a standard design were forthcoming from AT&T.

For the next quarter we plan to:

1. Complete negotiations of the contract extension.

2. Deliver IMPs to Rand, BBN and MAC.

3. Continue software development and test.

4. Fabricate Distant Host interfaces.

5. Continue making measurements on the four-node network.

6. Take a more active role in problems associated with Host protocol.

The fiscal status of this contract to date is:

Total funding to BBN to date - ~~$1,430,093~~ 2,013,492

Funds committed by BBN to date - ~~$1,263,072~~ 1,528,57

Estimated funds required to complete ~~ten~~ fourteen systems* - ~~$ 570,420~~ 484,915

Very truly yours,

BOLT BERANEK AND NEWMAN INC.

HKR

Hawley K. Rising

HKR/nlg

~~*Proposal P70-IST-1 for $840,765 which has been funded up to $437,366 is in final negotiation and is expected to provide the required additional funding to complete ten systems.~~

*Includes $180,000 of an estimated additional funding of $323,224 required to complete fourteen systems.