

INTERDEPARTMENTAL

MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS. 02139

from the office of

To: Robert H. Scott, Director of Information Processing Services

From: J. H. Saltzer, M.I.T. Project MAC

Date: September 6, 1973

Subject: Initial reaction of Project MAC to HISI large-memory proposal

By now I have had time to absorb and think about the large-memory proposal from HISI which you described to me about three weeks ago, and also to run the essence of the proposal by Ed Fredkin. Our first two reactions are roughly similar to yours, namely

1. The engineering aspects of the proposal appear on the surface to be very responsive to our request. I am concerned that full engineering specifications were not supplied with the proposal, and have not yet been delivered. The areas not specified are the expected access and cycle times of each kind of main memory to be supplied, as viewed from the processor in full configuration, and the size, organization, and access time of the cache memories, with and without address preparation overlap. All of this information is really essential to a determination of whether or not the proposal is a viable one.
2. The pricing appears to be unreasonable. As I understand the figures, the first 2 million words are priced at about 6¢ per bit; all additional memory at about 1 1/2¢ per bit. From our understanding of current marketplace quotations for interfaced memory to be delivered in 12 months, the 1 1/2¢ figure is about average. The 6¢ figure represents an extra cost of almost \$4M to get up to the 2 million word level. As best we can guess, this price seems to be an attempt to recover the engineering costs of the large memory system entirely on the basis of a single installation. Thus, our conclusion is that the marketing end of the proposal is unreasonably narrow -- it contains an assumption that no other Multics site would want to expand its memory. Experience with the 6180 Bulk Store Controller already convinces me of the desirability of moving to a simpler organization, with directly addressable memory replacing the BSC at all sites.

We also had a third reaction which may be new: after examining the dates on my original RFP, and of our meetings, and the promises of timely responses, it appears that the delay has been unreasonably long; it has caused some skepticism here about HISI's real interest in delivering a large memory system. My own perception is that delays in response from a large manufacturer are typical, but I report a level of surprise and skepticism at Project MAC, because skepticism affects our ability to convince people to commit funds.

Finally, I observe that we have, perhaps unintentionally, tied two ideas together: 1) the addition of a cache memory to the 6180, to solve some unexpected hardware performance problems, and 2) the implementation of a large memory system, which also happens to require a cache. In light of the response, I am now convinced that tying these ideas together was a strategy error on our part, and we should try to untangle the two ideas.

We would like to make the following specific proposals for action:

1. Request a separate price for upgrading the 6180 processors to contain a cache memory, on the basis that present hardware performance is so low that a cache will probably be needed whether or not the large memory proposal is accepted. A response to this request would also allow us to better evaluate the cost of the memory system alone.
2. Enter HISI at the highest possible level with the following two-part request:
 - a. Please review the marketing assumptions behind the price proposal.
 - b. Would HISI corporate management be interested in supporting research in future techniques by providing a gift to cover the difference in cost between HISI's current marketing position and the almost certain price of memory to be available in a few years?
3. Extend invitations to bid on the large memory system to several of the alternate memory suppliers mentioned in my original RFP. The results of this exercise will surely provide evidence of whether or not we are on the right track in claiming that the HISI bid is priced out of line.

What do you think of these proposals? Let's get together and talk them over when you have a chance. Thanks for your help in keeping this thing going.

xc: E. Fredkin
F. Corbató