MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROJECT MAC

TO: Malcolm Jones

FROM: F. J. Corbató

DATE: Oct. 30, 1967

   You asked me to come up with an overall GE 645 system which
has a total budget of approximately $90K/month. After a certain
amount of discussion with the key technical people the following
rough outline of a configuration seems appropriate. My estimates
of cost are based on some old August 1966 figures which I understand
have gone up approximately five percent. This correction is indicated
at the end. The recommended configuration is as follows:

Quantity Description	1966 Cost in $1000/Month
1 CPU	14.3
4 65K Core Memory Controllers of one microsecond access time	45.3
1 GIOC	10.4
1 High Speed Drum	12.2
10 Tapes including a 2x16 Controller	9.6
2 Data Products Disk Units of approximately 17M Words each plus Controller	11.6
2 Each of Card Reader, Punch and Printer	5.2
1 Old Style Operating Console for T and D.	.4
1 System Clock	1.2
1 New Style Reconfiguration Console	.6
Power Equipment	.3
Total	$105.9
Plus 5 percent price rise	5.3
	$111.2
Minus 20 percent Educational Dis.	22.2
	$ 89.0

The following comments apply to the above list:

1. The above list is not quite minimal in that it could be further shaved by: removing two of the system controllers but keeping all of the core memory at a saving of about \$4K/month; removing one of the two disk units (saving about \$4K/month); or removing two of the tape drives (saving about \$1.6K/month). Eliminating the two system controllers is possibly risky in terms of access time and maintenance experience and in addition would have to be undone as soon as one expanded the equipment by another processor. Eliminating the disk is probably unwise inasmuch as, the above amount of disk is about what there is available on the 7094 and program sizes on the 645 are bulkier. However, the second disk could be put on a delayed delivery basis to further shave costs. The number of tape drives could also be reduced by two but would raise the risk of poor maintenance and the downing of the system. After the 7094 is removed the tape drives should all be nine-channel drives except for two seven-channel drives for the purpose of compatibility with old tapes.

2. It should be noted that there is no Custom Direct Adapter in the above configuration nor are there any RACE units. There is also no peripheral switch inasmuch as there is only one GIOC that all peripheral gear attaches to. In addition in the interest of economy and at the expense of reliability and maintenance there is only one system clock and one CPU.

3. There is no Word Synchronous Adapter included in the above configuration although it is desired as soon as it is possible to order one from GE. Further, it is assumed that the above GIOC configuration is identical to the previous specifications except that if space permits, the six adapters for the 201 type dataset and the six adapters for the 202 type dataset should all be on the single GIOC which is to be installed. This is for the purpose of properly handling ARDS terminals and similar terminals as they are introduced.

4. Finally, to improve system performance over that offered by the above configuration, the most desirable component to add which is currently available from GE is a CPU at an approximate net cost of \$12K/month. It is quite probable that system performance could be vastly improved if GE were to offer an extended core memory unit similar to that of CDC but as yet nobody in GE is willing to think seriously of this. Similarly the drum unit seriously threatens system reliability but again there are no available alternatives as yet from GE. It should be clear that our only recourse if GE has no future plans will be to explore alternative suppliers.

FJC:scm

cc: R. M. Fano   R. C. Daley
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