8 April 1975

Prof. J. H. Saltzer
NE43-505

Dear Jerry,

Thank you for your letter of March 12, 1975, relating to the fact that
performance improvement on Multics has taken place in overhead
quantities rather than "user state" items. Following our meeting on
March 10, I made exactly the same calculation as you did for all paying
MIT users and am showing the results in the attachment. As you can
see, the figures are not substantially different from yours and confirm
the point you made; namely, that the performance improvement which
Roger Roach's measurement scripts show to be approximately a factor
of 2 over the last eighteen months has in fact been primarily in overhead
quantities diminished.

There is a rather interesting phenomenon that I discovered in digging
out these data; namely, that the pattern of usage of the third shift changed
drastically during calendar 1974. For example, in March 1974 (probably
our busiest month), in which there was significant pressure on the first
and even on the second shift, usage on the third shift was generating an
average on-line charge of $12.86 per console hour, or about $1.00 per
hour more than the first shift despite the substantial rate differential.
This, I think, reflects two facts. Firstly, people who are here during
the third shift are serious; i.e. they are using their consoles continuously,
not just leaving them dialed in and using them occasionally. Secondly,
people with expensive computing to do sometimes wait for the third shift
when the rates were lowest. As the load decreased during calendar 1974,
the average charge on the third shift also decreased, falling to $9.80 per
console hour in June, $5.10 in September, and $4.77 in November. In
fact, during early calendar 1974, we had the very strange situation of the
shift with the highest prices (i.e. the first) generating the lowest costs
per console hour. It may not be too surprising when you think about it,
but I suspect few of us would have guessed that this was the case.

Sincerely yours,

Robert H. Scott
Director

RHS:ssw
Attachment
cc: W. J. Burner
       F. J. Corbato
       R. C. Daley

First Shift Charges for All Paying MIT Users of Multics

January 1974 - March 1975

Charge $ Per Console Hour	Month
	1974
9.61	January
11.08	February
11.93	March
12.37	April
12.44	May
12.34	June
13.40	July
13.44	August
14.19	September
13.13	October
12.61	November
11.88	December
	1975
13.97	January
13.84	February
13.87	March