



TO: F. J. Corbató  
C. T. Clingen  
R. J. Feiertag  
R. A. Freiburghouse  
J. W. Gintell  
N. I. Morris  
J. G. Saltzer ✓  
B. L. Wolman  
V. L. Voydock

FROM: Steve Webber

DATE: March 25, 1971

SUBJECT: New PL/I Built-ins

The proposal for a built-in function to read the clock has been around for a while. I propose we implement the following two functions which give the user both real and virtual time.

- 1) rclock a builtin function which returns a fixed bin(71) quantity which is the number of microseconds since January 1, 1901, etc.
- 2) vclock a builtin function which returns a fixed bin(35) quantity which is the number of virtual microseconds used by the calling process.

*too small*

The vclock command assumes that the concept of Multics "process" is well-defined and understood by users.

The usage and code for rclock and vclock might be:

```
declare rclock builtin,  
    x fixed bin(71);  
    x = rclock;  
  
declare vclock builtin,  
    y fixed bin(35),  
    old fixed bin(35);  
    y = vclock-old;
```

where 'y' is the differential virtual time since "old" was calculated.

The following justifications are presented:

- 1) When the new hardware clocks arrive, the user need not notice any difference as p/l operators will be modified to return the same units.
- 2) Metering of virtual time is needed both by system designers and normal users and this can be made very efficient (a few instructions). A call is inherently less efficient.
- 3) The need for efficient metering is growing in that performance is becoming a larger and larger issues.
- 4) Introducing built-in's is not new to Multics PL/I.