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TO: M. D. MacLaren

FROM: R. C. Daley

DATE: November 19, 1973

SUBJECT: The New I/O System

The following comments attempt to give a hasty and brief summary of my current thinking on the new I/O system interface.

1. I continue to agree with the goals of the new I/O system interface but must disagree with the statement that the same goals can not be reached by modifications to the old I/O system interface. We can both conceive of countless ways in which the functional and performance goals can be reached with only minor changes to the existing I/O switch.

2. If the incompatible (but admittedly cleaner) interface is to be chosen, much more work must take place before first installation at MIT. The key issue is that MIT cannot tolerate any further performance degradation below the current level of system performance, already felt to be quite unsatisfactory. I think that adequate performance will require conversion of the bound command loop and the ring 4 typewriten DIM and require very high speed (not write around) entries to ios_$read_ptr and ios_$write_ptr which will become a permanent part of the new I/O system interface. In addition a plan must be put into action to convert any remaining areas of the system to use the new I/O system interface within a finite amount of time. It should be remembered that qedx was written to improve system performance for users because system programmers insisted on using qed regardless of performance degradation to the entire system.

3. If the new I/O system is to be installed the following additional problems should be addressed.

   3.1 Detailed specification of the control entry point for operations such as resetread, resetwrite and order should be provided.

   3.2 The io_op command must be fully specified, at least to the point where it can adequately handle the common functions presently provided by iocall.

3.3 Users must be told how to continue to read and write old fortran and PL/I record files and how to convert to the new I/O system format. The conversion process may extend for some time after first installation.

3.4 Full user documentation on the fortran, PL/I and command level interface must be provided before installation and the conversion process must be described in terms meaningful to the average fortran and PL/I user. (The actual procedure interface to iox_ should not be documented in the MPM and users should interface directly to the I/O system using the standard fortran and PL/I record I/O statements only.)

I still believe that the new I/O system represents a good piece of design. However, the choice of a path incompatible with the past must of necessity raise the level of effort required to achieve the first release of the desired function. I don't believe it is realistic to ask MIT and its users (including HISI) to stradle both the new and old I/O system interfaces for an indefinite (unspecified) period of time. We are willing to ask our users to convert if we can be convinced that the documentation is adequate, that adequate time is provided for user conversion, that performance will not be degraded in terms of CPU time or increased working sets, that the conversion has been carefully thought through from beginning to end and that users will not be asked to convert their programs more than once.

The installation of the new I/O system is very important to the future of Multics and the reputations of HISI and MIT will both be on the line during the first installation. We cannot afford to approach this installation in other than the most carefully planned and professional manner. The user community cannot and will not stand for another installation such as the 18.0 installation.

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