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Subject: PFS Requirement to Support IDS2 Under GCOS Simulator

In order to provide for the PFS requirement that the Multics GCOS batch simulator (i.e., the "gcos" command) support executing the GCOS IDS/II (IDS2) the following five enhancements to the simulator are required:

1) Provide the "$ IDS2" control card.
2) Provide the FORTX (Fortran X) that addresses IDS2.
3) Provide MME GEINOS multi-record read/write.
4) Allow RSW2 machine operation (currently treated as an illegal operation).
5) Provide concurrent access control in the file system.

I will now expand on each item, reflecting on approach to take to assure provision. I estimate an all over manpower consideration of 6 man-months. Manpower can not be effectively estimated on an item by item basis. The simulator presents difficulty in obtaining effective definition of precisely what is required to make extensions. A major problem is to find out exactly what the functional requirement is. This is a result of dealing with a very complex facility (GCOS III) whose definition is a marriage of information from manuals, people and the varing customer specific definition of this operating system. Once definition is decided the effort to implement the Multics changes is usually the least of the effort. Once new modules are developed the second most consumptive part of the undertaking is required, testing. This can require extensive effort to obtain on Multics GCOS facilities to assure the implementation is functioning.

1) Provicing the "$ IDS2" card requires modification of a table recording the control cards, and additions to code to provide for the IDS2 being loaded and put into execution. There is also the implication of various "default" control cards being supplied and various parameters that have to bet set.

2) The version of Fortran that provides IDS2 statements is currently not on the library utilized by the simulator. This will have to be edited into the library. (this is one of those "simple" requirements that can occupy an inordinate amount of time, partially because of the lack of background on the part of the implementor in performing such functions, and because of

malfunctioning in the simulator to execute GCOS facilities that may be needed)

3) MME GEINCS must be extended to provide multi-record i/o. At this time I am not able to comment whether this presents difficulties.

4) It is my understanding that the CPU's for level 66 and level 68 function differently in respect to executing the RSW2 (read switches) machine operation. On level 68 (Multics) its execution while the CPU is in BAR mode, required for the simulator, results in an illegal procedure fault. Fortunately this fault is processed by the simulator, so provision can be made to assure the RSW was executed in code processed by the simulator and provide the function required. Again, the full ramification of this provision is not known (by the author) at this time.

5) Provicing file concurrent access control, i.e., GCOS concurrent access, is a major extension to the batch simulator. The new module development will far overshadow that needed for all the other items. Secondly, this provision must be in "concert" with the GCOS TSS simulator (the "gtss" command). Concurrent access is alreacy provided in gtss. This strongly orients utilizing the same facility in the the batch simulator. To do this the gtss file mechanism should be used to replace the gcos (batch) facility (this will have other beneficial side effects, e.g., removing use of the "unsupported" older "ios_" Multics file facility). A customer, Bell Canada, has already made this (suggested) replacement. At the (just) past HLSUA Sandy Bartlett (of Bell Canada) proposed that their extended version of the simulator be provided for installation as the LISD offering. Besices providing the concurrent access requirement to meet this PFS item, it would have the benefit of extending the simulator in many areas. The prcblem is one of manpower to provide for assuring the implementation that would be obtained from Bell. Their version of the simulator can not be blindly adopted, provisions made specifically to that customers needs would have to be known, determination as to their suitability, and more difficult, their removal if necessary. There would also be a testing effort recuired.

In summary, it is assumed that the five items indicated constitute the extent of the effort required by the Multics GCOS project. Currently this is a one man project (and there are responsibilities in addition to the simulator required of this person). As this MTB is authored by this person consideration should be give to the lack of alternate views and opinions and general involvement in this requirement. The five items were originated by Mike Garner (HISLTDTP). Executing IDS2 under the simulator has already been accomplished by Mr. Garner (and "company") in England. In one sense the simulator already "supports" IDS2. The five items represent addressing IDS2 in its more normal fashion, i.e., as it would be on level 66 GCOS. The

concurrent access is a major consideration to make the use of IDS2 (on Multics) useful. The initial customer need for IDS2 under the simulator, to teach CODASYL data base, did not require this provision. Prospective customer needs make it mandatory.