

MULTICS STAFF BULLETIN-19

TO: Distribution
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SUBJECT: The Interim Tape Facility

The design of a Multics tape reel management system has been under development for the last two months. It is still in rough form. At least several weeks would be required to smooth out the rough edges and obtain design approval. Once approved it would require at least two man months to implement. Due to increasingly urgent user needs, it is necessary to implement an interim tape facility. The design of the interim facility was largely dictated by the following two constraints -- it must be quickly implementable (~1 man month) and it must not be incompatible with the design of the full-fledged tape facility.

Proposed Interim Facility

The proposed interim facility has the following properties:

- A user process may have only two drives assigned to it at a time.
- The assignment of a tape drive and the tape mounting request are done when the IO system attach call is made. (That is, the user process is blocked when the attach call is made until a drive has been assigned and a tape mounted.)
- If for some reason the tape cannot be mounted (e.g., it cannot be found) the user must be "manually" notified by operations. That is, they must call him on the telephone or use the user control process to force a message on his console.

- Accounting is either non-existent or is done manually. That is, operations will keep track of how many times a user mounted a tape and perhaps for how long. At the end of the month this usage will be (manually) totalled and the charge calculated.
- Tape access control is performed operationally. That is, the operators will have a list specifying which projects can use which tapes. When the user tries to mount a tape, the operator will look up that tape on the list to verify that the user has the right to mount it. If he does not, the operator will refuse to mount it.

Several deficiencies in the current tape mechanism will be fixed as part of the interim facility. The I/O assignment manager will be extended to know about tapes so that if a process terminated while it has a tape drive assigned to it, the drive will automatically be freed up. The tape DCM will be changed to reject an attach call if no physical tape drives are free (currently the process goes blocked until one become available). Finally, the tape DCM will be changed to reserve certain drives for use by the system. This will be done by the use of a privileged gate. A process attaching a tape through the privileged gate will be assigned any tape drive that is free. Attach calls via the non-privileged gate will be honored only if there is a free non-reserved tape drive.

This completes the description of the basic interim facility. It should be easy to implement and will provide users with useful though limited

tape manipulating capabilities. Many users, however, have need of a different facility that has been given the name "offline segments". Due to pressing time constraints it is not possible to immediately implement this facility. In the interim, a `tape_archive` command produced by the MACAimes Project which allows users to copy segments onto a tape and later read them back into the file system is being upgraded and simplified.

Extensions

The interim tape facility tape reel management system (e.g., tape descriptor segments, more refined access control of reels, append access, different tape densities, ansi standard headers), the tape drive management system (e.g., allowing one process to use multiple drives, reserving tape drives, requesting that a tape be mounted before the attach call is made) and the offline segment facility. In addition, some form of tape accounting must be implemented.