January 14, 1969

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SUBJ: Impressions of GECOS III Time Sharing System

Following are a number of impressions of the GECOS III Time-Sharing System, gleaned from manuals describing GECOS III TSS, GECOS III Basic, and the GECOS III File System, dated March and May, 1968. The system is similar in intent to CTSS, so the following comments are differential to CTSS. Many of the comments are made after reading between the lines of the user-oriented manuals, and may prove to be misconceptions upon closer inspection of the system.

1. From comments made, it would appear that if TSS is to be used within GECOS III, one must allocate a portion of core to it. Apparently it does not share core with batch jobs.

2. There is an emphasis on "subsystems" rather than "commands", so there is no "command language" as such. Instead, at command level, one can type only a subsystem name, without arguments. Two console-accessible subsystems are provided: BASIC, and a file access subsystem, discussed later. Several "internal" subsystems, accessible only to another subsystem are also available. These include a line-number editor.

3. Programs run in TSS are distinctly different than those of regular GECOS III. In particular,

    a. supervisor calls are made using the "derail" instruction rather than a "MME" sequence.

    b. TSS uses full ASCII throughout, with four 9-bit characters per word, while GECOS batch uses six GE hollerith 6-bit characters per word.

4. This ASCII/Hollerith split produces a kind of schizophrenia in the file system, which permits 8-character names for files originating within TSS and 12-character names for files originating within batch.

A number of special subroutines are provided to help paper over the resulting confusion.

5. To add a command (subsystem) to the system, one must reassemble one data subroutine, and reload the system. This is similar to the way the early CTSS worked.

6. There is no subsystem macro facility, such as RUNCOM, which can be driven by the subsystem itself. There is a complex intercommunication scheme whereby a subsystem can call upon another subsystem according to a pattern declared in advance to the supervisor (when the subsystem was installed in the system). Such calls can be nested three deep; a 36-bit intercommunication switch is provided, and a core area is also provided for subsystem intercommunication. One reads and writes in the core area by I/O type calls.

7. There are about 30 supervisor calls.

8. There is no mention of a SAVE or an Automatic Logout facility. There is a Quit function, but no way of restarting the interrupted program.

9. The clocks run at 1/64 millsecond. However, date information apparently comes from the operator at bootload time. (What happens at midnight is not described)

10. The system supports teletypes, with apparent provision for later addition of other console types.

11. Some kind of a batch process initiation facility is mentioned, which seems to require that the TSS user construct a GE Hollerith file which looks like a GECOS III batch input card deck.

12. The user can adjust his upper memory bound in blocks of 1024 words.

13. There is a file system, with a hierarchical directory structure. On the other hand, the hierarchical directory structure is not accessible to a running program. A program can only get at files which have been placed in the user's "Active File Table". Files can be placed there only by using the interactive (and privileged) "ACCESS" command, which can explore the hierarchy, and demand individual file passwords where required. When the session is over, it is the user's responsibility to put files in his "Active File Table" back into the hierarchy, or they will be discarded. (This feature makes an automatic logout facility a little awkward to add.)

14. The file system distinguishes between Read, Execute, Write, and Append

permission, though the first two and last two are"temporarily mapped together". In addition, directories may be given Purge and Modify permission. Each file may have a list of users who can get at it, all with the same permission. The owner of the file can always get at it, with all of Read, Execute, Write, and Append.

15. Passwords for files and catalog names (but not file names) are GE Hollerith character strings.

16. Two disk types and two drum types are supported. Apparently the user can specify which physical device he would like his files on.

17. The file system lacks a link facility. No mention is made of any system library facility.

18. The "List files" command apparently ignores all access restrictions.

19. The login password is typed over a mask of random characters.

20. Mention is made of how to add a subsystem to TSS, using cards. Although there doesn't appear to be any hindrance to building one on-line, the standard system maintenance scheme seems to use cards. (Probably because file system is not backed up - see below.)

21. There is a FAPDBG type facility for debugging a subsystem. It is not mentioned as a "user" facility, however, and may invoke special privileges.

22. There is no system-wide erase/kill, canonical form, or escape character convention. Basic does have an erase/kill convention, although the kill sequence leaves no printed mark.

23. The system Master catalog (root directory) contains the login passwords of each user and his accounting information.

24. Typewriter input/output is line-at-a-time only.

25. If programs were allowed direct access to the file system, they would have to have embedded passwords.

26. There is no mention of file creation or last usage dates; there is no mention of file retrieval: One must presume that there is no file backup on magnetic tape, and no salvager.

27. The following CTSS facilities are missing:

   a.   130-plus commands.

   b.   file system links.

   c.   accounting based on resource usage.

   d.   administrative facilities, group allocation schemes, etc.

   e.   must go offline to change basic system.

   f.   no date-delete facility.

g.   no interconsole communication.

h.   no user magnetic tape facility.

i.   no sleep primitive.

j.   no on-line supervisor debugging facilities.

k.   no bulk output facility to the printer.

l.   There is no notion of a group or project, either for administrative purposes, or for grouping access permission.

28. The system permits the user to overspend his quota by 10 percent, after warning him.

Overall, except for the lack of the quit/start and save/resume sequences, and file system backup on tape, GECOS III TSS resembles CTSS when it was first put into use at project MAC. Many of the missing facilities could be added easily, others would require extensive work if they were desired.