

TO: Distribution List
FROM: M. M. Daggett and J. W. Spall
DATE: March 1, 1967
SUBJECT: Possible Improvements to 6.36 Operation

Attached is a list of possible improvements which might be made to the 6.36 operation as well as some sample jobs.

Distribution List

Corbató, F. J.
Crowley, T. H.
Cushing, C.
Daley, R.
Dean, A. L.
Glaser, E. L.
Graham, R. M.
Liebling, N.
Martin, K.
Neumann, P.
Saltzer, J.
Shy, I.
Siem, E.
Stoller, G.
Widrig, D.

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Having observed several 6.36 jobs and noting the time taken by each GECØS activity as well as noting the time on the printed output it would seem that the following improvements could be made to the 6.36 operation. Thus the GE 645 might be used more effectively.

1) As may be noted from the attached sample jobs anywhere from 20 to 50 percent of the total time to run an IMCV tape is spent in reading or writing the disk. It should be noted here that the setup time of each job is not included in these samples. Anywhere from one to three minutes is spent reading the IMCV tape onto the disk preceding the first activity. On the basis of this information, it would seem that an I/O device which is faster than the current disk is desperately needed. Possibly, an MD-20 drum would speed up the current jobs considerably.

2) The execution activity of an IMCV includes loading as well as execution, all in the same GECØS activity. For this reason, it is difficult to estimate just what percentage of this activity is spent loading and what percentage is spent in actual execution. Mary Thompson has a job which spends 9 minutes in the execution activity of which she notes that 8 minutes are devoted to loading. Noel Morris feels that loading time could be cut by up to 95 percent if the logic of the loader were revised to make just one pass over text and link files. (He estimates this to be a one man-week job.)

3) The 6.36 dumper (created for return to the 7094) dumps all procedures. Both 645 and 7094 machine time, as well as 7094 disk space, would be saved, if pure procedures were not dumped. Since the CTSS command GEBUG is used to analyze the 6.36 dump, it also would require a change. The dump is returned to the 7094 in the form of a CTSS saved file which makes no allowances for gaps. Therefore, Jerry Stoller, who has worked on the dumper, and Don Wagner, who has worked on GEBUG, feel any such change would require major rewrites.

4) The 64.5 dumper (created on the 645 printer) currently dumps all procedures in core. As may be noted from the attached sample problems the 64.5 dumper takes much more machine time than the 6.36 dumper. If the 64.5 dumper were modified such that it would not dump pure procedures, a considerable amount of 645 machine might be saved. Jerry Stoller feels that this change would not be anywhere near as extensive as the preceding change to the 6.36 dumper.

5) Currently, the default option of a MRGEDT run causes a 6.36 dump to be generated and no 64.5 dump. Since 7094 disk space and time are at a premium and also since Cambridge users may easily obtain their 64.5 dumps it would seem that the default should be completely reversed, assuming that the above mentioned change to the 64.5 dumper is made.

6) Users should be made aware of the following two ways that 645 time might be saved.

- a) Segments should not be reassembled if TEXT and LINK files already exist.
- b) To avoid dynamic loading a LIBE card should be used for all segments whose numbers are greater than the stack and which are not specifically created by the user by calls to the pseudo-supervisor. (Needless to say, at least, one run is necessary to discover which these segments are.)

7) Once "Change Letter 9" version of GECØS is installed along with the correction allowing more than 32767 lines of output, users should be allowed to get only one type of dump, a 6.36 or 64.5, but not both; as they should not both be necessary. Until the GECØS correction is made, however, users may not always get their complete 64.5 dump and as a result may need to request both.

Sample Jobs (Time in hours)

Job 1 - Molly Wagner

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0023	.0033	.009
2. EPLBSA	.0136	.0070	.0206	.023
3. EPLBSA	.0276	.0095	.0371	.040
4. EPLBSA	.0021	.0032	.0053	.009
5. EPLBSA(.INIT)	.0016	.0030	.0046	.009
6. Packer	.0016	.0117	.0133	.017
7. Loader/driver	.0012	.0033	.0045	.008
8. Execution	.0134	.0903	.1037	.119
9. Return tape	<u>.0111</u>	<u>.0188</u>	<u>.0299</u>	.043
	.0733	.1491	.2224	

Total elapsed time = .29 hrs. or 17.4 min. Percent of total time using disk only = ~ 51 percent.

Percent of total time using processor only = 25 percent

Job 2 - Sandra Wolf

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0011	.0022	.0033	.010
2. EPLBSA	.0114	.0068	.0182	.022
3. EPLBSA	.0107	.0061	.0168	.019
4. EPLBSA(.INIT)	.0016	.0030	.0046	.008
5. Packer	.0014	.0079	.0093	.013
6. Loader/driver	.0009	.0025	.0034	.007
7. Execution	<u>.3087</u>	<u>.0673</u>	<u>.3760</u>	.383
	.3358	.0958	.4316	

Total elapsed time = .468 hrs. or 28.08 minutes

Percent of total time using disk only = ~ 20 percent

Percent of total time using processor only = ~ 71 percent

Job 3 - Don Widrig

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0022	.0032	.010
2. EPLBSA	.0201	.0086	.0287	.031
3. EPLBSA	.0105	.0059	.0164	.020
4. EPLBSA(.INIT)	.0016	.0029	.0045	.009
5. Packer	.0012	.0052	.0064	.011
6. Loader/driver	.0008	.0024	.0032	.007
7. Execution	.0086	.0556	.0642	.154
8. Return tape	.0015	.0030	.0045	.012
9. 64.5 dump	<u>.0113</u>	<u>.0067</u>	<u>.0180</u>	.023
	.0566	.0925	.1491	

Total elapsed time = .283 hrs. or 16.98 minutes

Percent of total time using disk only = ~ 32 percent

Percent of total time using processor only = 20 percent

Job 4 - Mary Thompson

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0022	.0032	.009
2. EPLBSA	.0022	.0031	.0053	.010
3. EPLBSA(.INIT)	.0016	.0029	.0045	.008
4. Packer	.0010	.0022	.0032	.007
5. Loader/driver	.0008	.0020	.0028	.006
6. Execution	.0081	.0104	.0185	.046
7. Return tape	.0094	.0101	.0195	.035
8. Errorfile	.0014	.0025	.0039	.009
9. 64.5 Dump	<u>.0119</u>	<u>.0096</u>	<u>.0215</u>	.026
	.0374	.0450	.0824	

Total elapsed time = .166 hrs. or 10 minutes

Percent of total time using disk only = ~ 27 percent

Percent of total time using processor only = ~ 23 percent

Job 5 - Charles Garman

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0022	.0032	.001
2. EPLBSA	.0045	.0041	.0086	.012
3. EPLBSA	.0035	.0035	.0070	.011
4. EPLBSA	.0032	.0035	.0067	.010
5. EPLBSA	.0037	.0037	.0074	.011
6. Packer	.0011	.0022	.0033	.009
7. Return tape	<u>.0011</u>	<u>.0024</u>	<u>.0035</u>	.012
	.0181	.0216	.0397	

Total elapsed time = .082 hrs. or 4.92 minutes

Percent of total time using disk only = ~ 26 percent

Percent of total time using processor = ~ 22 percent

Job 6 - Carole Cushing

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0023	.0033	.009
2. EPLBSA	.0036	.0039	.0075	.012
3. EPLBSA	.0402	.0133	.0535	.053
4. EPLBSA	.0059	.0046	.0105	.014
5. EPLBSA(.INIT)	.0016	.0030	.0046	.008
6. Packer	.0011	.0047	.0058	.009
7. Loader/driver	.0008	.0021	.0029	.007
8. Execution	.0072	.0179	.0251	.043
9. Return tape	.0014	.0027	.0041	.014
A. Errorfile	.0014	.0026	.0040	.010
B. 64.5 dump	<u>.0133</u>	<u>.0115</u>	<u>.0248</u>	.030
	.0775	.0686	.1461	

Total elapsed time = .26 hrs. or 15.6 minutes

Percent of total elapsed time using disk only = ~ 26 percent

Percent of total time using processor only = ~ 29 percent

Job 7 - Carole Cushing

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0023	.0033	.009
2. EPLBSA(.INIT)	.0017	.0031	.0048	.009
3. Packer	.0015	.0106	.0121	.016
4. Loader/driver	.0015	.0041	.0056	.009
5. Execution	.0113	.0467	.0580	.066
6. Return tape	.0014	.0030	.0044	.013
7. Errorfile	.0015	.0027	.0042	.009
8. 64.5 dump	<u>.0210</u>	<u>.0134</u>	<u>.0344</u>	.041
	.0409	.0859	.1368	

Total elapsed time = .181 hrs. or 10.86 minutes

Percent of total time using disk only = ~ 47 percent

Percent of total time using processor only = ~ 22 percent

Job 8 - Noel Morris

Activity	Processor Time	Disk Time	Processor and Disk	Total Elapsed Time per Activity
1. Initializer	.0010	.0023	.0033	.012
2. EPLBSA(.INIT)	.0016	.0031	.0047	.008
3. Packer	.0012	.0052	.0064	.010
4. Loader/driver	.0022	.0057	.0079	.010
5. Execution(inter-active)	.0144	.0227	.0371	.103
6. Return tape(includes 6.36 dump)	.0144	.0208	.0352	.056
7. Errorfile	.0024	.0096	.0120	.022
8. 64.5 dump	<u>.0185</u>	<u>.0135</u>	<u>.0320</u>	.039
	.0557	.0829	.1386	

Total elapsed time = .282 hours or 16.92 minutes

Percent of total elapsed time using disk only = ~ 30 percent

Percent of total elapsed time using processor only = ~ 20 percent