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SUBJ: Timing of Phase 1 Bootload Runs

The attached tables and notes show the progress that has been made in speeding up phase 1 bootloads, how long a bootload currently takes and where that time is spent, and a projected time for how long a full phase 1 bootload will take. Also included is a breakdown of the number of segments in each collection.

TABLE A

IMPROVEMENT OF BOOTLOAD TIMES

	Run 0	Run 1	Run 2	Run 3	Run 4
load and initialize collection 1 and 2	2 min	2 min	2 min	2 min	2 min
load and prelink collection 3	5 min	5	5	5	5
initialize branches	18	8 min	6	4.5	2.5
remainder of FS_init_3	12	3.4	2.5	2	2.3
reload_system_ hierarchy	25	13.5	10	8	5.4
total time	52 min	31.9 min	25.5 min	21.5 min	17.2 min

Explanation of Table A

All of the runs loaded 611 segments where a complete phase 1 bootload would require 742 segments.

Run 0 - 10/6/67

This is an original bootload run done with the old Libra-file.

Run 1 - 10/18/67

No coding changes were made, but the ~~old~~^{new} Libra-file was used.

Run 2 - 10/20/67

Hashing parameters used in searching directories were improved.

Run 3 - 11/2/67

1. The directory searching hash code was changed slightly,
2. five often used pieces of directory control were recompiled using pass 1.5,
3. make branches was changed to call status only when necessary instead of twice per segment.

Run 4 -

The 3 lines of print per segment for make_branches and reload_system_hierarch were removed and instead one line was printed each time a major initialization module was called.

TABLE B

CURRENT BOOTLOAD TIME

Taken: 11/2/67 at 22:25

This run loaded 611 segments.

<u>Event</u>	<u>Time Started</u>	<u>Time Spent</u>
Bootload	22:27:15	00:00:50
Load Coll. 2	28:05	0:55
Initialize Drum	29:00	0:30
Load Coll. 3	29:30	3:00
Pre-link Coll. 3	32:30	1:32
Start fs_init_3	34:02	0:29
initialize root	34:31	0:13
initialize branches	34:44	1:53
update hst	36:37	0:54
link ast parents	37:31	1:23
end of fs_init_3	38:54	0:03
start fs_init_4	38:57	0:02
reload syst. hierarchy	38:59	5:40
end of fs_init_4	44:39	

Total time = 17:25

Timing Runs

Full Bootloads

coll. 1 and 2 - 245 segments	245	70 percent increase in collection 3
coll. 3 - 183 segments	314	
coll. 4 - <u>183</u> segments	<u>183</u>	30 percent increase in coll. 1,2 and 3
611	742	

PROJECTED TIME FOR FULL PHASE 1 BOOTLOAD

load and initialize coll. 1 and 2	2 min.
load and prelink coll. 3	8.5
initialize branches	3.3
remainder of FS_INIT_3	3.1
reload_sys_hierarchy	<u>5.4</u>
	22.3 min.

Number of Segments Involved in Bootload

	Initializer	Supervisor	Total	
collection 1 (some of CC, segment loader, tape reader, library)	42	70	112	
collection 2 (PC, DIM, rest of CC, some of SC and initialize devices)	51	82	133	
collection 3 file system (rest of SC, dc, FS_INIT)	38	118	156	} 314
I/O	9	89	98	
SMM	3	57	60	
message and clock reading (for timing runs only)	27			
collection 4 commands and more library	<u>0</u> 143	<u>183</u> 599	<u>183</u> 742	

Notes:

1. SMM and I/O are about 150 seg. added to about 150 other seg. in "load coll. 3"
2. Bootload is about 45 sec of core initialization
3. Paging heavy in Load Coll. 3 and reload system hierarchy
4. From load coll. 3 to end of fs_init_3 is at worst proportional to # of segments loaded.
5. Binding would conspicuously help.
6. ~~Reload system hierarchy is loading about 200 more segments for Phase I. (not true)~~
7. Limit_branches and reload_system_hierarchy - use "make_branches".
8. Can estimate full Phase 1 at 18 minutes and $(10/300)*200 = 25$ minutes.