

April 7, 1969

TO: Multics Performance Log
FROM: R. J. Feiertag
SUBJECT: Core Size Experiment using 2.2.E

An experiment was performed using a special version of MTS 2.2.E. A normal certification was performed using the FSIM. Then 20 removable pages were temporarily wired down to effectively reduce removable core by 20K. Then the system was again certified using the FSIM. The Certification Record produced by these runs is enclosed. The significant changes occurred in page faults, idle time, and interrupts. The time to process page faults during command sequence increased by 65% primarily due to the increase in the number of page faults. This change also accounts for the rise in idle time and the rise in the number of interrupts.

On this system there are 98 1024-word pages either free or removable (526 64-word pages, 6 temp. wired pages, 96 perm.-wired pages). Therefore a 20% reduction in available core increases the number of page faults by 57%.

TO: Multics Performance Log

DATE: 4/8/69

FROM: R. J. Feiertag

SUBJECT: Multics System Performance Certification Record

I Variable settings: operating system

System being certified: Special version of 2.2.E

Certifier used: multics_test_e Script used: cert 1

Number of processes used: 4

Typewriter output: Yes No Number of lines output: 664

System Segment Table Size: 12288

Number of permanently wired pages: 96

Maximum number of processes eligible for multiprogramming: 2

Maximum number of processes which may be loaded: 2

Scheduling Quanta, starting with highest-priority queue:

1. 8 2. 8 3. 8 4. 8 5. 6.

II Hardware configuration

Amount of Core Memory: 256k

Number of processors: 1

Firehose Drum: Yes No

Disk: Yes No

Installation used: MAC

Date of Certification run: March 29, 1969

Time of Certification run: 457 EST

III Other factors expected to influence measurements:

This run uses the FSIM

Each top entry is for full core
 Each bottom entry is for core minus 20 pages

Certification of System:

IV Measurements

a. CPU time breakdown	during process creation	during command sequence	total
1. Time used by subject processes	177.4 244.6 sec.	454.1 572.5	631.5 817.1
2. Time spent loading processes	1.3 1.8	3.3 4.4	4.6 6.2
3. Time spent in file system daemon	0.8 0.4	5.5 6.9	6.3 7.3
4. Idle time due to eligibility control	14.0 25.9	97.7 143.8	111.7 169.7
5. Idle time during page waits	5.9 8.5 0.0 0.0	4.1 3.0 0.0 0.0	10.0 11.5 0.0 0.0
6. True idle time	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
	199.5	564.5	764.0
Total CPU time charged	281.2	730.6	1011.8

b. Breakdown of CPU times used by subject processes

1. Missing-page fault time	40.5 99.8 sec.	169.2 280.1	209.7 379.9
2. Missing-segment fault time	14.4 15.4	12.8 11.0	27.2 26.4
3. Linkage fault time	67.5 69.4	31.1 32.9	98.6 102.3
4. Wall crossing fault time	5.2 5.6	8.2 9.2	13.4 14.8
5. Interrupt handling time	0.7 2.2	1.8 3.8	2.5 6.0
6. Non-fault time	33.5 <u>33.2</u>	239.8 <u>246.8</u>	273.3 <u>280.0</u>
Total	161.8 225.6	462.9 583.8	624.7 809.4

Certification of System:

c. Fault times and number

Process Creation	missing page	missing segment	Linkage	wall crossing	Interrupt
average fault time	13.1 16.1 ms	43.9 46.9	80.0 82.2	2.7 2.9	1.2 1.3
number of faults	3083 6203	328 328	844 844	1928 1928	554 1633

command sequence

average fault time	13.3 14.1 ms	84.1 72.6	57.9 61.4	2.8 3.1	1.7 1.6
number of faults	12683 19927	152 152	536 536	2964 2964	1084 2405

d. Average times seen by a process

1. Average real time for completion of a process: 541.5
704.3 sec
2. Average process creation time: 44.4
61.2
3. Average time for execution of command sequence: 113.5
143.1
4. Time for CTSS to execute same command sequence. 37.6
37.6
5. Performance relative to CTSS (#4/#3) .33
.26

V Output of original run may be found in file labeled:VI Comments: