

To: Multics Performance Log  
From: R. J. Feiertag  
Subject: Certification run with mini-shell  
Date: August 4, 1969

A new certifier is now being used which is more compatible with improvements introduced in the mini-shell complex. It consists of a driving program called "multics\_test" functionally similar to the previous certifier and a process initialization program called "certio" which is called to initialize the certifier processes. "certio" essentially replaces "tio\_" thereby enabling it to direct the input and output of the process to and from the desired device or segment.

The results of the first run with this new certifier is attached. Output is directed to segments. Since this run uses the Fortran script, it can not be directly compared with previous certifier runs. The per process CPU time is comparable to the 36 second CPU time obtained from a 4-user on-line run of the PDP-8 simulator.

During process creation each process creates 100 links. Since the certifier first does its own initialization and then goes through the normal process initialization this can be considered an upper limit on the number of links normally snapped during process initialization.

Statistics seem to be generally better than those observed during console sessions and this can be attributed to the light load. It should be noted that approximately one-third of the time is being spent in idle time due to eligibility.

Future certifier runs will be made with many more processes and using typewriters for output.

TO: Multics Performance Log

DATE: 8/1/69

FROM: R. J. Feiertag

SUBJECT: Multics System Performance Certification Record

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I Variable settings: operating system

System being certified: 3.1.1

Certifier used: multics\_test\_h      Script used: cert3

Number of processes used: 4

Typewriter output:    Yes     No       Number of lines output:

System Segment Table Size: 30K

Number of permanently wired pages:

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. 16    4. 32    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: 8/1/69

Time of Certification run: 470 EDT

III Other factors expected to influence measurements:

This run produces output to a file.

## Certification of System:

IV Measurements

a. CPU time breakdown	during process creation	during command sequence	total
1. Time used by subject processes	37.2 sec.	130.1	167.3
2. Time spent loading processes	0.3	0.9	1.2
3. Time spent in file system daemon	1.5	5.8	7.3
4. Idle time due to eligibility control	15.7	61.3	77.0
5. Idle time during page waits	1.9	1.5	3.4
6. True idle time	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
Total CPU time charged	56.6	199.6	256.2

## b. Breakdown of CPU times used by subject processes

1. Missing-page fault time	5.0 sec.	29.4	34.4
2. Missing-segment fault time	2.3	2.8	5.1
3. Linkage fault time	17.5	17.0	34.5
4. Wall crossing fault time	1.5	4.9	6.4
5. Interrupt handling time	1.2	4.8	6.0
6. Non-fault time	<u>17.8</u>	<u>77.9</u>	<u>125.7</u>
Total	35.3	136.8	212.1

## Certification of System:

## c. Fault times and number

Process Creation	missing page	missing segment	Linkage	wall crossing	Interrupt
average fault time	6.2 ms	9.4	43.7	1.5	0.8
number of faults	795	248	400	960	1514

command  
sequence

average fault time	6.6 ms	14.5	28.7	1.3	0.8
number of faults	4423	196	592	3668	5839

## d. Average times seen by a process

1. Average real time for completion of a process:
2. Average process creation time: 9.3 sec.
3. Average time for execution of command sequence: 32.5 sec.
4. Time for CTSS to execute same command sequence.
5. Performance relative to CTSS (#4/#3)

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

VI Comments: