TO: MPN Distribution

FROM: J.H. Saltzer, J. Gintell

DATE: November 5, 1968

SUBJ: Performance Measurement Tasks

DRAFT

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Purpose

To establish measurement benchmarks for evaluating Multics system performance. Included are:

a. Development of a realistic "script", that is, a list of commands which represents a typical console session.

b. Running Multics with multiple instances of the script of _a_, to obtain running times for future comparison and for detailed metering results to suggest areas for performance improvements.

c. Installation of improved metering facilities.

d. Refinement of the PDP-8 user simulator program to drive Multics with scripts such as those developed in _a_.

Tasks

PM.1.   Script development. Establishment of a plausible, typical console session, for use on a test case in evaluating Multics.

Completion criteria: report describing script and its current execution time on CTSS and Multics.

Personnel: R. Feiertag

PM.2. Script Integration: Modification of system certification program to permit use of interactive scripts.

Completion criteria: execution of the certification program using the script developed in (1.) with four simultaneous processes.

Personnel: R. Feiertag

PM.3. System capacity measurement: Execution of script and certification program with enough parallel processes to saturate system.

Completion criteria: report describing number of processes required to saturate and giving metering results for saturation use.

Personnel: R. Feiertag

PM.4. Ring zero primitive metering: Installation of meters to measure separately time spent in each ring zero primitive as a result of calls from programs outside ring zero.

Completion criteria: Publication of results of measurement of Multics standard certification program.

Personnel: J. Gintell

PM.5. Modify meter_interpret to retrieve and print out metering of ring zero primitives.

Completion criteria: Same as PM.4.

Personnel: D. Vinagrad

PM.6.   Fix PDP-8 simulator program for high speed teletype interface and run with CTSS.

Completion criteria: Simulation of two users on CTSS using simple script.

Personnel: A. Sekino, H. Greenbaum

PM.7.   Integration of script of PM.1 into PDP-8 simulator.

Completion criteria: Simulation of two users on CTSS using PM.1 script.

Personnel: A. Sekino, H. Greenbaum

PM.8.   Expansion of PDP-8 simulator to four users. Requires hardware assembly and checkout of data set interface, and program re-test.

Completion criteria: Simulation of four users on CTSS using PM.1 script.

Personnel: A. Sekino, H. Greenbaum

PM.9.   Integration of PDP-8 simulator with Multics.

Completion criteria: Report comparing results of 4-user PDP-8 simulation with results of PM.2, and estimating actual capacity of Multics.

Personnel: A. Sekino, H. Greenbaum

PM.10. Computation limited benchmark program: Construction of a simple computation limited program and transcription into MAD, BCPL, and EPL, and execution thereof using all available CTSS and Multics compilers, in order to compare operating speeds of different compilers and their generated programs.

on CTSS and Multics for the same basic program.

Completion criteria: Report detailing results of benchmark test.

Personnel: H. Deitel

PM.11. Associative Memory test: Test to establish effectiveness of 645 associative memory in eliminating SDW and PTW fetches. Done by running system certiciation program twice, once with associative memory on and once with it off.

Completion criteria: Publication of report describing metering results of two cases.

Personnel:

PM.12. Extra memory test: Modification of Multics to utilize 392K core memory, and check effect on performance.

Completion criteria: Report comparing standard certification runs with 256K memory and with 392K memory.

PM.13. Dual processor test: Running of Multics with two central processing
units. Includes debugging of any remaining mis-coded locks.

Completion criteria: Report comparing system performance with
1 and 2 CPU's and estimating quantity of
additional memory necessary to keep second
CPU occupied.

PM.5. Traffic Control Metering: Installation of meters to keep track of
idle time (true idle time, idle time during page wait, and idle time
during process loading), average queue lengths, and number of processes
in each execution state.

Completion criteria: Publication of results of measurement of the
Multics standard certification program.

Personnel: R.L. Rappaport