

TO: Distribution

FROM: Grace E. Ackerman-Lewis

DATE: September 2, 1976

SUBJECT: Multics Performance Test Results as of System 28.11c

Attached is a summary of the results from the performance tests done between May 1, 1976 and September 2, 1976. We have seen some performance degradation in the new systems, particularly in the page fault area. This seems to be due partly to the temporary installation of bound_sss_wired_, which was put into sss for test purposes. Included in this report are comparisons of 28.11c with 28.3 and with 28.0. Since the last metering report, we are again running with only one MPC, which does slow us down some.

Current Status (System 28.11c)

	28.0	28.3	28.11c	% change from	
				<u>28.0</u>	<u>28.3</u>
Elapsed Time:	58.0 min	57.2 min	60.1 min	3.49%	4.82%
Virtual CPU:	2153 sec	2072 sec	2141 sec	-0.56%	3.22%
Total CPU:	3163 sec	3125 sec	3253 sec	2.77%	3.93%
Page Faults:	475322	471887	530815	1.04%	1.11%
Memory Units:	32767	33206	37474	1.25%	1.14%

related MTB's:

MTB-278 Multics Performance Test Results as of System 28.3

MTB-267 Multics Performance Test Results as of System 28.0

MTB-252 Multics Performance Test Results as of System 27.6

MTB-245 Multics Performance Test Results as of System 27.1

MTB-223 Multics Performance Test Results as of System 26.4a

MTB-218 Multics Performance Test Results as of System 26.1

MTB-208 Multics Performance Test Results as of System 25.7

MTB-174 Multics Performance Test Results (System 25.2)

MTB-146 Backup Performance Gains

MTB-132 Multics Performance Test Results (System 24.1c)

MTB-126 Revision of Multics Performance Tests

MTB-087 Multics Performance Goals for 1974

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Metering Comparisons for 28.3, 28.4, 28.4g, 28.5, 28.5b, 28.6c, 28.7, 28.7a, 28.8, 28.8a

System:	28.3	28.4	28.4g	28.5	28.5b	28.6c	28.7	28.7a	28.8	28.8a
Date:	04/21/76	04/29/76	05/07/76	05/12/76	05/24/76	06/07/76	06/10/76	06/14/76	06/16/76	06/21/76
Write-through status:	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw
SYST:	none	none	none	none	none	none	none	none	none	none
CPU:	A	A	A	A	A	A	A	A	A	A
Cache	on	on	on	on	on	on	on	on	on	on
Memories:	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B
External Interlace:	off	off	off	off	off	off	off	off	off	off
Disk Channels:	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4	2,8&2,4
P										
Elapsed Time:	57.2 min	57.8 min	58.2 min	59.2 min	57.9 min	61.1 min	61.7 min	57.5 min	61.3 min	58.0 min
Costs (shift 1):	\$494.79	\$509.98	\$602.07	\$618.31	\$615.64	\$643.30	\$652.39	\$615.59	\$657.46	\$618.03
Costs (shift 2):	\$268.32	\$276.59	\$325.76	\$334.57	\$333.17	\$348.12	\$353.04	\$333.17	\$355.83	\$334.47
Costs (shift 3):	\$176.00	\$181.49	\$212.32	\$218.11	\$217.28	\$226.99	\$230.22	\$217.32	\$232.11	\$218.15
CPU, total:	3125 sec	3189 sec	3194 sec	3202 sec	3170 sec	3342 sec	3356 sec	3160 sec	3366 sec	3182 sec
CPU, virtual:	2572 sec	2090 sec	2081 sec	2096 sec	2094 sec	2208 sec	2200 sec	2078 sec	2198 sec	2081 sec
CPU, good (1):	2237 sec	2249 sec	2234 sec	2265 sec	2245 sec	2377 sec	2377 sec	2229 sec	2495 sec	2235 sec
Memory Units:	33206	34489	34933	36031	36214	37670	38265	36367	38871	36423
Page Faults:	471887	498467	504256	504710	494804	521744	535037	506337	541769	511010

tfm meters:

Page Faults:	22.28%	22.99%	23.19%	22.67%	22.46%	22.56%	23.05%	22.71%	23.07%	23.11%
Network:	2.26%	2.22%	2.25%	2.27%	2.23%	2.17%	2.23%	2.24%	2.21%	2.26%
Seg Faults:	2.30%	2.46%	2.42%	2.57%	2.67%	2.60%	2.62%	2.60%	2.60%	2.66%
Bound Faults:	0.24%	0.28%	0.22%	0.24%	0.29%	0.22%	0.23%	0.22%	0.22%	0.25%
Interrupts:	3.74%	3.71%	3.82%	3.77%	3.55%	3.62%	3.70%	3.66%	3.71%	3.64%
Idle, zero:	0.68%	0.63%	0.29%	0.63%	0.70%	0.69%	0.49%	0.25%	0.36%	0.40%
Idle, MPI:	3.08%	2.59%	3.11%	3.72%	3.21%	2.98%	3.15%	3.47%	3.27%	3.23%
Idle, NMPI:	0.08%	0.17%	0.13%	0.19%	0.19%	0.12%	0.17%	0.05%	0.21%	0.09%
Idle, Loading:	0.18%	0.10%	0.16%	0.17%	0.13%	0.13%	0.17%	0.17%	0.15%	0.13%
Idle, total:	4.02%	3.46%	3.69%	4.70%	4.23%	3.92%	3.98%	3.94%	4.59%	3.82%
Other (good):	65.15%	64.88%	64.41%	63.78%	64.58%	64.92%	64.20%	64.63%	64.19%	64.26%

dvm meters:

Bulk Reads:	483373	509900	512651	517661	507239	536052	555253	515195	552214	522012
Bulk Writes:	249431	253088	256344	255009	249331	260876	263574	247883	260741	251863
Bulk ATB I/O:	4.691	4.550	4.545	4.604	4.603	4.602	4.531	4.528	4.528	4.503
DSKA Reads:	36492	32620	36821	33215	39087	40165	40427	32176	35954	37304
DSKA Writes:	16013	16406	17192	16758	18388	16837	15624	14708	15254	15030
DSKA ATB I/O:	51.285	55.374	50.612	50.668	48.878	50.717	52.769	56.937	56.162	51.403
DSKA Avg. Page Wait:	82.110	82.613	83.474	79.726	92.558	78.017	79.424	92.578	84.909	75.104
DSKB Reads:	12048	12607	12332	11050	5158	9788	11864	12973	15067	10703
DSKB Writes:	6589	6066	6191	5460	2828	5059	5971	6652	7717	565335
DSKB ATB I/O:	146.072	143.133	153.402	163.583	258.441	193.267	160.572	141.218	133.309	173.683
DSKB Avg. Page Wait:	62.764	70.749	69.753	101.465	53.448	68.882	66.023	71.682	72.731	79.667

Notes:

(1) Based on Elapsed Time * percentage good (tfm meters)

Metering Comparisons for 28.8a, 28.8b, 28.9, 28.9(2), 28.10, 28.10(3), 28.10(4), 28.10(5), 28.11b, 28.11c

System:	28.8a	28.8b	28.9	28.9	28.10	28.10	28.10	28.10	28.11b	28.11c
Date:	06/21/76	06/30/76	07/07/76	07/15/76	07/22/76	07/25/76	08/01/76	08/04/76	08/16/76	09/02/76
Write-through status:	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw
SYST:	none	none	none	none	none	none	none	none	none	none
CPU:	A	A	A	A	A	A,B	A	A,B	A	A
Cache	on	on	on	on	on	on	on	on	on	on
Memories:	A,B	A,B	A,B	A,3	A,B	A,B,C	A,B,C	A,B	A,B	A,B
External Interlace:	off	off	off	off	off	off	off	off	off	off
Disk Channels:	2,8&2,4	2,8&2,4	2,8&2,4	2,8	2,8	2,8	2,8	2,8	2,8	2,8
Elapsed Time:	58.0 min	56.9 min	57.3 min	60.6 min	59.1 min	33.8 min	48.9 min	69.5 min	57.9 min	60.1 min
Costs (shift 1):	\$618.03	\$614.82	\$621.77	\$645.46	\$609.70	\$301.53	\$382.43	\$831.65	\$589.24	\$637.39
Costs (shift 2):	\$334.47	\$332.77	\$336.54	\$349.32	\$329.88	\$162.93	\$206.37	\$450.47	\$318.77	\$344.94
Costs (shift 3):	\$218.15	\$217.10	\$219.59	\$227.83	\$215.00	\$105.81	\$133.51	\$294.52	\$207.69	\$224.96
CPU, total:	3182 sec	3159 sec	3135 sec	3246 sec	3179 sec	3342 sec	2732 sec	7023 sec	3133 sec	3253 sec
CPU, virtual:	2081 sec	2074 sec	2069 sec	2081 sec	2084 sec	2213 sec	2040 sec	2639 sec	2080 sec	2141 sec
CPU, good (1):	2235 sec	2214 sec	2224 sec	2252 sec	2220 sec	1198 sec	2084 sec	2028 sec	2219 sec	2294 sec
Memory Units:	36423	36489	36985	38126	35290	15892	18095	51916	33835	37474
Page Faults:	511010	502379	498211	532650	500787	318845	249637	1274846	493603	580815

t/m meters:

Page Faults:	23.11%	23.04%	22.75%	23.63%	22.04%	15.91%	15.70%	25.86%	21.99%	22.43%
Getwork:	2.26%	2.24%	2.20%	2.24%	2.17%	4.24%	2.33%	9.61%	2.16%	2.12%
Seg Faults:	2.66%	2.65%	2.62%	2.56%	2.62%	2.65%	3.16%	1.57%	2.65%	2.57%
Bound Faults:	0.25%	0.23%	0.23%	0.22%	0.23%	0.25%	0.27%	0.14%	0.28%	0.30%
Interrupts:	3.64%	3.59%	3.54%	4.04%	4.53%	5.22%	4.60%	2.92%	3.66%	3.74%
Idle, zero:	0.40%	0.38%	0.69%	0.79%	0.82%	1.87%	1.47%	0.28%	0.69%	0.80%
Idle, MP:	3.20%	2.79%	3.24%	4.00%	4.60%	6.54%	1.15%	8.69%	4.10%	4.13%
Idle, NMP:	0.09%	0.11%	0.10%	0.32%	0.17%	3.31%	0.26%	0.47%	0.16%	0.12%
Idle, Loading:	0.13%	0.14%	0.13%	0.25%	0.20%	0.44%	0.10%	0.36%	0.21%	0.19%
Idle, total:	3.82%	3.42%	4.16%	5.35%	5.79%	12.16%	2.98%	9.80%	5.16%	5.24%
Other (good):	64.26%	64.82%	64.49%	61.96%	62.63%	59.06%	71.06%	48.64%	63.90%	63.68%

dvm meters:

Bulk Reads:	522012	510260	507462	549844	511208	317031	245669	1309568	499763	539231
Bulk Writes:	251863	245742	243551	261819	248665	206093	181437	513289	247201	253830
Bulk ATB I/O:	4.503	4.526	4.589	4.488	4.669	3.886	6.888	2.289	4.659	4.551
DSKA Reads:	37304	38171	34708	50936	47473	57363	49391	67089	47586	46679
DSKA Writes:	15030	15943	13600	22248	20459	10201	16891	14837	19892	21511
DSKA ATB I/O:	51.403	49.828	53.947	39.568	41.186	23.364	34.634	40.957	40.319	41.655
DSKA Avg. Page Wait:	75.104	81.799	85.264	102.477	38.119	46.680	38.160	39.106	35.883	34.662
DSKB Reads:	10703	7808	11841	00000	00000	00000	00000	00000	00000	00000
DSKB Writes:	5653	4963	5913	00000	00000	00000	00000	00000	00000	00000
DSKB ATB I/O:	173.683	207.205	164.037	000.000	000.000	000.000	000.000	000.000	000.000	000.000
DSKB Avg. Page Wait:	79.667	74.480	103.308	000.000	000.000	000.000	000.000	000.000	000.000	000.000

Notes:

- (1) Based on Elapsed Time * percentage good (t/m meters)
- (2) The second MPC has been removed
- (3) Special test using two CPU's
- (4) Special test using one CPU and three memories
- (5) Special test using two CPU's and two memories