

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

6/16

19 71

Memo to Prof. Saltzer

Room

Ext.

Here is MPM 129.

The two CPU system was measured.

from Akira

Room

Ext.

MURAN BOSTON

MPM129
 6/16/71
 # users = 53
 MFTN3
 15.11A

***** MULTICS PERFORMANCE ANALYSIS *****

USER NO	COMMAND	TIME	CPU TIME	NO OF P.F.	384 K core 2 CPUs 2 DS270 channels
0	login	1442	3.284	0 + 82	
	edm	1451	5.984	39 + 348	
	fortran	1453	5.772	4 + 247	
	edm	1458	2.823	20 + 192	
	fortran	1458	4.164	3 + 185	
	rename	1459	1.108	2 + 43	
	print	1500	1.066	3 + 22	
	a_prime\$prime	1501	3.038	20 + 107	
	list	1502	.693	4 + 32	
	df	1502	1.362	3 + 37	
	edm	1511	4.137	119 + 206	
	fortran	1513	4.505	16 + 249	
	edm	1518	2.905	24 + 154	
	fortran	1518	3.926	1 + 197	
	rename	1519	.433	1 + 23	
	print	1520	1.010	1 + 41	
	b_prime\$prime	1521	1.703	10 + 66	
	list	1522	.578	6 + 20	
	df	1522	1.103	1 + 46	
	logout			+	

***** SUMMARY *****

USER NO	TOTAL CPU TIME	TOTAL REAL TIME	TOTAL NO OF P.F.	NO OF INTER-ACTIONS	AVERAGE CPU TIME	AVERAGE RESPONSE TIME	AVERAGE NO OF P.F.
USER 0	46.310	2366	277 + 2215	66	.701	7.1 (3.5)	4+ 33

***** #users

(26.010	1175	98 + 1213	33	.788	7.9 (3.3)	2 + 36	54 first half
	20.300	1158	179 + 1002	33	.615	6.3 (3.6)	5 + 30	53 second half

The system was not exactly fully loaded.

tcm -all

Total metering time 0:22:16

Ave queue length 3.99 ← *very pretty short*
 Ave eligible 4.22
 Working-set factor .50
 Working-set addend 0
 Te first (seconds) 2
 Te last (seconds) 2
 Ti max (seconds) 8

IDLE TYPE	TIME	%
Total idle	0:07:55	17.80
Multi-prog idle	0:03:51	8.65
Loading idle	0:00:23	.89
Non-multi-prog idle	0:03:40	8.25 ← <i>large</i>
Zero idle	0:00:00	0.00

The system is not fully saturated.

COUNTER	TOTAL	ATB	#/INT
Interactions	202	6.617 sec	
Loadings	2536	.527 sec	12.554
Blocks	1813	.735 sec	
Wakeups	1799	.743 sec	
Waits	76825	17.399 msec	380.322
Notifies	203985	6.553 msec	
Schedulings	2353	.568 sec	11.649
Pre-empts	83402	16.027 msec	412.881

Time	%Int	%Cum	Ave	%T	%CumT
0.0	48	48	.263	30	30
.5	13	60	.741	23	53
1.0	5	66	1.304	17	70
1.5	5	70	1.866	21	92
2.0	1	72	2.398	8	100
2.5	1	73	2.827	6	105
3.0	1	74	3.362	7	113
3.5	0	74	3.906	4	116
4.0	0	74	4.506	3	119
4.5	0	74	4.946	3	122
5.0	0	74	5.263	0	122
5.5	0	75	5.893	3	124
6.0	0	75	6.540	2	126
6.5	0	75	6.816	0	126
7.0	24	99	7.340	435	561
.5	1	100	8.116	-478	100

screwy

DEPTH	%PF	TBPF	%GTW	TBS	%CPU
1	21.4	28.2	19.0	18.9	21.1
2	21.2	34.9	19.1	23.1	25.7
3	19.6	32.1	20.0	18.7	21.9
4	16.9	26.9	18.1	14.9	15.9
5	13.6	22.7	15.2	12.1	11.0
6	10.4	20.3	11.7	10.7	7.5
7	.5	0.0	.5	0.0	.5

r 1507 2.971 17+36

fsm -all

Total meteri g time 0:27:0

	#	ATB		
Deactivations	4859	.335 sec.		
Seg Faults	6280	.259 sec.		
Bound Faults	209	7.783 sec.		
Setfaults (all)	12677	128.318 msec.		
Setfaults (acc)	120	13.556 sec.		
Updates	6603	246.356 msec.		
Steps	16250	100.104 msec.		
Skips (ehs)	4 98	.362 sec.		
Skips (inf)	4276	.380 sec.		
Skips (level)	2297	.708 sec.		
Skips (init)	0	0.000 sec.		
Skips (ring)	14	116.192 sec.		
Skips (lock)	69	23.575 sec.		
Skips (pc)	5	325.338 sec.		
AST Sizes	4	16	64	64
Number	408	160	90	0
Need	3633	1038	420	0
Steps	12326	2088	1345	0
Ave Steps	3.4	2.0	3.2	0.0
Gra e (sec)	53.8	124.7	108.8	0.0

	#	ATB	
Needc	121889	13.346 msec.	
Ceiling	92	.295 min.	
Iaps	1143	1.423 sec.	
Steps	426508	3.814 msec.	
Skip wired	8755	85.801 msec.	
Skip used	246779	6.592 msec.	
Skip mod	42209	38.539 msec.	
Skip os	6876	236.575 msec.	

315 pages, 38 wired.
Averag steps 3.499

	DRUM	DSU270	DSU170
Left	528	9341	4766
Reads	95257	20665	19 5
ATB	7.077	78.717	815.383
Writes	65145	10342	399
ATB	2 .970	157.290	4076.9
	10.141	52.462	679.486
% Cpcty	20	100 ←	13
Ave Latency	22.673	80.689	81.982
N Er ors	2	0	0

100 % ?

r 1512 3.336 11+91

hmu

Multic 15.11A, load 54.0/54.0; 53 users

r 1512 .250 1+12

hmu;ttm -all

Multics 15.11A, load 54.0/54.0; 53 users

Total metering time 0:39:16

	%	AVE
Page Faults	10.33	3561.522
Drum interrupts	5.05	2289.472
Getwork	7.58	1228.018
Seg Faults	3.96	19199.221
Bund Faults	.34	48486.723
Interrupts	7.24	3709.790
Gate faults	3.07	3670.000
MP Idle	8.62	
Loading idle	.99	
NMP Idle	4.99	← large
Zero idle	0.00	
Other	47.83	← This is small because NMP idle is large.

r 1522 1.625 4+44

ppmt -all;intm2 -all

Total metering ime 0:39:47

Working-set factor	.50
Working-set addend	0
Min-eligible	2
Max-eligible	6
% bad pre-paging	21.65
Drum faults/pre-paging	1.47
% drum priority move	13.12
% misses	4.68
Ave post size	27.43
Ave purge size	10.91
% purged	39.76
Ave pre size	16.04
Ave re-pagings	7.95
% pre-paged	49.55
Thrashing percentage	3.82
Ave post in core	21.58
Ave working-set size	10.72
Ave used in quantum	23.98
Pre-page time	19.71
Post-purge time	21.25
Calls	4544

Total metering time 0:39:50

	ATB lock	loop %	loop time
ptl	6.5 ms.	3.37	.438 ms.
tcl	3.4 ms.	.35	.023 ms.

all locks 3.72 ← out of 100% (not 200%)

r 1523 1.727

pcd

```

cpu b 5
cpu a 4
gioc a 2 0 7 11 13 } 2 CPUs & 384 Kcore
mem c 200 on
mem d 200 on
m m e 200 on
clock b 1 25 edt 4
drum 0 7700 0 4 5 6
d170 0 105340 a 37 8. 102030405 607
d270 0 60650 a 27 10. 1201130214 3150416
part mult 0 7700 0 57650 0 104340 0 0
part salv 0 0 57650 1000 0 0 0 0
part dump 0 0 0 0 104340 1000 0 0
sched 400000 20 20 100
sst 16. 408. 160. 90. 0.
int 27 30 31 2 37
pod 9. 250. 1000.
ttyp 5
tty a 60 3 1200.
tty a 70 3 1200.
tty a 100 32. 133.
tty a 00 32. 133.
tty a 400 14. 110.
tty a 300 24. 150.
intk 77 mult

```

r 1501 1.954 6+20

ttym

```

total metering time 3.39 hr, .15274000e+03 terminal hr
min output buffer 334 chars, 22 sec.
ave output buffe 1014 chars, 67 sec.
ATB output blocks 22 1005 sec.
ATB status .142 6.424 sec.
% status queued 3.5%
ATB quit 25.1 1131.4 sec.
ATB dialups 128.4 5788.0 sec.
ATB cycle 1.2 54.8 sec.
output buffer eff. 73%
ave interrupt time 4.658 ms. 3.4%
max interrupt time 256.594 ms.

```

	total	1050	2741	M37	T300	ARDS	2741	M35
cur # dialed	55	4	31	12	2		3	0
ave # dialed	45.1	3.7	26.8	11.0	1.0	1.7	.7	.3
input rate	2.1	.2	.4	.2	.2	.3	.3	.5
output rate	56.1	3.7	4.1	3.9	5.7	21.1	9.2	8.5

r 1502 1.421 3+39

hmu

Multics 15.11A, load 54.0/54.0; 53 users

r 1503 .301 3+11

rzd scs 245
245 000001100100
r 1458 .460 1+25

memory is not interlaced

rzd scs 201
201 0000000000002
r 1458 .344 6+21

dq -d270

Connects = 137733, 73217.

P RW D CORE

O W 3 5260
O W 1 3760

r 1458 .627 4+15

dq -d270

Connects = 137911, 73304.

2 DS270 channels

P RW D CORE

O W 1 140
O W 1 5260
O W 1 3400

r 1458 .477 4+16

dq -d270

Connects = 138143, 73374.

P RW D CORE

1 R 3 5640
O W 3 11260
O W 3 6060

r 1459 .470 3+24

tcq

avq = 4, elapsed time = 0 sec, 15 active last 15 sec.

flags	tu	dtu	te	ts	ti	ssc	event	d	ws	process
LEI	1640	1641	913	0	8000	.001	20630	2	53	Backup
LERI	765	766	705	0	0	-.007	0 0		14	initializer
NLEI	36	37	930	0	0	.123	0 0		2	Sekino
NLEI	182	182	630	0	0	.018	7076	2	6	Brammer
NLEI	6	7	25	0	0	-.006	0 0		1	Skinner

The queue is very short.

r 1459 1.838 3+72

hmu

Multics 15.11A, load 54.0/54.0; 53 users

r 1500 .333 4+17