

MPM 73
 # users = 22
 12/2/69
 MFTN 3

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

USER NO	COMMAND	TIME	CPU TIME	NO OF P.F.
0	login	1447	6.101	224
	edm	1457	7.038	384
	fortran	1500	5.438	206
	edm	1505	3.254	202
	fortran	1506	4.493	197
	rename	1507	.917	55
	print	1508	.803	48
	a_prime\$prime	1509	3.713	149
	list	1510	1.085	53
	df	1511	1.481	80
	edm	1520	4.630	341
	fortran	1521	3.592	123
	edm	1526	2.824	184
	fortran	1527	3.548	167
	rename	1528	.378	22
	print	1528	.669	31
	b_prime\$prime	1530	2.347	125
	list	1531	.701	47
	df	1532	.647	51

***** SUMMARY *****

USER NO	TOTAL CPU TIME	TOTAL REAL TIME	TOTAL NO OF P.F.	NO OF INTER-ACTIONS	AVERAGE CPU TIME	AVERAGE WAIT TIME	AVERAGE NO OF P.F.
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USER 0	16011 47.558	2414 2670	2414 2465	66 66	.720 .720	—	37 37
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df b_prime b_prime.fortran
 r 1534 .647 51

MPMT3

rm\$inc apt
 hnu
 tcm all
 hnu
 fsm
 hnu

7777777777	2:02.8	001100000004	756412467376	13:19.5	016101000002
756412467405	6:47.3	214100000002	756412467417	1:58.9	200100000002
756412471241	43.5	034100000003	756412471412	69.5	001100000004
756412470577	51.1	001100000004	756412471206	18.6	001100000004
756412471456	64:76.0	001100000004	756412471437	80.6	001100000004
756412467620	6.0	001100000004	756412467634	2:58.5	000100000002
756412467646	1:01.0	200100000002	756412470463		300100000000
756412467710	1:06.8	001100000004	756412471371	63:00.2	001100000004
756412471044	44.6	001100000004	756412470047	2.6	001100000004
756412470007	33.8	001100000004	756412470061	5.6	001100000004
756412470260	1:01.2	001100000004	756412471012	2.8 + 44.7	001100000004 ← PDP8
756412470361	22.2	320100000000	756412471116	63.7	300100000000
756412471307	13.1	001100000004	756412470432	32.8	200100000002
756412470447	10.4	320100000000	756412470633		320100000000
756412470760	5.6	001100000004	756412470776	50.5	034100000001
000000000000		000000000000	000000000000		000000000000
000000000000		000000000000	000000000000		000000000000
000000000000		000000000000	000000000000		000000000000
000000000000		000000000000	000000000000		000000000000
000000000000		000000000000	000000000000		000000000000

r 1535 5.131 125

20 users, 30 maximum
 r 1535 .226 13

Total metering time 0:45:33

Ave queue length(X10) 60
 Max eligible 3
 Te min (seconds) 4
 Ti max (seconds) 8

IDLE TYPE	TIME	%
Total idle	0:14: 1	31
Multi-prog idle	0:13:40	30
Non-multi-prog idle	0: 0:21	1
Zero idle	0: 0: 0	0

COUNTER	TOTAL	ATB
Loadings	1505	1816
Blocks	1411	1937
Wakeups	1479	1848
Waits	66397	41
Notifies	134356	20
Schedulings	1519	1799
Interactions	1231	2220

0.0	65	65	235
0.5	17	82	753
1.0	6	88	1262
1.5	3	91	1749
2.0	2	93	2278
2.5	2	95	2810
3.0	1	96	3386
3.5	1	97	3809
4.0	1	98	4412
4.5	0	98	4674
5.0	1	99	5403
5.5	0	99	5878
6.0	0	99	6261
6.5	0	99	6797
7.0	1	100	7422
7.5	1	101	7996

DEPTH	%PT	TBPF	%GTW	TBS	%CPU
1	39	30	34	26	42
2	30	32	35	21	35
3	30	22	31	16	23

r 1537 2.310 49

19 users, 30 maximum

r 1537 .174 7

fsm
hmu

File System Meters

Deact count	6908
Ast grace	1: 8.221
Used ASTs	249
Free ASTs	0
Held ASTs	96
Steps	996704
Needc	224959
Ave.steps	4
Ceiling	8
Laps	5024
Skip wired	8449
Skip used	649963
Skip mod	112249
Skip os	1084
No. pages	178
Wired pages	17
Drum left	982
Drum reads	199037
Drum writes	100303
Drum errors	
Non-fatal	8
Fatal	1
Disk left	2696
Disk reads	20280
Disk writes	12463
Disk errors	
Non-fatal	3
Fatal	0

r 1538 1.555 40

19 users, 30 maximum

File System Meters

Deact count	4089
Ast grace	1:23.506
Used ASTs	235
Free ASTs	0
Held ASTs	124
Steps	631724
Needc	141125
Ave.steps	4
Ceiling	0
Laps	3196
Skip wired	5319
Skip used	416033
Skip mod	68662
Skip os	585
No. pages	178
Wired pages	17
Drum left	679
Drum reads	123869
Drum writes	61095
Drum errors	
Non-fatal	8
Fatal	1
Disk left	2374
Disk reads	13270
Disk writes	7853
Disk errors	
Non-fatal	2
Fatal	0

r 1445 1.776 49

26 users, 30 maximum

Some observations :

(See Fig. 1)

1. Multi-programming idle time

The percentage of the multi-programming idle time goes up from 30% to 50% as the number of simultaneous users increases from 20 to 28.

2. Non-multi-programming idle time

It stays around almost 0% in the same range of the number of users.

3. Average queue length

The average queue length increases from 6 (22 users) to 14 (28 users).

4. Mean Time between Interactions

Generally speaking, it was observed that, as the number of simultaneous users increases, the mean time between interactions measured by the traffic controller metering procedure increases.

Some Problems :

1. As the number of users increases, the portion of time spent for service computation decreases.
2. The observation # 4 also suggests that the computational capability decreases considerably when the system is heavily loaded.

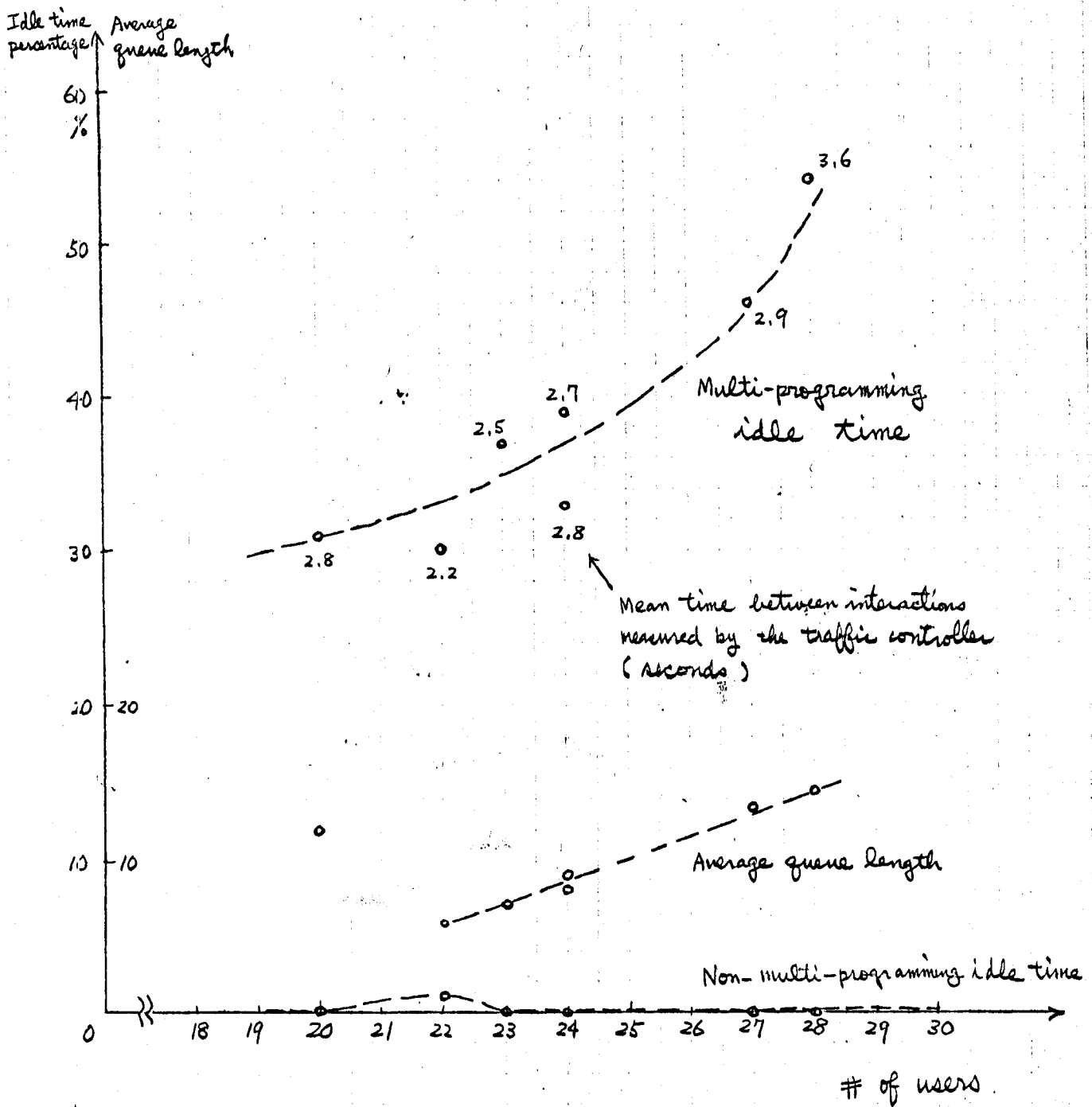


Fig. 1 CPU idle times, average queue length, and mean time between interactions as functions of # of users