

5/3

1971

Memo to Prof. Saltzer Room \_\_\_\_\_ Ext. \_\_\_\_\_

Here are some more results.

MPM 126 ... 2 CPU, 384 K system

MPM 125 ... Measurement of a crippled system

from Akira Room \_\_\_\_\_ Ext. \_\_\_\_\_

MPM125  
 4/29/71  
 #users = 51  
 MFT N3  
 15.5

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

| USER NO | COMMAND        | TIME | CPU TIME | NO OF P.F. |
|---------|----------------|------|----------|------------|
| 0       | login          | 1622 | 3.334    | 0 + 81     |
|         | edm            | 1631 | 5.094    | 150 + 238  |
|         | fortran        | 1632 | 4.553    | 26 + 202   |
|         | edm            | 1637 | 2.216    | 84 + 120   |
|         | fortran        | 1638 | 3.957    | 35 + 199   |
|         | rename         | 1639 | .720     | 6 + 31     |
|         | wrint          | 1640 | .825     | 4 + 26     |
|         | a_prime\$prime | 1641 | 2.472    | 37 + 75    |
|         | list           | 1642 | .520     | 6 + 22     |
|         | df             | 1643 | 1.193    | 2 + 49     |
|         | edm            | 1652 | 3.102    | 168 + 124  |
|         | fortran        | 1653 | 3.173    | 27 + 139   |
|         | edm            | 1658 | 1.954    | 94 + 87    |
|         | fortran        | 1658 | 2.611    | 26 + 123   |
|         | Orename        | 1659 | .437     | 6 + 23     |
|         | wrint          | 1700 | .687     | 2 + 28     |
|         | b_prime\$prime | 1701 | 1.635    | 42 + 57    |
|         | list           | 1702 | .520     | 6 + 22     |
|         | df             | 1703 | .887     | 6 + 30     |
|         | logout         |      |          | +          |

384 K core  
 2 CPUs  
 ← crippled  
 2 disk channels

\*\*\*\*\* 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  | 36.497         | 2419            | 727 + 1623       | 66                  | .552             | 9.1 (6.9)             | 11 + 24            |

\*\*\*\*\* #users \*\*\*\*\*  
 ( 21.440 1205 350 + 962 33 .649 9.8 (7.3) 10 + 29 52 first )  
 ( 15.057 1181 377 + 666 33 .456 8.4 (6.6) 11 + 20 49 second )

The result shows that the system was obviously crippled. Actually, (almost) one processor was servicing these 51 users. It should be noted that this result is very similar to that of MPM123 (one CPU result).

Total metering time 0:33:45

|                    |       |             |
|--------------------|-------|-------------|
| Ave queue length   | 17.25 | ← very long |
| Ave eligible       | 5.62  |             |
| Working-set factor | .50   |             |
| Working-set addend | 0     |             |
| Te first (seconds) | 2     |             |
| Te last (seconds)  | 2     |             |
| Ti max (seconds)   | 3     |             |

| IDLE TYPE           | TIME    | %    |
|---------------------|---------|------|
| Total idle          | 0:02:07 | 3.15 |
| Multi-prog idle     | 0:01:45 | 2.61 |
| Non-multi-prog idle | 0:00:00 | .02  |
| Zero idle           | 0:00:00 | 0.01 |

← very little

| COUNTER      | TOTAL  | ATB         | #/INT   |
|--------------|--------|-------------|---------|
| Interactions | 128    | 15.923 sec  |         |
| Loadings     | 2695   | .752 sec    | 21.055  |
| Blocks       | 2287   | .896 sec    |         |
| Wakeups      | 2313   | .876 sec    |         |
| Waits        | 73665  | 27.503 msec | 575.528 |
| Notifies     | 245919 | 8.238 msec  |         |
| Schedulings  | 2773   | .731 sec    | 21.664  |
| Pre-empts    | 57944  | 34.965 msec | 452.687 |

| Time | %Int | %Cum | Ave   | %T | %CumT |
|------|------|------|-------|----|-------|
| 0.0  | 67   | 67   | .258  | 18 | 18    |
| .5   | 16   | 83   | .718  | 12 | 29    |
| 1.0  | 6    | 89   | 1.289 | 8  | 37    |
| 1.5  | 6    | 95   | 1.910 | 12 | 49    |
| 2.0  | 2    | 97   | 2.316 | 4  | 53    |
| 2.5  | 1    | 98   | 2.886 | 3  | 57    |
| 3.0  | 0    | 99   | 3.321 | 2  | 58    |
| 3.5  | 1    | 99   | 3.924 | 2  | 60    |
| 4.0  | 0    | 99   | 4.560 | 1  | 61    |
| 4.5  | 0    | 99   | 5.176 | 1  | 62    |
| 5.0  | 0    | 99   | 5.533 | 2  | 64    |
| 5.5  | 0    | 100  | 5.961 | 1  | 65    |
| 6.0  | 0    | 100  | 6.470 | 1  | 66    |
| 6.5  | 0    | 100  | 6.916 | 0  | 66    |
| 7.0  | 0    | 100  | 7.340 | 0  | 66    |
| 7.5  | 0    | 100  | 8.216 | 32 | 100   |

| DEPTH | %PF  | TBPF | %GTW | TBS  | %CPU |
|-------|------|------|------|------|------|
| 1     | 5.2  | 34.3 | 4.4  | 24.3 | 6.0  |
| 2     | 32.1 | 37.5 | 26.6 | 27.2 | 40.5 |
| 3     | 25.1 | 30.6 | 26.5 | 17.4 | 26.0 |
| 4     | 18.9 | 22.6 | 20.5 | 12.4 | 14.5 |
| 5     | 13.1 | 21.0 | 14.9 | 11.0 | 9.5  |
| 6     | 8.5  | 22.3 | 10.2 | 11.0 | 6.6  |
| 7     | .5   | 0.0  | .5   | 0.0  | .5   |

MTBPF = 31.0 msec.

r 1656 2.233 17+22

Multics 15.5, load 50.0/54.0; 49 users

r 1659 .199 8+5

fsm -all

Total metering time 0:33:32

|               |         |
|---------------|---------|
| Reactivations | 5689    |
| Ast grace     | 0:00:00 |
| Used ASTs     | 0       |
| Free ASTs     | 0       |
| Held ASTs     | 0       |
| Seg Faults    | 7882    |

|            | #      | ATB            |
|------------|--------|----------------|
| Needs      | 129482 | 35.720 msec.   |
| Steps      | 269167 | 15.934 msec.   |
| Callings   | 27     | 2.855 min.     |
| Lans       | 635    | 7.234 sec.     |
| Skip wired | 4549   | 1016.720 msec. |
| Skip used  | 132792 | 34.829 msec.   |
| Skip mod   | 18031  | 255.797 msec.  |
| Skip os    | 4263   | 1084.931 msec. |

315 pages, 31 wired.  
Average steps 2.233

|             | DRUM   | DSU270     | DSU170     |
|-------------|--------|------------|------------|
| Left        | 513    | 6048       | 9649       |
| Reads       | 110388 | 13890      | 1102       |
| ATB         | 41.899 | 337.942    | 4196.968   |
| Writes      | 75272  | 7864       | 397        |
| ATB         | 61.445 | 588.131    | 11650.023  |
| ATB I/O     | 24.912 | 214.580    | 3085.430   |
| % Cnctv     | 16     | 49         | 7          |
| Ave Latency | 22.691 | 69.208     | 98.882     |
| N Errors    | 1      | 7465861120 | 1772075008 |
| F Errors    | 0      | 7077680    | 2800       |

*very low I/O traffic*

r 1700 1.557 8+27

ttm -all

Total metering time 0:39:50

|                 | %     | AVE       |
|-----------------|-------|-----------|
| Page Faults     | 4.93  | 2786.546  |
| Drum interrupts | 4.91  | 3188.943  |
| Getwork         | 5.70  | 1681.543  |
| Seg Faults      | 1.64  | 9736.225  |
| Round Faults    | .23   | 37932.957 |
| Interrupts      | 4.29  | 4857.798  |
| Gate faults     | 2.16  | 3670.000  |
| MP Idle         | 2.70  |           |
| Loading idle    | .51   |           |
| NMP Idle        | .02   |           |
| Zero idle       | 0.00  |           |
| Other           | 72.91 |           |

*MTBPF (in real time) = 56.5 msec.*

*short*

*note*

Multics 15.5, load 51.0/54.0; 50 users

r 1646 .266 4+12

psmt -all

Total metering time 0:24:56

Ave pre-page time 32.818  
Ave post\_purge time 45.999  
Pre-page calls 2007  
Post-purge calls 2023  
Ave pre-pagings 13.894  
Ave post-purings 22.062  
Ave working-set size 40.130  
Working-set factor .50  
Working-set addend 0  
Ave misses 3.361  
Thrashing index 2.802

r 1646 .620 6+11

rcd

cpu a 4 } 2 CPUs  
cpu b 5 }  
sioc a 2 0 7 11 13  
mem c 200 on } 384 kcore  
mem e 200 on }  
mem d 200 on }  
clock a 0 25 edt 4  
drum 0 7700 1 4 5 6  
d270 0 60650 a 27 10. 501060207 3100411  
d170 0 105340 a 37 8. 102030405 607  
part mult 0 7700 0 57650 0 104540 0 0  
part dump 0 0 0 0 104540 577 0 0  
part salv 0 0 57650 1000 0 0 0 0  
int 27 30 31 32 37  
ppis 11 1000.  
schd 400000 20 20 100  
sst 16. 408. 160. 90. 0.  
ttyb 5  
tty a 60 3 1200.  
tty a 70 3 1200.  
tty a 100 32. 133.  
tty a 200 32. 133.  
tty a 300 24. 150.  
tty a 400 14. 110.  
intx 77 mult

r 1647 1.456 6+26

dq -d270

Connects = 318976, 41374.

Queue empty.

r 1648 .326 5+19

brp

Multics 15.5, load 49.0/54.0; 43 users

r 1650 .187 6+8

```

tcq
ave = 23, elapsed time = 913 sec, 23 active last 15 sec.
flags   tu dtu  te   ts   ti   tssc event d  ws process
WFNLEI 1505   0   0    0    0  .14678321e+04   0 0 14 IO
MFRI    54  19 370   0    0  -.001    0 0   5 Sekino
WNLEI   82  13 402   0    0  .159 -400000000000 0 6 EFranklin
NLEI   203  13 125   0    0  .156 -400000000000 0 26 Install
VLEI    4   4 137   0    0  .001    0 0  31 Goldman
NLEI   757  33 173   0    0  .004    0 0  22 Boss
W       11  11   0   0    0  .656    0 0   3 Bricklin
        103  10  74   0 2012 22.929   0 0  39 JRosenberg
W       121  43  77   0 2084  1.465   0 0  43 Tavares
        116  10 103   0 2373 233.764   0 0  48 Hill
W        4   4  67   0 4002 69.687   0 0  42 Hatvany
W        4   4  68   0 4003 152.791   0 0  50 Development
W       74  25  61   0 6002 115.035   0 0  42 Haber
        65  34  45   0 6002 30.777   0 0  23 Wolman
W       35  32  87   0 6002 19.484   0 0  38 Morris
W      243  10 106   0 6027 257.762   0 0  48 Klinzing
        22  11 103   0 6052 609.553   0 0  59 Krebs
w     2227   9  99   0 6155 588.699   0 0  64 Backup
Q       523   0  50 6086 8000  .10329675e+04   0 0  31 Snyder
W     1737   0   0   0    0  .10697994e+04   0 0  33 Translator
r 1651 2.382 36+68

```

hmu

Multics 15.5, load 49.0/54.0; 43 users

r 1652 .338 2+28

dc -d270

Connects = 320455, 41928.

→ Two disk channels

Queue empty.

r 1652 .408 6+28

dc -d170

Connects = 23373.

Queue empty.

r 1652 .306 7+15

hmu

Multics 15.5, load 49.0/54.0; 43 users

r 1653 .229 6+3

Data base lockout

loop %

8.09

.30

} This is smaller than usual.

MPM127  
 5/28/71  
 #users = 43  
 MFTN3  
 15.9B

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

| USER NO | COMMAND        | TIME | CPU TIME | NO OF P.F. |
|---------|----------------|------|----------|------------|
| 0       | login          | 1507 | 2.757    | 0 + 57     |
|         | edm            | 1516 | 3.673    | 115 + 162  |
|         | fortran        | 1517 | 4.243    | 12 + 163   |
|         | edm            | 1522 | 2.037    | 73 + 93    |
|         | fortran        | 1523 | 3.424    | 11 + 170   |
|         | rename         | 1524 | .738     | 2 + 26     |
|         | print          | 1524 | .933     | 2 + 23     |
|         | a_prime\$prime | 1526 | 2.681    | 22 + 110   |
|         | list           | 1526 | .579     | 7 + 28     |
|         | df             | 1527 | 1.227    | 8 + 45     |
|         | edm            | 1536 | 3.069    | 149 + 128  |
|         | fortran        | 1537 | 3.168    | 10 + 169   |
|         | edm            | 1542 | 2.007    | 73 + 109   |
|         | fortran        | 1543 | 2.747    | 8 + 154    |
|         | rename         | 1544 | .418     | 4 + 19     |
|         | print          | 1545 | .718     | 7 + 21     |
|         | b_prime\$prime | 1546 | 1.581    | 11 + 68    |
|         | list           | 1547 | .425     | 7 + 14     |
|         | df             | 1547 | .913     | 5 + 32     |
|         | logout         |      |          | +          |

384 Kcore  
 1 CPU  
 1 DS270 channel

\*\*\*\*\* 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  | 34.587         | 2393            | 526 + 1534       | 66                  | .524             | 7.9 (5.6)             | 7+ 23              |

\*\*\*\*\* #users

|   |        |      |           |    |      |           |        |                |
|---|--------|------|-----------|----|------|-----------|--------|----------------|
| ( | 19.541 | 1179 | 252 + 820 | 33 | .592 | 8.2 (5.8) | 7 + 24 | 44 first half  |
| ( | 15.046 | 1181 | 274 + 714 | 33 | .456 | 7.7 (5.5) | 8 + 21 | 43 second half |

↑  
 except "fortran"

The result is fairly similar to that of MPM125.

tom -all

Total metering time 0:18:04

Ave queue length 13.96  
 Ave eligible 5.35  
 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               | 0:00:25 | 2.30 |
| Multi-processor idle     | 0:00:20 | 1.88 |
| Loading idle             | 0:00:05 | .50  |
| Non-multi-processor idle | 0:00:00 | .01  |
| Zero idle                | 0:00:00 | 0.00 |

| COUNTER      | TOTAL  | ATB         | #/INT   |
|--------------|--------|-------------|---------|
| Interactions | 135    | 8.034 sec   |         |
| Loadines     | 1307   | .776 sec    | 10.348  |
| Blocks       | 1134   | .908 sec    |         |
| Wakeups      | 1212   | .825 sec    |         |
| Waits        | 35254  | 30.766 msec | 261.141 |
| Notifies     | 107053 | 10.131 msec |         |
| Schedulines  | 1423   | .762 sec    | 10.541  |
| Pre-empts    | 22771  | 47.632 msec | 168.674 |

| Time | %Int | %Cum | Ave   | %T   | %CumT |
|------|------|------|-------|------|-------|
| 0.0  | 54   | 54   | .228  | 17   | 17    |
| .5   | 9    | 63   | .713  | 8    | 25    |
| 1.0  | 2    | 65   | 1.250 | 4    | 29    |
| 1.5  | 3    | 69   | 1.993 | 3    | 37    |
| 2.0  | 1    | 69   | 2.401 | 2    | 40    |
| 2.5  | 0    | 70   | 2.933 | 1    | 41    |
| 3.0  | 0    | 70   | 3.353 | 1    | 42    |
| 3.5  | 0    | 70   | 3.817 | 1    | 43    |
| 4.0  | 0    | 70   | 4.404 | 2    | 45    |
| 4.5  | 0    | 70   | 4.710 | 0    | 45    |
| 5.0  | 0    | 71   | 5.252 | 1    | 46    |
| 5.5  | 0    | 71   | 5.801 | 1    | 47    |
| 6.0  | 0    | 71   | 6.774 | 1    | 47    |
| 6.5  | 0    | 71   | 7.209 | 1    | 48    |
| 7.0  | 20   | 100  | 7.342 | 289  | 337   |
| 7.5  | 0    | 100  | 7.864 | -236 | 100   |

Someone is doing heavy computation!

What does this mean?  
I don't trust these numbers!

| DEPTH | PP   | TPPF | %TW  | TBS  | %CPU |
|-------|------|------|------|------|------|
| 1     | 33.3 | 39.2 | 26.8 | 29.7 | 42.2 |
| 2     | 25.6 | 32.2 | 26.9 | 18.5 | 27.4 |
| 3     | 18.4 | 24.8 | 20.1 | 13.6 | 15.3 |
| 4     | 12.5 | 20.2 | 14.2 | 10.6 | 8.6  |
| 5     | 8.3  | 20.4 | 9.3  | 10.3 | 5.3  |
| 6     | 4.9  | 22.3 | 5.7  | 11.4 | 3.9  |
| 7     | .5   | 0.0  | .5   | 0.0  | .5   |

MTBPF = 31.5 msec



hnu

Multics 15.0B, load 44.5/45.0; 43 users

r 1527 .333 3+18

fsm -all

Total metering time 0:20:40

|                 | #     | ATB     |       |     |  |
|-----------------|-------|---------|-------|-----|--|
| Deactivations   | 1570  | .720    | sec.  |     |  |
| Sec Faults      | 2325  | .534    | sec.  |     |  |
| Bound Faults    | 118   | 10.512  | sec.  |     |  |
| Setfaults (all) | 4573  | 271.072 | msec. |     |  |
| Setfaults (acc) | 90    | 13.782  | sec.  |     |  |
| Updates         | 2300  | 530.315 | msec. |     |  |
| Steps           | 4008  | 309.487 | msec. |     |  |
| Skips (ehs)     | 843   | 1.471   | sec.  |     |  |
| Skips (inf)     | 916   | 1.354   | sec.  |     |  |
| Skips (level)   | 520   | 2.345   | sec.  |     |  |
| Skips (init)    | 0     | 0.000   | sec.  |     |  |
| Skips (ring)    | 3     | 413.475 | sec.  |     |  |
| Skips (lock)    | 10    | 124.042 | sec.  |     |  |
| Skips (oc)      | 0     | 0.000   | sec.  |     |  |
| AST Sizes       | 4     | 16      | 64    | 64  |  |
| Number          | 408   | 150     | 90    | 0   |  |
| Need            | 1205  | 203     | 200   | 0   |  |
| Steps           | 2851  | 469     | 420   | 0   |  |
| Ave Steps       | 2.4   | 1.6     | 2.0   | 0.0 |  |
| Grace (sec)     | 177.5 | 423.2   | 265.8 | 0.0 |  |

|            | #      | ATB     |       |
|------------|--------|---------|-------|
| Needs      | 61524  | 20.162  | msec. |
| Ceiling    | 365    | .057    | min.  |
| Lans       | 437    | 2.838   | sec.  |
| Steps      | 171590 | 7.229   | msec. |
| Skip wired | 1348   | 920.106 | msec. |
| Skip used  | 88484  | 14.019  | msec. |
| Skip mod   | 16961  | 73.048  | msec. |
| Skip os    | 3253   | 381.317 | msec. |

315 pages, 27 wired.

Average steps 2.789

|             | DRUM   | DSU270  | DSU170   |
|-------------|--------|---------|----------|
| Left        | 1028   | 8153    | 6782     |
| Reads       | 50705  | 6179    | 495      |
| ATB         | 24.464 | 151.660 | 2557.576 |
| Writes      | 32907  | 4863    | 160      |
| ATB         | 37.810 | 255.074 | 7752.653 |
| ATB I/O     | 14.353 | 95.110  | 1923.139 |
| % Cnctv     | 14     | 55      | 4        |
| Ave Latency | 22.735 | 95.250  | 81.819   |

r 1529 2.136 16+26

thru

Multics 15.0R, load 44.5/45.0; 43 users

r 1530 .333 5+14

ttm -all

Total metering time 0:23:07

|                 | %     | AVE       |
|-----------------|-------|-----------|
| Page Faults     | 8.04  | 2444.195  |
| Drum interrupts | 3.57  | 1337.357  |
| Getwork         | 6.81  | 1187.010  |
| Seg Faults      | 3.22  | 16893.250 |
| Round Faults    | .41   | 44019.835 |
| Interrupts      | 7.65  | 3039.342  |
| Gate faults     | 4.11  | 3670.000  |
| MP Idle         | 1.84  |           |
| Loading idle    | .49   |           |
| NMP Idle        | .01   |           |
| Zero idle       | 0.00  |           |
| Other           | 63.87 | ←         |

MTBPT (in real time) = 30.4 msec

r 1530 1.526 7+39

nomt -all

Total metering time 0:23:57

|                        |       |
|------------------------|-------|
| Working-set factor     | .50   |
| Working-set addend     | 0     |
| Min-eligible           | 2     |
| Max-eligible           | 6     |
| % bad pre-paging       | 26.68 |
| Drum faults/pre-paging | 1.07  |
| % drum priority moves  | 13.75 |
| % misses               | 3.43  |
| Ave post size          | 32.40 |
| Ave purge size         | 13.04 |
| % purged               | 40.26 |
| Ave pre size           | 10.46 |
| Ave pre-paging         | 11.32 |
| % pre-paged            | 59.17 |
| Thrashing percentage   | 6.09  |
| Ave post in core       | 26.10 |
| Ave working-set size   | 11.89 |
| Ave used in quantum    | 27.23 |
| Pre-purge time         | 19.80 |
| Post-purge time        | 18.60 |
| Calls                  | 1853  |

r 1531 1.141 4+43

intm2 -all

Total metering time 0:25:31

|     | ATB lock | loop % | loop time |
|-----|----------|--------|-----------|
| ptl | 11.2 ms. | 0.00   | 0.000 ms. |
| tbl | 5.9 ms.  | 0.00   | 0.000 ms. |

r 1533 .600 2+32

hmu

Multics 15.9B, load 44.5/45.0; 43 users

r 1533 .305 3+16

pod

```

cpu b 5
alloc a 2 0 7 11 13
mem d 200 on
mem e 200 on
mem c 200 on
clock b 1 25 edt 4
drum 0 7700 1 4 5 6
d270 0 60650 a 27 10. 50607101116 15141213
d170 0 105340 a 37 8. 102030405 607
part mult 0 7700 0 57650 0 104540 0 0
part salv 0 0 57650 1000 0 0 0 0
part dump 0 0 0 0 104540 600 0 0
sched 400000 20 20 100
sst 15. 408. 150. 90. 0.
int 27 30 31 32 37
rds 9. 250. 1000.
trvb 5
trv a 60 3 1200.
trv a 70 3 1200.
trv a 100 32. 133.
trv a 200 32. 133.
trv a 400 14. 110.
trv a 300 24. 150.
inth 77 mult

```

} 1 CPU, 384 Kcore

r 1533 1.767 7+14

twm

```

total metering time 6.01 hr, .24168861e+03 terminal hr
min output buffer 601 chars, 40 sec.
ave output buffer 1214 chars, 80 sec.
ATB output blocks 50 2047 sec.
ATB status .175 7.040 sec.
% status queued 2.7%
ATB quit 18.4 739.9 sec.
ATB dialups 75.9 3052.9 sec.
ATB cycle 1.6 64.3 sec.
output buffer eff. 84%
ave interrupt time 4.097 ms. 2.5%
max interrupt time 194.061 ms.

```

|              | total | 1050 | 2741 | M37 | T300 | ARDS | 2741 | M35 |
|--------------|-------|------|------|-----|------|------|------|-----|
| cur # dialed | 45    | 2    | 27   | 11  | 0    | 2    | 2    | 1   |
| ave # dialed | 40.2  | 2.1  | 26.3 | 3.8 | .3   | 1.5  | .8   | .3  |
| input rate   | 2.3   | .2   | .3   | .1  | .5   | .4   | .5   | .3  |
| output rate  | 41.2  | 3.3  | 3.4  | 2.8 | 3.1  | 16.1 | 8.3  | 3.7 |

r 1534 1.730 7+37

hmu

Multics 15.9B, load 44.5/45.0; 43 users

r 1536 .332 3+19

rzd 201000 rzd scs 201  
 201 0000000000001 ← 1 CPU  
 r 1536 1.039 2+71

rzd scs 245 ↘ memory is not interlaced  
 245 000001000000  
 r 1537 .323 7+17

da d270

Unknown device type: d270.

r 1537 .264 7+11

da -d270

Connects = 265000, 0. ← 1 DS270 channel

P RW D CORF

0 W 2 4440  
 0 W 3 5000  
 0 W 2 4640  
 0 W 3 4040  
 0 W 2 11420  
 0 W 2 5400  
 0 W 2 4260  
 0 W 2 5320  
 0 W 2 10640

r 1537 .570 7+9

top

avg = 12, elapsed time = 0 sec, 24 active last 15 sec.

| flags | tu   | dtu  | te   | ts   | ti   | tssc    | event | d | ws | process     |
|-------|------|------|------|------|------|---------|-------|---|----|-------------|
| NLEFI | 56   | 57   | 1218 | 0    | 0    | .001    | 33043 | 2 | 2  | Meer        |
| NLEFI | 33   | 37   | 898  | 0    | 0    | -.001   | 0 0   | 0 | 6  | Sekino      |
| NLEFI | 111  | 111  | 443  | 0    | 0    | .318    | 0 0   | 0 | 5  | Miles       |
| WLEFI | 163  | 164  | 113  | 0    | 0    | .340    | 0 0   | 0 | 4  | Stone       |
| NLEFI | 35   | 35   | 181  | 0    | 0    | .327    | 0 0   | 0 | 42 | Bensoussan  |
| NLEFI | 32   | 32   | 0    | 0    | 0    | .322    | 0 0   | 0 | 4  | Bhoola      |
| NLEFI | 32   | 32   | 0    | 0    | 0    | .322    | 0 0   | 0 | 4  | Bhoola      |
| WR    | 1150 | 1150 | 0    | 0    | 0    | 6.700   | 0 0   | 0 | 10 | initializer |
| W     | 32   | 33   | 0    | 0    | 0    | 2.993   | 0 0   | 0 | 11 | Morneault   |
| W     | 26   | 26   | 0    | 0    | 0    | 2.560   | 0 0   | 0 | 15 | Garman      |
| W     | 15   | 15   | 0    | 0    | 0    | 2.492   | 0 0   | 0 | 7  | JPLinderman |
| W     | 112  | 112  | 0    | 0    | 0    | 2.119   | 0 0   | 0 | 11 | Connell     |
| W     | 110  | 111  | 0    | 0    | 0    | 2.056   | 0 0   | 0 | 11 | IP          |
| W     | 1110 | 1110 | 0    | 0    | 0    | .217    | 0 0   | 0 | 21 | Sward       |
| W     | 50   | 51   | 22   | 0    | 2004 | 16.909  | 0 0   | 0 | 13 | Meyer       |
| W     | 44   | 45   | 24   | 6001 | 6009 | 16.009  | 0 0   | 0 | 14 | Haber       |
| W     | 503  | 504  | 2    | 4047 | 6017 | 9.297   | 0 0   | 0 | 1  | Translator  |
| W     | 654  | 655  | 21   | 4013 | 8000 | 672.461 | 0 0   | 0 | 22 | Backup      |
| W     | 313  | 313  | 15   | 0    | 8000 | 339.165 | 0 0   | 0 | 10 | Retriever   |
| W     | 143  | 143  | 42   | 0    | 8000 | 84.363  | 0 0   | 0 | 38 | Donachue    |
| W     | 394  | 395  | 36   | 0    | 8000 | 35.824  | 0 0   | 0 | 27 | Jordan      |

r 1529 2.967 21+101