

Talk given to ARPA  
Review Panel 12/17/68

## Performance

Measurement explains less than on first week,  
rather than previous performance

Some argument of twice speed possible are  
consistent with all measurements.

Have detailed probe to ~32  
other changes

12/11/68

## Tools for performance measurement

- real-time memory read time comp time page writes
- segment usage metrics by reported addresses
- direct measurement of fault times and number
- primitive " " " " (coming)
- standard system performance certificates (disk, program, calculator)
- standard script for a model "ideal" user.
- PDP-8 driver to drive the system
- PDP-8 timing monitor + scope displays
  - case status
  - process status
  - fault time metrics
  - user flags
- CBS system as a basis for comparison

How many users can Multics ?

CTSS users n  
 "Full Multics" users  
 "Basic" users ~2n

CTSS

645

"Modern" machine

256k + 1 CPU

More complex  
 4 CPU  
 10^6 memory

500 us core  
 bulk core  
 80us assoc. mem.  
 "fast CPU" ~ 10

CTSS users (24-30)

Today " 12-16  
 6 mos " 24-32  
 future " 50-64

x 2

x 6-15  
 Design limit ~ 1000 users

Cost (m) 100k 150k 250k

?

# Performance fixes after file system redo

12/10/68

1. EPL BSA - new
2. General attention to compilers and other commands
3. General review of working set of a process and contention of data bases.
4. Logic / process creation complex known to be spotty.
5. Specialized high-performance subsystems (Bonnie, etc.)
6. The Dir in N/O.
7. C-M network to lower wind down cost.
8. Audit I/O - IPC - shell - listeners with
9. Super block redo.
8. Audit world crossing