

Proposal for Inclusion of "Counters" in the Traffic Controller Data Segment

J.M. Grochow

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Introduction

The Traffic Controller Data Segment (< tc_data >) is divided into three parts, one of which is the Active Process Table ([apt]). As the APT contains status information for each active process in the entry for that process, it is desired to summarize this information in the APT header for ease of access.

Implementation

The APT header is currently 8 words long, the last entry not containing any useful information (the header must be an even number of words in length). It is proposed that 4 words be added to the header thus making room for 5 new data items (this proposal suggests only implementing 4 items but lists several possible choices for a fifth):

tc_data\$apt.nready (to replace "dummy") - the number of processes in the ready list.

tc_data\$apt.nblock - the total number of processes blocked (for any reason).

tc_data\$apt.npgwait - the number of processes awaiting a page to be brought into core.

tc_data\$apt.nhdwait - the number of processes awaiting a system (hardware) interrupt.

As each APT entry contains switches to indicate which of the above categories a process falls in, the routines which change the state of a process would

be given the responsibility of incrementing and decrementing these counters.

The scheduler is charged with inserting a process in the ready list. In so doing it must:

1. Turn off any "blocked" switch (page wait, hardware wait)
2. Turn on the "running switch."

As it must detect which switch is on in order to turn it off, it could, at this time, also decrement the appropriate counter:

```
tc_data$apt.x = tc_data$apt.x - 1
```

The getwork module is responsible for selecting a process to run next. It need only execute

```
tc_data$apt.h.ready = tc_data$apt.nready - 1
```

Similarly, those modules which set a process' "page wait" or "system interrupt wait" switches would, at that time, increment the appropriate counters.

Suggested data for the remaining <tc_data> word are:

ring number of one of the running processes

"drum in use" bit to be sampled in order to access the drum load.

total number of active processes.

total number of loaded processes.

Implementation of these suggestions could be carried out at a later date.

Conclusions

The proposed modifications to < tc_data > and to the various Traffic Controller modules can be summarized as follows:

1. The addition of 4 words to <tc_data>|[apt]
2. The addition of 9 lines of EPL code: 4 in the scheduler, 1 in "getwork", and 2 each when the APT "page wait" and "system interrupt wait" switches are set.

These additions would then allow the various Multics monitoring devices to have quick and easy access to these system important system statistics.