

To: MTB Distribution  
From: F. C. Smith  
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Subject: estimate\_bill command.

A new command, estimate\_bill, is proposed to enable users to obtain information about resources consumed during a session and their cost. A draft MPM writeup is included.

It will be necessary to extend the Process Initialization Table (PIT) to include the total memory units and terminal I/O operations for previous processes in the current session, as well as the total virtual CPU time, which is already included. This will be needed for any application in which figures for resource consumption in the current session are desired, as well as for implementation of the estimate\_bill command. It will then be possible to obtain the usage for previous processes from the PIT, and the usage for the current process can be obtained from the supervisor.

Name: estimate\_bill, eb

The estimate\_bill command prints a report about the CPU time, memory usage, terminal I/O, and connect time for the current console session and their cost. Arguments allow the user to specify various parts of the available information to be printed, or to specify that initialization is to be performed.

Although Multics keeps very accurate records of the total resources that a user has consumed on each shift during the current month, a breakdown by shifts of usage for the current session is not kept. It is therefore necessary to record information about usage on different shifts if a shift change has occurred during the current session, and accurate cost figures are desired. This information will be recorded at the time the shift changes if the estimate\_bill command (with any argument) has been given during the current process. The purpose of the argument "-init" is to set a timer for the next shift change, without producing output, so that the usage for the shift that ends at that time can be recorded. If usage information is recorded, a segment will be created for this purpose in the user's login directory. It will have the name username.eb\_data, where username is the user's login name, and will be created only if the shift changes.

If the information requested cannot be computed accurately,

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i.e. a shift change has occurred during the session and the usage for that shift was not recorded because the user did not set up the `estimate_bill` command to do so, the breakdown by shift will be estimated. The first time `estimate_bill` is invoked after a shift change at which usage was not recorded, the missing values will be estimated by assuming that the amounts of CPU time, memory usage, and terminal I/O per unit of real time are constant for the whole session. The estimates for past shifts will then be recorded and used in future invocations of `estimate_bill`.

### Usage

`estimate_bill -control_arg-`

1) `-control_arg-` Provides the ability to select various portions of the available information to be printed, or to initialize the command.

`-init` This argument initializes the command for a process. A timer is set to go off next time a shift change occurs. When this timer goes off, the usage for the shift that ends at that time will be recorded, as described above. Any use of the `estimate_bill` command will set this timer; the `-init` argument suppresses the printing of information. If a user is interested in obtaining accurate usage values for a session that may include a shift change, this command should be given at the beginning of each process in the session, or be included in the user's start up `exec_com`.

`-long, -lg` Prints the most detailed information about the resources used during the current session. The display includes a report of the total virtual CPU time, memory usage, terminal I/O operations, and costs, broken down by shift.

`-brief, -bf` Prints only the total cost of the current session.

If no argument is given, the dollar cost of the current session is printed, broken down by shift. If usage has to be estimated, this fact will be indicated.

If the `estimate_bill` command is given during an absentee session, the output will be placed in the output segment. For absentee processes, shifts have no significance, and giving the command "`estimate_bill -init`" will have no effect.