

Identification

Overview of the Absentee Monitor
H. M. Deitel

Purpose

The Absentee Monitor is responsible for the initiation, control, and termination of absentee computations in Multics. This section discusses the major sections of the Absentee Monitor and the interrelationship between the Absentee Monitor and other parts of the Multics system. Familiarity with the terminology of BQ.8.00 is presumed.

Discussion

The Absentee Monitor consists of a group of related modules and a series of queues. Modules are provided to insert and delete queue entries, initiate new absentee computations, and shelve running absentee computations.

This document is organized into subsections as follows:

1. Major Sections of the Absentee Monitor
 - a. Absentee Queue Control
 - b. Absentee Waiting Queues
 - c. Absentee Running Queues
 - d. Absentee Initiation Module
 - e. Absentee Shelving Module
2. Relationships between the Absentee Monitor and other Portions of Multics
 - a. System Control
 - b. Performance Measurement
 - c. Load Control
 - d. Load Control Table
 - e. Reserver
 - f. SAVE/RESUME and QUIT
 - g. User Commands

The reader is referred to the block diagram of figure 1 which illustrates the various relationships which are discussed in the following sections.

1a. Absentee Queue Control

As new requests for AC's are entered into the system, the pathnames of the corresponding Absentee Computation Descriptor Files (ACD-Files) are placed into queues where they remain until such time as the system decides to initiate additional AC's. Absentee Queue Control is responsible for making appropriate entries in the queues, retrieving entries from the queues when these entries are needed by other parts of the absentee mechanism, and deleting entries which are no longer needed.

1b. Absentee Waiting Queues

These are a series of queues which contain the names of ACD-Files of AC's waiting to be initiated. A request for a new AC causes Absentee Queue Control to make an entry in the appropriate Absentee Waiting Queue. As explained in section BQ.8.00, there is one Absentee Waiting Queue for each priority stream.

1c. Absentee Running Queues

When an AC is initiated, the corresponding entry in the appropriate Absentee Waiting Queue is deleted and an entry for the AC is inserted in the appropriate Absentee Running Queue. The Absentee Running Queues are a series of queues, one per priority stream, which contain an entry for each running AC. (Note that an entry in an Absentee Running Queue may be thought of as representing an AC which is waiting to be shelved).

1d. Absentee Initiation Module

Whenever more AC's may be initiated, Load Control informs the Absentee Initiation Module of the number of AC's to initiate. The Absentee Initiation Module decides which AC's to initiate and proceeds to initiate them. The Absentee Initiation Module calls Absentee Queue Control to make the appropriate insertions (deletions) in the Absentee Running (Waiting) Queues.

1e. Absentee Shelving Module

At certain times it becomes necessary to decrease the number of running AC's. This situation occurs, for example, at system shutdown when service to all running AC's must be suspended. Whenever the AC load must be trimmed, Load Control informs the Absentee Shelving Module of how many AC's to shelve. The Absentee Shelving Module determines which AC's to shelve and proceeds to shelve them. The Absentee Shelving Module calls Absentee Queue Control to make the appropriate insertions (deletions) in the Absentee Waiting (Running) Queues. Note that when an AC is shelved, an entry for it is placed back into the appropriate Absentee Waiting Queue so that the AC may be continued whenever Load Control decides that AC's may again be initiated.

2a. System Control

System Control conveys the AC-IC resource apportionment information from the System Operator to Load Control, and also conveys dedicated resource apportionment information from the System Operator to the Reserver.

2b. Performance Measurement

Performance Measurement supplies periodic information to Load Control regarding the actual amounts of absentee and interactive usage currently being supported by the system.

2c. Load Control

The main function of Load Control is to see that the apportionment of resources between interactive and absentee computations remains close to that specified by the System Operator, and that the system is neither under- nor over-loaded. Load Control compares the apportionment information it receives from the System Operator with the current usage statistics which Performance Measurement supplies. If any significant discrepancies between these sets of figures exist, then Load Control modifies the current system load by any of the following means:

- 1 - calls the Absentee Initiation Module to initiate more AC's
- 2 - calls the Absentee Shelving Module to shelve some AC's
- 3 - increases the maximum number of IC's allowed
- 4 - automatically logs out some IC's.

2d. Load Control Table

In this table, Load Control maintains a list of all logged-in IC's and certain additional information such as the current total number of logged-in IC's and the maximum number of IC's which the system currently allows. During the load balancing operations, Load Control obtains information about AC's from the Absentee Waiting Queues and the Absentee Running Queues, and information about IC's is obtained from the Load Control Table.

2e. Reserver

The Reserver is responsible for scheduling the usage of dedicated resources (for both IC's and AC's). If a user's AC requires dedicated resources, the user must place an advance reservation for the resources. The system automatically initiates the AC when the reservation becomes due.

2f. SAVE/RESUME and QUIT

The shelving and unshelving of AC's (see BQ.8.00) is accomplished by use of the SAVE, RESUME, and QUIT facilities of Multics. Shelving an AC involves first QUITting the AC, then SAVEing it, deleting the Absentee Running Queue entry for the AC, and creating an Absentee Computation Descriptor File containing a RESUME command. Unshelving an AC is done by the Absentee Initiation Module in the same fashion as initiating a new AC. However, since the Absentee Waiting Queue entry for this AC now has the name of an ACD-File which consists of a RESUME command to resume a SAVED file, the SAVED AC is restarted.

2g. User Commands

Users are provided with a detailed set of commands with which to control the initiation, operation, and termination of absentee computations. These commands cause calls to entries in the Absentee Monitor and status is returned to the user in each case to indicate if the calls are successful.

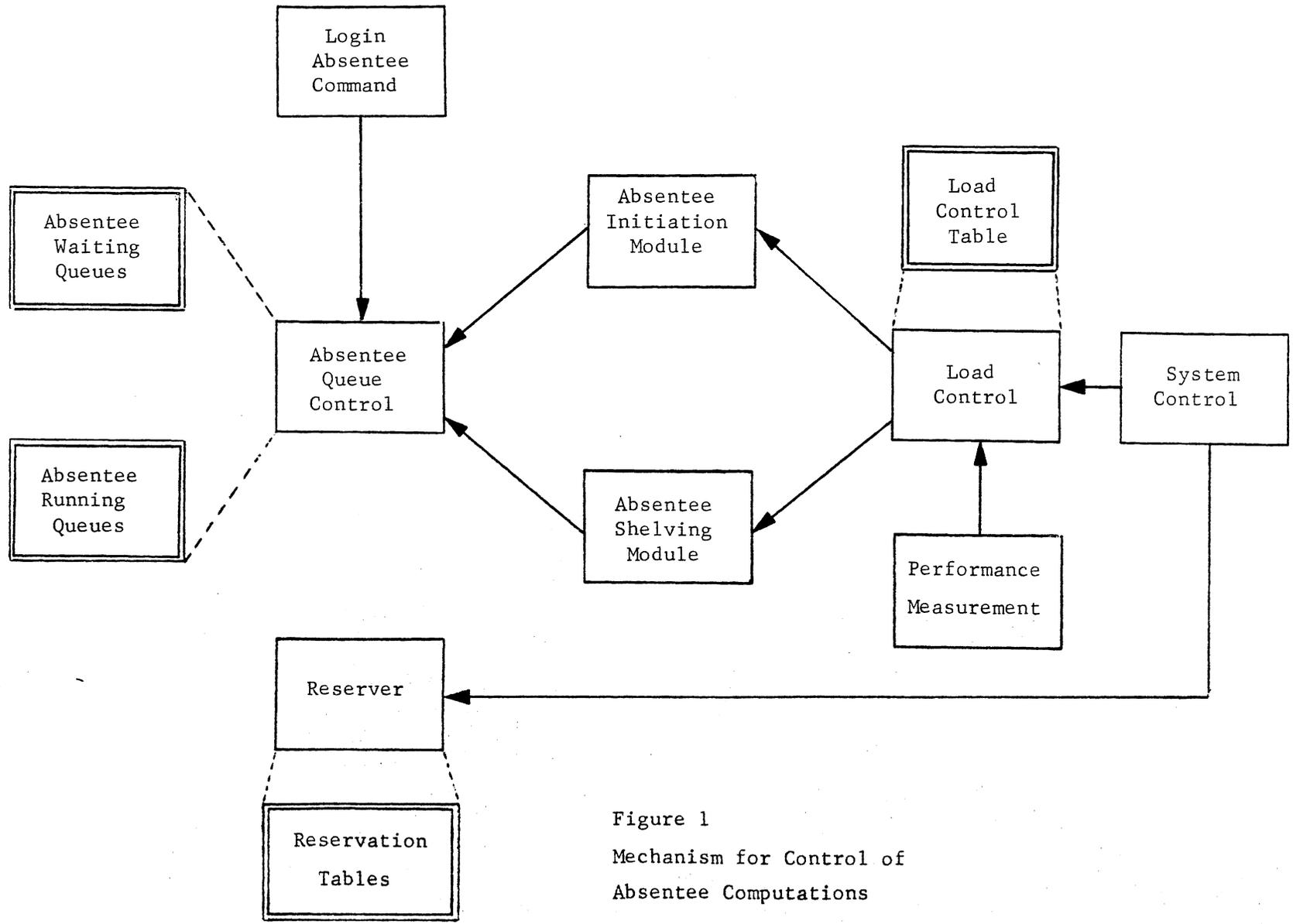


Figure 1
Mechanism for Control of
Absentee Computations