TO: MSPM Distribution
FROM: R. C. Daley
SUBJECT: Revised Core Control Documentation
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The attached sections (BG.5.00, BG.5.01, BG.5.02, BG.5.03) reflect the recent revisions to the design of Core Control and replace the existing BG.5 and BG.6 series (i.e., replace BG.5.00, and BG.6.00 - .06).

These sections also obsolete some of the details described in BL.6.03 which is still useful however for background information.

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Identification

Overview of Core Control
P. G. Neumann, M. R. Wagner and R. C. Daley

Purpose

This section provides an overview of modules responsible for core management in the Multics system. The current design of core control is marked primarily by simplicity and lack of sophistication, in order to achieve quick response to requests for core allocation resulting from paging. Further design improvements may be considered when it becomes possible to determine the effects on performance in a working Multics system.

Core Allocation Strategy

During system initialization, all core available to the system is divided into two independent pools of core. One pool is used to satisfy requests for a 64-word block of core, the other pool is used to satisfy requests for 1024-word blocks. The size of these pools is fixed during initialization and is not changed during normal Multics operation.

During normal Multics operation, all segments (except descriptor segments) are paged in 1024-word blocks. The 1024-word core pool is used to satisfy page requests resulting from paging these segments. The 1024-word pool is also used to satisfy requests for page tables greater than 64-words (i.e., for segments greater than 64K).

The 64-word pool is used to satisfy requests for 64-word page tables (for segments less than 64K) and for pages of descriptor segments. Since segments are normally unloaded (page table removed) whenever the last page of a segment is removed, and since only loaded Multics processes may have descriptor segments in core, the size of the 64-word pool may be established during initialization knowing only the amount of available core and the maximum number of processes allowed to be loaded at a time. If during normal operation the 64-word pool is exhausted, requests for 64-word blocks are satisfied from the 1024-word pool. This strategy allows the size of the 64-word pool to be set smaller than required by the worst case situation while still allowing the system to deal with transients caused by unusual paging activity.

The Core Map

All information necessary to handle the allocation and deallocation of core memory is kept in a single data base known as the core map. This data base contains a 1024-word core pool, a 64-word core pool and the necessary control information needed for core management. A detailed discussion of the structure of the core map is contained in BG.5.01.

The Core Management Module

The core management module is responsible for the allocation and deallocation of core memory resulting from paging. During normal operation, all requests for core memory are directed through the modules of page control (BF.4) to the core management module. A detailed description of the core management module is contained in BG.5.02.

Core Initialization Procedures

Several procedures are provided during system initialization to initialize the core map and to interface with the various aspects of system initialization. After initialization these procedures are no longer needed and may be deleted from the system. A detailed description of these procedures is contained in BG.5.03