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Identification

Stack Switching Module: switch_stack
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Purpose

The Stack Switching Module is used by those procedures which are required to operate in the concealed stack (see BJ.1.03). These are procedures which must not take a page fault during execution.

Usage

The Stack Switching Module must be called as a validate option by the procedure wishing to operate in the concealed stack. An example of this is shown below:

```
alpha:   proc (beta) options (validate (switch_stack));
```

The reason for the use of the validate option is as follows: Upon entering a PL/I compiled procedure, before the execution of the actual program, the prologue is executed. The prologue may set up pointer information using the segment number of the current stack. If the stack segment is then switched, this pointer information will be incorrect. However, a procedure specified as a validate option will be called before the prologue is executed, and hence, before any pointers pertaining to the stack are set up.

Implementation

The contents of "sb" are compared against the segment number of the process data segment, <pds>. If they are equal, the calling procedure is already operating in the concealed stack and "switch_stack" will return. Otherwise, "switch_stack" will create its own stack frame at the bottom of the concealed stack. It will create a stack frame following its own, identical in size to that of the calling procedure. Then, "switch_stack" will transfer the contents of the calling procedure's stack frame into the new stack frame in the concealed stack. "Switch_stack" will modify the return information in the new stack frame so that the procedure will return to "switch_stack" in order to switch back to the previous stack. Finally, it will modify "sp-sb" in the new stack frame and return to the calling program.

Restrictions

Since "sb" is locked under Multics, "switch_stack" must be a mastermode procedure. Most procedures which call "switch_stack" will probably also mask interrupts. Hence, it is important that these procedures not cause a page fault while masked. Therefore, the procedure which calls "switch_stack" should copy over its arguments into the concealed stack before masking interrupts. Moreover, the procedure, and all procedures that it calls, should be wired-down and should reference only wired-down segments.