Hard-Core Supervisor entry points

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Purpose

The innermost protection ring of the Multics supervisor is known as the hard-core supervisor ring. As a general rule, procedures and data bases are located in the hard-core ring if their correctness is needed in order to guarantee inter-user protection and privacy. For example, the procedures and data bases of the Basic File System, the GIOC interface module, and the Traffic Controller are located in the hard-core ring. This section lists all permitted entry points to the hard-core ring.

Discussion

The hard-core ring of the supervisor is entered by the standard ring-crossing mechanism described in BD.9.01. From outside the hard-core ring, it appears that all entry points are located in one of two segments named "hcs_" and "hcs1_". These segments are merely transfer vectors which pass the call to the appropriate segment entry point in the hard-core ring. This extra indirection is inserted on the assumption that the position of entry points of segment hcs_ and hcs1_ will change only rarely—when an old hard-core entry point is deleted, for example—and that therefore the caller can rely on his linkage to the entry point remaining correct even though the hard-core supervisor changes. If the caller were linked directly to an entry point of some hard-core supervisor procedure, his link becomes useless if a trivial change to the hard-core supervisor procedure should move its entry point. (In general, it is not practical for one user to run with an "old" version of a hard-core supervisor segment. Security is difficult to check and the segment may have to be "wired-down" to operate. It might also contain a serious bug.)

Whenever the system is initialized or reconfigured, the segments hcs_ and hcs1_, being part of the hard-core ring, are correctly linked to the real hard-core entry points by the same pre-linking mechanism which links all hard-core modules together. Pre-linking of the hard-core ring is described in section BL.7.02.
Segment hcs_ contains entries to all unrestricted hard-core entry points. Segment hcs1_ contains all entries which may be called only from the administrative ring.

**Entry points**

Below is an exhaustive list of all legal entry points to the hard-core ring. For further information on any entry point including arguments, see the MSPM sections indicated.

<table>
<thead>
<tr>
<th>entry</th>
<th>MSPM section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Controller</td>
<td></td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[wakeup]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[block]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[create_process]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[destroy_process]</td>
</tr>
</tbody>
</table>

Basic File System

<table>
<thead>
<tr>
<th>entry</th>
<th>MSPM section</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;hcs1_]</td>
<td>[makeunknown]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[transuse]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[get_ring]</td>
</tr>
<tr>
<td>&lt;hcs1_]</td>
<td>[moveseg]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[free_core]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[read_seg]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[write_seg]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[truncate_seg]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[core_test]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[check_access]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[check_ring]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[list_dir]</td>
</tr>
<tr>
<td>&lt;hcs_&gt;</td>
<td>[status]</td>
</tr>
</tbody>
</table>
MULTICS SYSTEM-PROGRAMMERS' MANUAL
SECTION BD.6.03

<hcs_> | [chname] 
BG.8.02
<hcs_> | [delentry] 

<hcs_> | [readac1] 

<hcs_> | [writeac1] 

<hcs_> | [setbc] 

<hcs_> | [setconsistsw] 

<hcs_> | [setml] 

<hcs_> | [setcospysw] 

<hcs_> | [setrelatesw] 

<hcs_> | [setrd] 

<hcs_> | [appendb] 

<hcs_> | [appendl] 

<hcs_> | [movefile] 

<hcs1_> | [estblseg] 
BG.8.04
<hcs1_> | [setlimits] 
BG.8.03
<hcs1_> | [setsystrap] 

<hcs1_> | [setretriever] 

<hcs1_> | [setdtd] 

<hcs1_> | [getentry] 

<hcs1_> | [putentry] 

<hcs1_> | [setusage] 
BG.8.04
<hcs1_> | [set_base_dir] 

GIOC Interface Module
<hcs_> | [define_class] 
BF.20.02
<hcs_> | [define_list]
<hcs_> | [change_list]   BF.20.02
<hcs_> | [change_global] "
<hcs_> | [copy_list]   BF.20.02
<hcs_> | [connect_list] "
<hcs_> | [request_status] "
<hcs_> | [release_list] "
<hcs1_> | [assign_channel] "
<hcs1_> | [define_assign] "
<hcs1_> | [define_channel] "

Media Management Module

<hcs_> | [load]   BT.2
<hcs_> | [unload]   BT.2
<hcs_> | [locate]   BT.2
<hcs_> | [return]   BT.2

Resource Assignment Module

<hcs1_> | [assign]   BT.1
<hcs1_> | [unassign]   BT.1

Interprocess Communication

<hcs1_> | [get_device_signal]   BQ.6

Miscellaneous entry points

<hcs_> | [set_timer]   BD.10.04
<hcs1_> | [set_alarm]   BD.10.03