SCSI-2 CAM Change Proposal

Title: Clarifying relationship of XPT to SIM
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References

1. X3T9.2/90-186, *SCSI-2 Common Access Method - Transport and SCSI Interface Module*, rev 2.4, I. Dal Allan (Ed.)

Discussion

This paper discusses a problem with [1] and offers a specific change proposal that is intended to fix the problem.

A primary purpose of [1] is to specify the behavior of XPT's and SIM's. In particular, it is hoped that a limited number of XPTs will be distributed by operating system vendors, and SIMs will be provided by Host Bus Adaptor vendors.

A driver or application using CAM formulates a CCB and then transmits to the XPT. The XPT then executes the CCB either by executing it directly, or by passing it on to the SIM. For example, "01h, "Execute SCSI I/O" is clearly intended to be passed on to the appropriate SIM.

However, the proposed specification does not explicitly state which functions are explicitly handled by the XPT and which are explicitly handled by the SIM. This explicit specification is needed if all conforming SIMs are to correctly operate with corresponding conforming XPTs.

In particular, consider the following four function codes:

02h Get Device Type
03h Path Inquiry
05h Set Asynch Callback
06h Set Device Type

To illustrate the problem this proposal attempts to fix, consider three hypothetical conforming implementations:

Implementation #1 implements CCBs containing these 4 function codes in the XPT. The XPT queries the SIM, when necessary, by building a second local CCB with the function code "01h Execute SCSI IO", and then calling the SIM using this second CCB.

Implementation #2 implements function codes 02h,03h, 06h by passing on the original CCB to the SIM. The SIM then processes this unmodified CCB.

Implementation #3 implements 02h and 06h like implementation #2, and implements 03h like implementation #2.

Result: Each implementation is conforming, and the SIMs for each implementation correctly work with the matching XPT. But NOTE: THE XPTs AND SIMs ARE NOT INTEROPERABLE. XPT #2 expects its SIMs to handle unmodified CCBs. SIM #1 does not even recognize code 02h.

This interoperability problem can be solved only by specifying the exact manner an XPT must use to extract information from a SIM.

This proposal specifies a change so that the behavior of implementation #1 in this example is the required behavior of all SIMs and XPTs.

NOTE: This proposal is unimportant in environments where the XPT/SIM are the same module, but is VERY IMPORTANT in environments where they are distinct entities.

Change Proposal

Insert new clause 8.1.6 and 8.1.7:

8.1.6 XPT Function Codes:

Let "XPT specific codes" be the XPT function codes:

02h Get Device Type
03h Path Inquiry
05h Set Asynch Callback
06h Set Device Type

An XPT shall recognize all Function Codes specified in Table 8-3. CCBs containing XPT specific codes shall NOT be directly submitted to SIMs. All CCBs containing function codes from Table 8-3 that are not XPT specific codes shall be routed to the appropriate SIM.

Implementors note: In order to execute the XPT specific codes, it is assumed the XPT will query the SIM by constructing a local Execute SCSI IO and its appropriate CCB that specifies necessary functions such as Inquiry. The SIM is then called with this local CCB.

8.1.7 SIM Function Codes:

A SIM shall recognize all Function Codes in Table 8-3 EXCEPT XPT specific codes.