To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 07-223r0 SAM-4 Peripheral device and logical unit addressing errors

Revision history
Revision 0 (4 May 2007) First revision

Related documents
sam4r10 - SCSI Architecture Model - 4 (SPC-4) revision 10

Overview
When a SCSI device receives a command or task management function with a LUN using the peripheral device addressing (00b) or logical unit (10b) addressing method that it does not relay to a dependent logical unit, the SAM-4 currently requires returning:
- a) CHECK CONDITION/ILLEGAL REQUEST/INVALID COMMAND OPERATION CODE for a command; and
- b) SERVICE DELIVERY OR TARGET FAILURE for a task management function.

If the SCSI device *never* relays anything to certain LUN values, however (e.g., it only supports bus zero), those are misleading responses implying that other opcodes or TMFs might be supported.

The SCSI device is more likely to return these more informative responses:

- a) CHECK CONDITION/ILLEGAL REQUEST/LOGICAL UNIT NOT SUPPORTED for a command; and
- b) INCORRECT LOGICAL UNIT NUMBER for a task management function.

These should be the responses required by SAM-4.

Suggested changes

4.6.7 Peripheral device addressing method

If the peripheral device addressing method (see table 10) is selected, the SCSI device should relay the received command or task management function to the addressed dependent logical unit. ~~Any command that is not relayed to a dependent logical unit shall be terminated with a CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to INVALID COMMAND OPERATION CODE. If a task management function cannot be relayed to a dependent logical unit, a service response of SERVICE DELIVERY OR TARGET FAILURE shall be returned.~~

If the SCSI device does not relay any commands or task management functions to the addressed dependent logical unit, it shall follow the rules for selection of incorrect logical units described in 5.8.4 and 7.12.

If the SCSI device does relay some commands and task management functions to the addressed dependent logical unit, it shall:

- a) terminate any command that is not relayed with CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and the additional sense code set to INVALID COMMAND OPERATION CODE; and
- b) terminate a task management function that is not relayed with a service response of SERVICE DELIVERY OR TARGET FAILURE.

> NOTE 2 - A SCSI device may filter (i.e., not relay) commands or task management functions to prevent operations with deleterious effects from reaching a dependent logical unit (e.g., a WRITE command directed to a logical unit that is participating in a RAID volume).

4.6.9 Logical unit addressing method

If the logical unit addressing method (see table 12) is selected, the SCSI device should relay the received command or task management function to the addressed dependent logical unit. ~~Any command that is not relayed to a dependent logical unit shall be terminated with a CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to INVALID COMMAND~~

~~OPERATION CODE. If a task management function cannot be relayed to a dependent logical unit, a service response of SERVICE DELIVERY OR TARGET FAILURE shall be returned.~~

If the SCSI device does not relay any commands or task management functions to the addressed dependent logical unit, it shall follow the rules for selection of incorrect logical units described in 5.8.4 and 7.12.

If the SCSI device does relay some commands and task management functions to the addressed dependent logical unit, it shall:

a) terminate any command that is not relayed with CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and the additional sense code set to INVALID COMMAND OPERATION CODE; and

b) terminate a task management function that is not relayed with a service response of SERVICE DELIVERY OR TARGET FAILURE.

NOTE 3 - A SCSI device may filter (i.e., not relay) commands or task management functions to prevent operations with deleterious effects from reaching a dependent logical unit (e.g., a WRITE command directed to a logical unit that is participating in a RAID volume).

5.8.4 Incorrect logical unit selection

The SCSI target device's response to a command addressed to an incorrect logical unit number is described in this subclause.

In response to a REQUEST SENSE command, a REPORT LUNS command, or an INQUIRY command the SCSI target device shall respond as defined in SPC-3.

Any command except REQUEST SENSE, REPORT LUNS, or INQUIRY:

a) Shall be terminated with CHECK CONDITION status, with the sense key set to ILLEGAL REQUEST, and with the additional sense code set to LOGICAL UNIT NOT SUPPORTED, if:
   A) The SCSI target device is not capable of supporting the logical unit (e.g., some SCSI target devices support only one peripheral device); or
   B) The SCSI target device supports the logical unit, but the peripheral device is not currently connected to the SCSI target device;

   or

b) Is responded to in a vendor specific manner, if:
   A) The SCSI target device supports the logical unit and the peripheral device is connected, but the peripheral device is not operational; or
   B) The SCSI target device supports the logical unit but is incapable of determining if the peripheral device is connected or is not operational because the peripheral device is not ready.

7.12.4 Task Management Function Executed transport protocol service response

Service Response: An encoded value representing one of the following:

...

FUNCTION REJECTED: The task manager does not implement the requested function.

INCORRECT LOGICAL UNIT NUMBER: An optional task router response indicating that the function requested processing for an incorrect logical unit number.

SERVICE DELIVERY OR TARGET FAILURE: The request was terminated due to a service delivery failure (see 3.1.118) or SCSI target device malfunction. The task manager may or may not have successfully performed the specified function.

7.12.5 Received Task Management Function Executed transport protocol service confirmation

Service Response: An encoded value representing one of the following:

...

FUNCTION REJECTED: The task manager does not implement the requested function.

INCORRECT LOGICAL UNIT NUMBER: An optional task router response indicating that the function requested processing for an incorrect logical unit number.

SERVICE DELIVERY OR TARGET FAILURE: The request was terminated due to a service delivery failure (see 3.1.118) or SCSI target device malfunction. The task manager may or may not have successfully performed the specified function.