



X3T9.2/87-51

Memo to: John Lohmeyer, ANSI X3T9.2 Chairman
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Memo from: Robert N. Snively
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Date: March 9, 1987

Subject: Proposed Clarification of Invalid LUN handling

Dear Mr. Lohmeyer:

The handling of attempts to address invalid LUN's is not clearly defined in the present SCSI-2 document. The proper target response for requests against an invalid LUN is described implicitly in a number of paragraphs. At the same time, the error handling procedure for multiple accesses to the same LUN are described somewhat illogically in the introduction to the SCSI command and status description in section 6. The part discussing multiple accesses to the same LUN does not allow for the proper handling of queueing against a LUN or for the soft reset error handling which sometimes forces a second access to an active LUN. To include the invalid LUN handling in a standard way and to clarify the multiple access handling, I would suggest the following modifications to the SCSI-2 document dated 10/31/86.

Paragraphs 5 through 9 of section 6 should be removed. The affected paragraphs begin "An initiator should never...." and end "....integrity of the data on the logical unit." These pages will be replaced by a similar section at the end of chapter 6.

The following text should be added to the second paragraph of section 5.5.1 after the words "... been released (BUS FREE phase)." to clarify the location of further information about LUN addressing.

The treatment of other LUN addressing errors is described in section 6.5

The following text should be added to the first paragraph of section 6.4.3 to clarify the addressing of linked commands. The text is added immediately after the paragraph ending "...functional component of the initiator."

All commands in a series of linked commands are addressed to the same LUN.

The following text should be added to chapter 6 as section 6.5. This new text includes the content of paragraphs 5 through 9 above, suitably modified, and includes a description of invalid LUN handling.

6.5 Command Processing Exception Conditions

The following sections describe some exception conditions and errors associated with command processing and the sequencing of commands.

6.5.1 Redundant Commands to an Active Logical Unit

An initiator should never attempt to send a second command to a logical unit until the command in progress is terminated unless both the initiator and the target support full command queueing against an LUN. The initiator is normally informed that a command is terminated by the target when the target presents a COMMAND COMPLETE message. Termination may also result from a hard RESET condition or from unusual soft RESET conditions.

If a target receives an untagged command from an initiator for a logical unit that already has an untagged command in progress from the same initiator and if no soft RESET condition has occurred since the original command was identified, the target shall take the following action:

The target shall internally stop execution of the first command and shall present CHECK CONDITION status to the second command. The target shall internally treat the first command as if an ABORT message had been received. The sense key on behalf of the second command shall be ABORTED COMMAND and the additional sense code shall be set to OVERLAPPED COMMANDS ATTEMPTED. Error recovery procedures may be required to establish the integrity of the data on the logical unit in such a case.

If a target receives an untagged command from an initiator for a logical unit that already has an untagged command in progress from the same initiator and if a soft RESET condition has occurred, the soft RESET action (3) shall be taken as described in section 5.2.2.2. The target shall clear the original command and perform the new command instead. The assumption is made that the new command will normally be a repetition of the original command in this special case.

6.5.2 Selection of an Invalid Lun

The LUN for which a command is destined is specified by either the IDENTIFY message or by bits 7,6, and 5 of byte 1 of the Command Descriptor Block. If an invalid or non-operational LUN is selected, the target must take the appropriate action as described below:

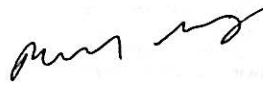
If the specified LUN is not implemented by the SCSI device, the Command Descriptor Block is requested by the target. If the command is a REQUEST SENSE command, the sense information presented will contain a sense key of ILLEGAL REQUEST (sense key 7) with an additional sense code of INVALID LUN (sense code 25). If the command is an INQUIRY command, the command will be executed normally. The device type code in byte 0 of the parameter list will indicate that the device is a type 7F device, Logical Unit Not Present. Any other command will be immediately followed by CHECK CONDITION status. No further information need be stored by the target, since the REQUEST SENSE command that follows will be handled as above.

If the specified LUN is implemented by the SCSI device the SCSI device may have the capability of determining whether or not the LUN is physically installed. If the LUN is determined by the SCSI device to be not installed, the actions described above for non-implemented LUN's will be taken.

If the specified LUN is implemented by the SCSI device and the SCSI device does not have the capability of differentiating a non-installed LUN from a powered off, not ready, or failing LUN, the following actions will be taken. The target shall obtain the Command Descriptor Block. If the command is an INQUIRY command, the normal information appropriate for the selected LUN will be presented. If the command is a REQUEST SENSE command, an indication of NO SENSE will be presented unless the command was immediately preceded by a command that forced a CHECK CONDITION. If any other command is detected by the target, the target shall perform the command in a manner appropriate to the LUN state determined during the command sequencing. The command

may or may not terminate normally. Abnormal terminations will include CHECK CONDITION status followed by an appropriate sense condition. Appropriate sense codes include NOT READY, UNABLE TO SELECT, LOGICAL UNIT COMMUNICATION FAILURE, and certain others.

The above text should clarify the error conditions presented during redundant command handling and during invalid LUN addressing. Thank you for your acceptance of the above proposal.



Robert N. Snively

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