

To: X3T10 Committee
cc: Jim Coomes, Mike Miller, Bharat Kothari
From: Gerry Houlder
Date: 04/18/94 06:00:47 PM
Subject: Data Recovery on Deferred Errors X3T10/94-067r1

PROBLEM STATEMENT

We have a customer that is concerned about recovering write data after a deferred error. When Write Caching is used, the WRITE command will return GOOD status before the data is written to the disc. If an unrecoverable error occurs during that write operation, a later command from the same initiator will end with CHECK CONDITION status. The sense bytes for that error will report Deferred Error and the Logical Block Address of the erroring block. When such an error occurs, the customer wants to read the unwritten data back and attempt to retry the write (possibly at a different location). Existing direct access device SCSI doesn't have enough information/commands to do this to our customer's satisfaction.

SOLUTION

The Auto Contingent Allegiance (ACA) feature of SCSI-3 is almost enough. The ACA procedure allows for retrieving sense data, then issuing a READ command to "retrieve" the unwritten data from the target's buffer. Of course, the target must be careful to retain all write data for failed write commands (and allow that data to be used to satisfy subsequent READ requests) until after the Contingent Allegiance is cleared. The returned sense data will contain the first LBA that was not written to disc in the information bytes. This can be used by the following READ command to retrieve the unwritten data. The only item that is still unknown is the number of blocks of unwritten data that is available. I propose using the command specific bytes in REQUEST SENSE data to indicate the length of unwritten data when a deferred error occurs.

Add the following wording to the error reporting section of the direct access device model (equivalent to section 9.1.12 in SCSI-2 Standard):

Condition

Unrecovered write error, GOOD status already returned because write caching is active.

Sense Bytes

Error Code = 0x71; Sense Key = MEDIUM ERROR; ASC & ASCQ contain appropriate codes;
Information = LBA of first block not written to medium; Command Specific Information = Number of blocks not written to disk (and may be recovered via a READ command if it is issued before ACA condition is cleared). This number of blocks may include blocks from subsequent commands that were merged with the block that encountered the unrecoverable write error.

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