Date: Sept. 9, 1999

To: T10 Committee (SCSI)

From: George Penokie (IBM)

Subject: Beyond 2TBytes

Overview

Subsystems connected to parallel SCSI and Fibre Channel are rapidly approaching sizes that will require SCSI commands that will address more than 2 TBytes of data. Many of the SCSI commands defined today for direct-access type SCSI devices are limited to addressing 2 TBytes when the block size is set to 512 bytes. Already some UNIX operating systems support an 8 byte address space, so where possible, this proposal will modify the LBA fields to 8 bytes.

This proposal will only address the direct-access type SCSI device command set.

Proposed changes

This proposal would make 16 byte commands out of any CDB that contains an LBA field. Those LBA fields would be make into 8 byte fields with the format of the CDB as shown in table 1.

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Table 1 -Typical CDB for large LBA 16-byte commands

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE							
1	Reserved			MISC. CDB INFORMATION				
2	(MSB)							
3								
4								
5								
6				LOGICAL BLOCK ADDRESS				
7								
8								
9								(LSB)
10	(MSB)							
11				TRANSFER LENGTH (if required) PARAMETER LIST LENGTH (if required) ALLOCATION LENGTH (if required)				
12								
13								(LSB)
14	Reserved							
15	CONTROL							

The commands that would use the above format are listed in table 2.

Table 2 -CDB and parameter list changes

Command Name	Op code	Type	Standard	Comment
EXTENDED COPY	83h	O	SPC-2	Already in SPC-2
FORMAT UNIT	04h	M	SPC-2	CDB OK - Need new Defect List Format
LOCK-UNLOCK CACHE(16)		O	SBC-2	Use format from table 1 for extended LBA and number of blocks.
PRE-FETCH(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
READ(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
READ CAPACITY(16)		O	SBC-2	Use format from table 1 for extended LBA and the parameter data needs an extended LBA.
READ LONG (16)		O	SBC-2	Use format from table 1 for extended LBA and byte transfer length.
REASSIGN BLOCKS	07h	O	SBC-2	CDB OK - New new option for defect list to add in 8-byte LBAs.
REBUILD	81h	O	SBC-2	No room for larger LBA in CDB - No proposed change.
REGENERATE	82h	O	SBC-2	No room for larger LBA in CDB - No proposed change.
SET LIMITS(16)		O	SBC-2	Use format from table 1 for extended LBA and number of blocks.
SYNCHRONIZE CACHE(16)		O	SBC-2	Use format from table 1 for extended LBA and number of blocks.
VERIFY(16)		O	SBC-2	Use format from table 1 for extended LBA and verification length.
WRITE(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
WRITE AND VERIFY(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
WRITE LONG(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
WRITE SAME(16)		O	SBC-2	Use format from table 1 for extended LBA and number of blocks.
XDREAD(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
XDWRITE(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.
XDWRITE EXTENDED	80h	O	SBC-2	No room for larger LBA in CDB - No proposed change.
XPWRITE(16)		O	SBC-2	Use format from table 1 for extended LBA and transfer length.

In addition to the commands and parameters listed above the mode page header is another area where the LBA for direct-access SCSI device has only an eight byte field. I do not propose changing this as the capacity can be determined by the read capacity command.