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To: T10 Committee (SCSI)

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Subject: Defination of Well Known Logical Units

1 Overview

This proposal defines an extension to logical unit addressing that would allow definition of a logical unit that does specific functions. The commands these special logical units would be primary used for carrying out functions that are not contained within the boundaries of the logical unit. Any device that accepts a well known logical unit number would be required to support every command defined for that specific well known logical unit.

2 Terminology for SAM-2

2.0.1 Well known logical unit: A logical unit that only does specific functions. If a well known logical unit is supported within a SCSI target device then that logical unit shall support all the commands associated with it. Well known logical units allow an application client to issue requests to receive specific information usually relating to a SCSI target.

3 LUN structure on SAM-2

An application client selects a well known logical unit using LUN extended addressing LUN. See xxx for the LUN format.

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Table 1 - Format of addressing fields

Bit Byte	7	6	5	4	3	2	1	0
n-1	ADDRESS METHOD		(MSB)					
n	ADDRESS METHOD SPECIFIC							(LSB)

The ADDRESS METHOD field defines the contents of the ADDRESS METHOD SPECIFIC field. See table 2 for the address methods defined for the ADDRESS METHOD field. The ADDRESS METHOD field only defines address methods for entities that are directly addressable by an application client.

Table 2 - ADDRESS METHOD field values

Code	Description	Clause
10b	Logical unit addressing method	xxx
00b	Peripheral device addressing method	xxx
01b	Device type specific	
11b	Extended addressing	xxx

3.1 Extended addressing

Extended addressing allows for more address methods to be defined for the eight byte LUN. These may include additional two byte formats or formats that use more than two bytes. See table 3 for the format of the two byte EXTENDED ADDRESS METHOD field, table 4 for the format of the four byte EXTENDED ADDRESS METHOD field, table 5 for the format of the six byte EXTENDED ADDRESS METHOD field, and table 6 for the format of the eight byte EXTENDED ADDRESS METHOD field.

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Table 3 - Format of two byte extended addressing fields

Bit Byte	7	6	5	4	3	2	1	0
n	1	1	LENGTH		EXTENDED ADDRESS METHOD			
n+1	EXTENDED ADDRESS METHOD SPECIFIC							

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Table 4 - Format of four byte extended addressing fields

Bit Byte	7	6	5	4	3	2	1	0
n	1	1	LENGTH		EXTENDED ADDRESS METHOD			
n+1 n+3	EXTENDED ADDRESS METHOD SPECIFIC							

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Table 5 - Format of six byte extended addressing fields

Bit Byte	7	6	5	4	3	2	1	0
n	1	1	LENGTH		EXTENDED ADDRESS METHOD			
n+1 n+5	EXTENDED ADDRESS METHOD SPECIFIC							

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Table 6 - Format of eight byte extended addressing fields

Bit Byte	7	6	5	4	3	2	1	0
0	1	1	LENGTH		EXTENDED ADDRESS METHOD			
1 7	EXTENDED ADDRESS METHOD SPECIFIC							

A LENGTH field indicates the length of the EXTENDED ADDRESS METHOD SPECIFIC field. See table 7 for the supported EXTENDED ADDRESS METHOD SPECIFIC field lengths.

Table 7 - LENGTH **field values**

Code	Description
00b	EXTENDED ADDRESS METHOD SPECIFIC field is one byte in length
01b	EXTENDED ADDRESS METHOD SPECIFIC field is three bytes in length
10b	EXTENDED ADDRESS METHOD SPECIFIC field is five bytes in length
11b	EXTENDED ADDRESS METHOD SPECIFIC field is seven bytes in length

The EXTENDED ADDRESS METHOD field defines the contents of the EXTENDED ADDRESS METHOD SPECIFIC field. See table 8 for the address methods defined for the EXTENDED ADDRESS METHOD field. The EXTENDED ADDRESS METHOD field only defines address methods for entities that are directly addressable by an application client.

Table 8 - EXTENDED ADDRESS METHOD **field values**

Code	LENGTH	Description	Subclause
00000b	00b - 11b	Reserved	
00001b	00	Well known logical unit	3.2
00001b	01b - 11b	Reserved	
00010b - 11111b	00b - 11b	Reserved	

3.2 Well known logical unit addressing

A SCSI target device may support zero or more W-LUNs. A single SCSI target device shall only support one instance of each supported well known logical unit. All well known logical units within a SCSI target device shall be accessible from all target ports contained within the SCSI target device.

See table 9 for the definition of the EXTENDED ADDRESS METHOD SPECIFIC field used when the well know logical unit extended address method is selected.

Table 9 - Well known logical unit extended address format

Bit Byte	7	6	5	4	3	2	1	0
n-1	1	1	0	WELL KNOWN LOGICAL UNIT(000001b)				
n	W-LUN							

The W-LUN field identifies well known logical unit to be addressed. See table 10 for a list of well know addresses.

Table 10 - W-LUN field values

W-LUN	Name	Subclause
00h	Reserved	
01h	REPORT LUNs	SPC-3
02h-FFh	Reserved	

3.3 REPORT LUNs for new SPC-3 command section

The REPORT LUNs W-LUN shall only process the commands listed in table 11. If a command is received by the REPORT LUNs well know logical unit that is not listed in table 11 the device server shall return CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and an additional sense code of INVALID COMMAND OPERATION CODE.

Table 11 - REPORT LUNs W-LUN commands

Command Name	Operation code	Type	Subclause
INQUIRY (need a Peripheral device type for W-LUNs)	12h	M	SPC-3
REPORT LUNS	A0h	M	SPC-3
REQUEST SENSE	03h	M	SPC-2
TEST UNIT READY	00h	M	SPC-2
Key: M = Command implementation is mandatory.			

3.4 Other target function rules in SPC-3 section on W-LUNs

If a SCSI target device receives a W-LUN and that W-LUN is not exist, a task manager shall follow the SCSI rules for selection of invalid logical units as defined in the SCSI Primary Commands-2 standard.

Protocols should define a method to allow notification of a change to any of the reported information (e.g., AER would be one method).

4 SPC-3 changes to REPORT LUNs command

One of two methods could be used for discovering well known logical units. The preferred method would be to access the well know logical unit that would accept the REPORT LUNs command. Another method would be to return the information on a REPORT LUNs command to LUN zero. In either case the REPORT LUNs command in SPC-3 needs to have a new field and additional text defined as follows:

The LUNs returned as the result of the REPORT LUNs command shall consist of a list of the requested logical units addressable through the SCSI target port that received the REPORT LUNs command.

Table 12 - REPORT LUNS command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (0Ah)							
1	RESERVED					SELECT REPORT		
2	RESERVED							
3	RESERVED							
4	RESERVED							
5	RESERVED							
6	(MSB)							
7				ALLOCATION LENGTH				
8								
9								(LSB)
10	RESERVED							
11	CONTROL							

The SELECT REPORT field contains the information on which logical unit addresses shall be reported. See table 13 for the defined states.

Table 13 - SELECT REPORT

Codes	Description
000b	The list of logical units shall not contain any well known logical units
001b	The list of logical unit shall only contain well known logical units, if any. If there are no well know logical units the LUN LIST LENGTH FIELD shall be set to zero.
010b	The list of logical units shall contain all logical units.
011b - 111b	Reserved

5   **Defination of Well Known Logical Units**