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To: T10 Committee (SCSI)

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Subject: Report Supported Operation Codes Command

1 Overview

There currently is no easy way in SCSI for determining what commands a logical unit supports. The only way is to try the command to see if it fails. This is not an acceptable method when there are large numbers of logical units that need to be managed in a network. The, just try method, would burn bandwidth and time, and would cause errors when unsupported commands are discovered.

This proposal also replaces the CMDDT function currently defined in the INQUIRY command with one that includes requesting service actions. If this is accepted that function should be made obsolete on SPC-3.

2 REPORT SUPPORTED OPERATION CODES command

The REPORT SUPPORTED OPERATION CODES command (see table 1) requests information on CDBs the addressed logical unit supports. An application client may request a list of all operation codes and service actions supported by the addressed logical unit or the command support data for a specific CDB.

The persistent reservations would conflict with this command except for when the initiator is a registered initiator

Table 1 - REPORT SUPPORTED OPERATION CODES command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (A3h)							
1	RESERVED			SERVICE ACTION (0Ch)				
2	RESERVED				REPORTING OPTIONS			
3	REQUESTED OPERATION CODE							
4	(MSB)	REQUESTED SERVICE ACTION						(LSB)
5								
6	(MSB)							(LSB)
7								
8	ALLOCATION LENGTH							
9								
10	RESERVED							
11	CONTROL							

The REPORTING OPTIONS field (see table 2) defines the information to be returned in the parameter list.

Table 2 - REPORTING OPTIONS

Reporting options	Description
000b	A list of all operation codes and service actions supported by the addressed logical unit shall be returned in the REPORT SUPPORTED OPERATION CODES parameter list (see table 3). The OPERATION CODE and SERVICE ACTION fields shall be ignored.
001b	The command support data for the operation code specified in the REQUESTED OPERATION CODE field shall be returned in the REPORT COMMAND SUPPORT DATA parameter list (see table 5). The REQUESTED SERVICE ACTION field shall be ignored. If the requested operation code contains a service action the device server shall return CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to INVALID FIELD IN CDB.
010b	The command support data for the service action specified in the REQUESTED OPERATION CODE and REQUESTED SERVICE ACTION fields shall be returned in the REPORT COMMAND SUPPORT DATA parameter list (see table 5). If the requested operation code is not a service action the device server shall return CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to INVALID FIELD IN CDB.
011b-111b	Reserved

The REQUESTED OPERATION CODE field contains the operation code of the CDB to be returned in the REPORT COMMAND SUPPORT DATA parameter list.

The REQUESTED SERVICE ACTION field contains the service action of the CDB to be returned in the REPORT COMMAND SUPPORT DATA parameter list.

2.1 REPORT SUPPORTED OPERATION CODES parameter list

The REPORT SUPPORTED OPERATION CODES parameter list (see table 3) contains a four-byte header that contains the length in bytes of the parameter list and a list of supported commands. Each OPERATION CODE DESCRIPTOR contains information on a single supported CDB. The list of OPERATION CODE DESCRIPTORS shall contain all CDBs supported by the addressed logical unit.

Table 3 - REPORT OPERATIONS CODE parameter list

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1	OPERATION CODES LIST LENGTH (n-3)							
2								
3								
OPERATION CODE(s) (if any)								
4	OPERATION CODE DESCRIPTOR 0							
11								
⋮								
n-7	OPERATION CODE DESCRIPTOR X							
n								

The OPERATION CODE(S) LIST LENGTH field specifies the length in bytes of the following OPERATION CODE DESCRIPTOR(s).

The OPERATION CODE DESCRIPTOR is defined in table 4.

Table 4 - Data format of OPERATION CODE DESCRIPTOR

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE							
1	RESERVED							
2	SERVICE ACTION							
3								
4	RESERVED							
5	RESERVED							SERVACT
6	CDB LENGTH							
7								

The OPERATION CODE field contains the operation code of a command supported by the addressed logical unit.

The SERVICE ACTION field contains the service action of the command indicated by the OPERATION CODE field. If the command indicated in the OPERATION CODE field does not contain a service action then the SERVICE ACTION field shall be set to 00h.

A service action (SERVACT) bit of zero indicates the operation code indicated in the OPERATION CODE field does not contain a service action and the SERVICE ACTION field shall be ignored. A SERVACT bit of one indicates the operation code indicated in the OPERATION CODE field contains a service action in the SERVICE ACTION field.

The CDB LENGTH field contains the length of the CDB in bytes.

2.2 REPORT COMMAND SUPPORT DATA parameter list

The REPORT COMMAND SUPPORT DATA parameter list (see table 5) contains information about the CDB and a usage map for bits in the CDB for the operation code or service action being queried.

Table 5 - REPORT COMMAND SUPPORT DATA parameter list

Bit Byte	7	6	5	4	3	2	1	0	
0	RESERVED								
1	RESERVED					SUPPORT			
2	(MSB)	CDB SIZE (m-3)							
3								(LSB)	
4	CDB USAGE DATA								
m									

The SUPPORT field is defined in table 6.

Table 6 - SUPPORT

Support	Description
000b	Data about the requested SCSI operation code or service action is not currently available. All data after byte 1 is not valid. A subsequent request for command support data may be successful.
001b	The device server does not support the requested SCSI operation code or service action. All data after byte 1 is undefined.
010b	Reserved
011b	The device server supports the requested SCSI operation code or service action in conformance with a SCSI standard. The data format conforms to the definition in table 5.
100b	Reserved
101b	The device server supports the requested SCSI operation code or service action in a vendor specific manner. The data format conforms to the definition in table 5.
110b	Reserved
111b	Reserved

The CDB SIZE field shall contain the number of bytes in the CDB for the operation code or service action being queried, and the size of the CDB USAGE DATA field in the return data.

The CDB USAGE DATA field shall contain information about the CDB for the operation code or service action being queried. The first byte of the CDB usage data shall contain the operation code for the operation being queried. If the operation code contains an action code then that action code shall be placed in the same location as the SERVICE ACTION field of the CDB. All bytes except the first byte of the CDB usage data shall contain a usage map for bits in the CDB for the operation code being queried.

The bits in the usage map shall have a one-for-one correspondence to the CDB for the operation code or service action being queried. If the device server evaluates a bit in the CDB for the operation code or service action being queried, the usage map shall contain a one in the corresponding bit position. If any bit representing part of a field is returned as one all bits for the field shall be returned as one. If the device server ignores or treats as reserved a bit in the CDB for the operation code or service action being queried, the usage map shall contain a zero in the corresponding bit position. The usage map bits for a given CDB field all shall have the same value.

For example, the CDB usage bit map for the SEND DIAGNOSTIC command of a device server that implements only the default self-test capability is: 1Dh, 04h, 00h, 00h, 00h, 07h. This example assumes that SAM-2 defines uses for only the low-order three bits of the CONTROL byte. Note that the first byte contains the operation code and the remaining bytes contain the usage map.