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To: T10 Committee (SCSI)

From: Jim Coomes (Seagate)

Subject:SBC 32 Byte Commands for End-to-End Data Protection

1 Revision

This revision changes the RELADR field in the proposed commands to reserved, RDPROTECT and WRPROTECT field descriptions to reference 03-176r5 and qualifies DATA BLOCK APPLICATION TAG checking with the RDPROTECT and WRPROTECT fields.

2 Overview

There is a need to provide the initial value of the DATA BLOCK REFERENCE TAG proposed in 03-176r4~~5~~ on a command by command basis. One use case is in a configuration where a controller (e.g., a RAID) remaps the LBA to a different LBA space on a physical LUN. By passing the initial value of the DATA BLOCK REFERENCE TAG in the command to the LUN, the original data protection block may be passed through the controller to the LUN and checked. This function provides end to end protection in the remapping case.

To provide the space for the initial DATA BLOCK REFERENCE TAG and maintain 8 byte LBA space, 32 byte formats are proposed for read and write operations.

This proposal additionally provides a mechanism to enable device server checking ot the DATA BLOCK APPLICATION TAG in the protection information.

Changes to document 03-176r5

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The DATA BLOCK REFERENCE TAG field is an incrementing value associated with ~~set to the least significant four bytes of the logical block address to which~~ the data block ~~is associated~~. For commands that do not include an INITIAL DATA BLOCK REFERENCE TAG field, the first data block transmitted shall contain the least significant four bytes of the logical block address contained in the LOGICAL BLOCK ADDRESS field of the command associated with the data being transferred. For commands that include an INITIAL DATA BLOCK REFERENCE TAG field, the first data block transferred shall contain the DATA BLOCK REFERENCE TAG equal to the value in the command. Each subsequent data block's DATA BLOCK REFERENCE TAG field shall contain the data block reference tag of the previous data block plus one. The default value for the DATA BLOCK REFERENCE TAG field shall be the least significant four bytes of the LBA of the data block being written or formatted.

SBC-2 additions

2.0.1 READ (32) Command

The READ (32) command (see table 1) requests that the device server transfer data to the application client. The most recent data value written in the addressed logical block shall be returned

Table 1 — READ (32) command

Byte\Bit	7	6	5	4	3	2	1	0
0	OPERATION CODE (7Fh)							
1	CONTROL							
2	Reserved							
6								
7	ADDITIONAL CDB LENGTH (18h)							
8	(MSB)			SERVICE ACTION (TBDh)				
9								(LSB)
10	Reserved	RDPROTECT		DPO	FUA	Reserved		Reserved
11	Reserved							
12	(MSB)			LOGICAL BLOCK ADDRESS				
19								(LSB)
20	(MSB)			INITIAL DATA BLOCK REFERENCE TAG				
23								(LSB)
24	(MSB)			DATA BLOCK APPLICATION TAG				
25								(LSB)
26	(MSB)			DATA BLOCK APPLICATION TAG MASK				
27								(LSB)
28	(MSB)			TRANSFER LENGTH				
31								(LSB)

The RDPROTECT field is defined in the description for READ (10) in 03-176r5.

The INITIAL DATA BLOCK REFERENCE TAG field contains the value of the DATA BLOCK REFERENCE TAG expected on the first data block requested by the command. The device server may compare the DATA BLOCK REFERENCE TAG read from the medium with this value as enabled by the RDPROTECT field. in this command.

The DATA BLOCK APPLICATION TAG field contains a value that is expected in the protection information transferred by this command. If the APP_TAG_OWN bit set to one, the device server may compare the DATA BLOCK APPLICATION TAG read from the medium with this value as enabled by the RDPROTECT field and ~~by~~ the DATA BLOCK APPLICATION TAG MASK. If the APP_TAG_OWN bit set to zero, the device server shall ignore the DATA BLOCK APPLICATION TAG field.

The DATA BLOCK APPLICATION MASK field contains a value that is a bit mask for enabling the checking of the DATA BLOCK APPLICATION TAG in the protection information for each data block transferred by this command. A bit set to one in a DATA BLOCK APPLICATION TAG MASK bit enables the checking of the corresponding bit in the DATA BLOCK APPLICATION TAG field with the DATA BLOCK APPLICATION TAG read from the medium.

2.0.2 WRITE (32) command

The WRITE (32) command ((see table 2)) requests that the device server write the data transferred from the application client to the returned

Table 2 — WRITE (32) command

Byte\Bit	7	6	5	4	3	2	1	0
0	OPERATION CODE (7Fh)							
1	CONTROL							
2	Reserved							
6								
7	ADDITIONAL CDB LENGTH (18h)							
8	(MSB)			SERVICE ACTION (TBDh)				
9								(LSB)
10	Reserved	WRPROTECT		DPO	FUA	Reserved		Reserved
11	Reserved							
12	(MSB)			LOGICAL BLOCK ADDRESS				
19								(LSB)
20	(MSB)			INITIAL DATA BLOCK REFERENCE TAG				
23								(LSB)
24	(MSB)			DATA BLOCK APPLICATION TAG				
25								(LSB)
26	(MSB)			DATA BLOCK APPLICATION TAG MASK				
27								(LSB)
28	(MSB)			TRANSFER LENGTH				
31								(LSB)

The WRPROTECT field is defined in the description for WRITE (10) in 03-176r5.

The INITIAL DATA BLOCK REFERENCE TAG field contains the value of the DATA BLOCK REFERENCE TAG expected on the first data block transferred by the command. The device server may compare the DATA BLOCK REFERENCE TAG received from the application client with this value as enabled by the WRPROTECT field in this command.

The DATA BLOCK APPLICATION TAG field contains a value that is expected in the protection information transferred by this command. If the APP_TAG_OWN bit set to one, the device server ~~may~~ shall compare the DATA BLOCK APPLICATION TAG received from the application client with this value as enabled by the WRPROTECT field and ~~by~~ the DATA BLOCK APPLICATION TAG MASK. If the APP_TAG_OWN bit set to zero, the device server shall ignore the DATA BLOCK APPLICATION TAG received from the application client ~~field~~.

The DATA BLOCK APPLICATION MASK field contains a value that is a bit mask for enabling the checking of the DATA BLOCK APPLICATION TAG in the protection information for each data block transferred by this command. A bit set to one in a DATA BLOCK APPLICATION TAG MASK bit enables the checking of the corresponding bit in the DATA BLOCK APPLICATION TAG field with the DATA BLOCK APPLICATION TAG received from the application client.