To: T10 Technical Committee
From: Tim Hoglund, LSI Logic (tim.hoglund@lsil.com)
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Subject: T10/06-096r0 SAS-2 remove access zone management bit

Revision Information

- Revision 0 Initial

References

SAS2r02 Serial Attached SCSI - 2 (SAS-2)
T10/06-019r3 SAS-2 zoning

Introduction

Reference document T10/06-019 incorporates a feature specified as “Access zone management” as a means of controlling access to SMP zone management functions. Access zone management provides a limited measure of “security” and masking for certain SMP zoning functions.

This proposal seeks to allow zoning-aware management applications the ability to issue any of the SMP REPORT_NNN zoning functions without requiring those management applications to either be the active supervisor or be attached via an expander phy with the Access Zone Management bit set to one. This capability is intended to provide management applications “read-only” information about the physical SAS domain.

This proposal affirms that access to SMP CONFIGURE_NNN zoning functions should be limited to the active supervisor device but removes the T10/06-019 conditional response to non-active-supervisor SMP CONFIGURE_NNN zoning functions, i.e. SMP FUNCTION FAILED vs SMP UNKNOWN FUNCTION based on the Access Zone Management bit.

[Start CHANGES proposed to T10/06-019r3]

4.9.3.5 Zone routing

When a zoning expander device receives an OPEN request, the zoning permission table shall check the access permission between the zone group of the source port and the zone group of the target port. If the zone permission table entry is set to one then access between the phys is allowed and the zoning expander shall continue with the normal ECM arbitration procedure. If the zone permission table entry is set to zero then access between the phys is not permitted and the OPEN_REJECT (ZONE VIOLATION) response shall be sent for the OPEN request and the ZONE VIOLATION bit for the initiating phy shall be set to one (see 7.2.5.11).

When an OPEN request is received on a phy with the ZONE PARTICIPATING bit set to zero (e.g. the initiating device resides outside the ZSDS) the zone group of the receiving phy is used for the SOURCE ZONE GROUP field.

The zoning expander device uses the rules in Table 2 to check the zone group access permission of the DESTINATION SAS ADDRESS field from the OPEN request.

Table 2 - Routed zone group

Expander routing attribute (see 4.6.7.1)	Target zone group permission
direct routing	zone group of the destination phy.
table routing	zone group stored in the zone route table for the destination SAS address.
subtractive routing	zone group of the subtractive phy.

When an OPEN request is ~~send~~ sent on a phy with the ZONE PARTICIPATING bit set to zero (e.g. the target device resides outside the ZSDS) the SOURCE ZONE GROUP field ~~and the ACCESS ZONE MANAGEMENT field~~ shall be set to zero.

4.9.4.2 Active zone supervisor

The active zone supervisor device shall be the only zone supervisor device permitted to issue SMP CONFIGURE ZONE PERMISSION request and SMP CONFIGURE PHY ZONE request. If a zone supervisor device that is not the active zone supervisor device issues an SMP CONFIGURE ZONE PERMISSION request or an SMP CONFIGURE PHY ZONE request then ~~if the access zone management bit is set to one~~ the function result shall be SMP FUNCTION FAILED. ~~If the access zone management bit is set to zero than the function result shall be UNKNOWN SMP FUNCTION (see 4.9.5).~~

~~The active zone supervisor~~Any device may issue SMP REPORT ZONE PERMISSION request and SMP REPORT ZONE ROUTE TABLE request.

[Editor's note – should this be "Any SAS device containing an SMP Initiator" ?]

~~A zone supervisor device that is not the active zone supervisor device may issue SMP REPORT ZONE PERMISSION request and SMP REPORT ZONE ROUTE TABLE request under the following conditions;~~

~~a)the ACCESS ZONE MANAGEMENT bit is set to one in the OPEN address frame; or~~
~~b)the ZONE PARTICIPATING bit is set to zero and the zone supervising priority field is not zero.~~

In all other cases the function response shall be UNKNOWN SMP FUNCTION.

4.9.5 Access zone management

The ACCESS ZONE MANAGEMENT bit in the OPEN address frame indicates that a supervisor zone devices has a zone supervising priority value greater than zero and may issue SMP REPORT ZONE PERMISSION and SMP REPORT ZONE ROUTE TABLE requests. If the ACCESS ZONE MANAGEMENT bit is set to one then the function result for SMP REPORT ZONE PERMISSION response and SMP REPORT ZONE ROUTE TABLE response shall be SMP FUNCTION ACCEPTED. If the ACCESS ZONE MANAGEMENT bit is set to zero then the function result shall be UNKNOWN SMP FUNCTION.

A zone supervisor device that is not the active zone supervisor device should not make SMP CONFIGURE ZONE PERMISSION or SMP CONFIGURE PHY ZONE requests. If a supervisor device that is not the active zone supervisor device makes an SMP CONFIGURE ZONE PERMISSION request or an SMP CONFIGURE PHY ZONE requests and the ACCESS ZONE MANAGEMENT bit is set to one then the function result for SMP CONFIGURE ZONE PERMISSION response or SMP CONFIGURE PHY ZONE response shall be SMP FUNCTION FAILED. If the ACCESS ZONE MANAGEMENT bit is set to zero then the function result shall be UNKNOWN SMP FUNCTION.

A zoning device that reports a ZONE SUPERVISING PRIORITY field value greater than zero, shall set the ACCESS ZONE MANAGEMENT bit set to one in the OPEN address frame (see 7.8.3). A zoning device that reports a ZONE SUPERVISING PRIORITY field of zero, shall set the ACCESS ZONE MANAGEMENT bit set to zero in the OPEN address frame (see 7.8.3).

When an OPEN address frame is received on a phy that has the ZONE SUPERVISING PRIORITY field set to a value greater than zero and the ZONE PARTICIPATING bit set to zero, then the zoning expander device shall respond as if the ACCESS ZONE MANAGEMENT bit is set to one in the OPEN address frame and ignore the value of the ACCESS ZONE MANAGEMENT bit in the OPEN address frame. If the OPEN address frame is forwarded to another device then the zoning expander device shall set the ACCESS ZONE MANAGEMENT bit to one.

7.8 Address frames

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7.8.3 OPEN address frame

Table XX defines the OPEN address frame format used for connection requests.

Table XX OPEN address frame format

Byte\Bit	7	6	5	4	3	2	1	0
0	INITIATOR PORT	PROTOCOL			ADDRESS FRAME TYPE (1h)			
1	FEATURES				CONNECTION RATE			
2	(MSB)	INITIATOR CONNECTION TAG						
3								(LSB)
4		DESTINATION SAS ADDRESS						
11								
12		SOURCE SAS ADDRESS						
19								
20	~~ACCESS ZONE MANAGEMENT~~Reserved	SOURCE ZONE GROUP						
21	PATHWAY BLOCK COUNT							
22	(MSB)	ARBITRATION WAIT TIME						
23								(LSB)
24		MORE COMPATIBLE FEATURES						
27								
28	(MSB)	CRC						
31								LSB)

…

~~An ACCESS ZONE MANAGEMENT bit set to one specifies that the OPEN request is from a zone supervisor device. If the ACCESS ZONE MANAGEMENT bit is set to zero then the request is from a device that is not a zone supervisor device, or from a zone supervisor device with a zone supervisor priority of zero.~~

The SOURCE ZONE GROUP field identifies the zone group that contains the phy making the connection request. A connection may be opened if the zone permission table indicates that the zone group of the phy attached to the destination SAS address has permission to access the source zone group (See 4.9.3.3).

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10.4.3.5 DISCOVER function

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Table YY defines the DISCOVER request format.

Table YY - DISCOVER request

Byte\Bit	7	6	5	4	3	2	1	0
…	…							
8	Reserved							NO ZONE MASK
…	…							

…

When the NO ZONE MASK bit is set to one ~~and the ACCESS ZONE MANAGEMENT bit is set to one in the OPEN address frame,~~ the DISCOVER response shall report all phy connections. Performing SAS domain discovery with the NO ZONE MASK bit set to one returns the physical SAS topology.

When the NO ZONE MASK bit is set to zero ~~or the ACCESS ZONE MANAGEMENT bit is set to one in the OPEN address frame,~~ the DISCOVER response shall only report phys that have zone access permission to the phy indicated in the PHY IDENTIFIER field. All other phys shall return PHY VACANT in the FUNCTION RESULT field of the response. Performing SAS domain discovery with the NO ZONE MASK bit set to zero returns the logical SAS topology for the port performing the discovery.

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10.4.3.15 REPORT ZONE PERMISSION function

The REPORT ZONE PERMISSION function returns a set of zone permission table entries. This function shall be supported by all zoning devices ~~and should only be issued by the active zone supervisor device with zone supervisor priority greater than zero~~.

Table 18 defines the REPORT ZONE PERMISSION request format.

Table 18 – REPORT ZONE PERMISSION request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (03h)							
2	Reserved							
3	REQUEST LENGTH (01h)							
4	Reserved							
5								
6	START SOURCE ZONE GROUP INDEX							
7	NUMBER OF ZONE PERMISSION ENTRIES							
8	(MSB)	CRC						
11								(LSB)

The SMP FRAME TYPE field shall be set to 40h.

The FUNCTION field shall be set to 03h.

The REQUEST LENGTH field shall be set to 01h.

The START SOURCE ZONE GROUP INDEX field specifies the zone group of the first zone permission entry table being requested.

The NUMBER OF ZONE PERMISSION ENTRIES field specifies the number of zone permission entries being requested.

The CRC field is defined in 7.8.1.

Table 19 defines the REPORT ZONE PERMISSION response format.

Table 19 – REPORT ZONE PERMISSION response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (03h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH ((n - 7) / 4)							
4	Reserved							
5								
6	START SOURCE ZONE GROUP INDEX							
7	Reserved			NUMBER OF ZONE PERMISSION ENTRIES ((n – 11) / 16)				
8	First ZONE PERMISSION entry descriptor (See Table 16)							
23								
…	…							
n - 19	Last ZONE PERMISSION entry descriptor (See Table 16)							
n - 4								
n - 3	(MSB)	CRC						
n								(LSB)

The SMP FRAME TYPE field shall be set to 41h.

The FUNCTION field shall be set to 03h.

The FUNCTION RESULT field ~~shall contain SMP FUNCTION ACCEPTED if the ACCESS ZONE MANAGEMENT field in the OPEN request is greater than zero. If the ACCESS ZONE MANAGEMENT field in the OPEN request is zero then the FUNCTION RESULT field shall be set as defined in 4.9.5.~~ is defined in 10.4.3.2.

[Editor's note – 10.4.3.2 contains table of SMP Function Result field values]

The RESPONSE LENGTH field shall be set to ((n - 7) / 4).

The START ZONE ENTRY INDEX field indicates the zone group of the first zone permission entry being returned in the first zone permission table entry descriptor.

The NUMBER OF ZONE PERMISSION ENTRIES field indicates the number of zone permission entry descriptors being returned ((n – 11) / 16).

Table 16 defines the zone permission entry descriptor format. If the zone permission entry indexed from the START SOURCE ZONE GROUP INDEX field does not exist then response shall return a function result of ZONE GROUP INDEX DOES NOT EXIST in the response frame (see 10.4.3.2).

The CRC field is defined in 7.8.1.

10.4.3.16 REPORT ZONE ROUTE TABLE function

The REPORT ZONE ROUTE TABLE request requires a zoning expander device to respond with zone information about each phy. This function shall be supported by all zoning devices ~~and should only be issued by a zone supervisor device with zone supervisor priority greater than zero~~.

Table 20 defines the REPORT ZONE ROUTE TABLE request format.

Table 20 –REPORT ZONE ROUTE TABLE request

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (14h)							
2	REQUEST LENGTH (02h)							
3								
4	NUMBER OF ZONE ROUTE TABLE ENTRIES							
5	PHY IDENTIFIER							
6	(MSB)	STARTING PHY ROUTE INDEX						
7								(LSB)
8		Reserved						
11								
12	(MSB)	CRC						
15								(LSB)

The SMP FRAME TYPE field shall be set to 40h.

The FUNCTION field shall be set to 14h.

The REQUEST LENGTH field shall be set to 02h.

The NUMBER OF ZONE ROUTE TABLE ENTRIES field specifies the number of zone route table entries requested starting from the value specified by the STARTING PHY ROUTE INDEX field for the phy specified by the PHY IDENTIFIER field.

The PHY IDENTIFIER field specifies the phy for which the expander zone route entries are being requested.

The STARTING PHY ROUTE INDEX field specifies the first phy route entry of the zone route table descriptor entry being requested.

The CRC field is defined in 7.8.1.

The REPORT ZONE ROUTE TABLE response provides zone information about each phy. This function shall be supported by all zoning devices.

Table 21 defines the REPORT ZONE ROUTE TABLE response format.

Table 21 –REPORT ZONE ROUTE TABLE response

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (14h)							
2	FUNCTION RESULT							
3	RESPONSE LENGTH ((n - 7) / 4)							
4	NUMBER OF ZONE ROUTE TABLE ENTRIES ((n – 15) / 12)							
5	PHY IDENTIFIER							
6	(MSB)	STARTING PHY ROUTE INDEX						
7								(LSB)
8	Reserved							
11								
12	First ZONE ROUTE TABLE entry descriptor (see Table 22)							
23								
…	…							
n – 15	Last ZONE ROUTE TABLE entry descriptor (see Table 22)							
n – 4								
n – 3	(MSB)	CRC						
N								(LSB)

The SMP FRAME TYPE field shall be set to 41h.

The FUNCTION field shall be set to 14h.

The FUNCTION RESULT field ~~shall contain SMP FUNCTION ACCEPTED if the ACCESS ZONE MANAGEMENT field in the OPEN request is greater than zero. If the ACCESS ZONE MANAGEMENT field in the OPEN request is zero then the FUNCTION RESULT field shall be set as defined in 4.9.5.~~is defined in 10.4.3.2.

[Editors note – 10.4.3.2 contains table of SMP Function Result field values]

The RESPONSE LENGTH field shall be set to ((n - 7) / 4).

The NUMBER OF ZONE ROUTE TABLE ENTRIES field indicates the number of zone route table entry descriptors being returned ((n – 15) / 12).

The PHY IDENTIFIER field indicates the phy for which the expander zone route entry is being returned.

The STARTING PHY ROUTE INDEX field indicates the first phy route entry of the zone route table descriptor entry being returned.

Table 22 defines the ZONE ROUTE TABLE ENTRY DESCRIPTOR format. If the zone route table entry does not exist for the phy indexed by the PHY IDENTIFIER field then response shall return a function result of ZONE ROUTE INDEX DOES NOT EXIST in the response frame (see 10.4.3.2).

The CRC field is defined in section 7.8.1.

[End CHANGES proposed to T10/06-019r3]