To: T10 Technical Committee
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Subject: SRP Asynchronous Event Reporting

Revision History
Revision 0: first revision

Related Documents
SAM-2 revision 14
SRP revision 1 (previously called SVP)
SPC-2 revision 18b
00-354r2 64-bit tags in SRP (Ed Gardner)

Overview
SAM-2 says "Each SCSI protocol specification shall describe a mechanism for Asynchronous Event Reporting, including a procedure whereby an SCSI device can selectively enable or disable asynchronous event reports from being sent to it by a specific target." SRP revision 1 lacks such a definition.

Other SCSI protocols like SPI and FCP take the approach of letting the target switch to initiator mode and run a SEND command to the host, which assumes target mode as a processor device. SRP could do the same. However, a native approach would be preferred.

A new IU for reporting asynchronous events is proposed. This IU is initiated by the target. A corresponding response IU is also defined so the target knows when it can send another IU.

The control mode page has bits to control whether the target may use AER to report ready, unit attention, or an error state rather than creating a unit attention or reporting an error on the next command. An SRP target supporting AER would support these bits.

A bridge that maps SRP to a protocol supporting the processor device type approach like FCP or SPI will have difficulty mapping an SRP target's AER correctly. To avoid this problem, add a bit to the IU negotiation that indicates whether SRP native AER is supported. An FCP bridge would disable this feature. The SRP target not supporting the processor device model would then treat its control mode page bits as reserved and not negotiate to enable AER.

This IU can also be used to communicate changes in the RequestLimitDelta without waiting for a command to complete and an SRP_RSP IU can be sent.

Proposed changes

[Add two new information units:]

Table 1 – SRP information units

IU	TYPE value	Length (bytes)	Sent by	Description
SRP_AER_REQ	1Ch	40-296	Target	Asynchronous Event Reporting request
SRP_AER_RSP	1Dh	36	Initiator	Asynchronous Event Reporting response

5.8 SRP_ILQ information unit
[Add a bit to the login IUs to negotiate whether AER is supported.]

Table x – SRP_ILQ information unit

Byte Bit	7	6	5	4	3	2	1	0
0-23	(unchanged)							
24								AER
25-n	Reserved							

The AER bit indicates whether the initiator supports receiving the SRP_AER_REQ IU and generating the SRP_AER_RSP IU.

5.9 SRP_TLS information unit
[Add a bit to the login IUs to negotiate whether AER is supported.]

Table x – SRP_TLS information unit

Byte Bit	7	6	5	4	3	2	1	0
0-23	(unchanged)							
24								AER
25-n	Reserved							

The AER bit indicates whether the target supports generating the SRP_AER_REQ IU and receiving the SRP_AER_RSP IU.

If the initiator set the AER bit to one in the SRP_ILQ IU and the target set the AER bit to one in the SRP_TLS IU, then the target may use the SRP_AER_REQ IU to report asynchronous events. If the AER bit was not set in either direction, the SRP_AER_REQ IU shall not be used to report asynchronous events; the processor device model may be used instead.

[Add two new IU descriptions:]
5.xx SRP_AER_REQ information unit
An SRP_AER_REQ information unit (see table x) conveys a target request to report an asynchronous event. SRP_AER_REQ information units shall be sent as the minimum length VI message capable of carrying the fields. SRP targets shall not send an SRP_RSP information unit longer than the current value of TGTMAXRSPIU; instead the target shall truncate SENSE DATA as discussed below.

SRP_AER_REQ is a request information unit sent by an SRP target; it shall not be sent by an SRP initiator. SRP initiators shall promptly respond to an SRP_AER_REQ with an SRP_AER_RSP response unless the SRP VI connection is disconnected.

Table x – SRP_AER_REQ information unit

Byte Bit	7	6	5	4	3	2	1	0
0	Type							
1-3	Reserved							
4-7	RequestLimitDelta							
8-15	Tag							
16-23	LogicalUnitNumber							
24-27	Sense Data List Length = n							
28-(28+n-1)	Sense Data (n bytes long)							

The TYPE field shall contain the value specified in table 1.

The TAG field may contain whatever value the target wishes. [Editor's note: would prefer to just reserve this field in IUs that don't need it]

The REQUESTLIMITDELTA field is defined in clause 4.3.

The LOGICAL UNIT NUMBER field shall contain the logical unit reporting the asynchronous event.

The SENSE DATA LIST LENGTH field shall specify the number of bytes in the SENSE DATA field. The SENSE DATA LIST LENGTH field shall only contain lengths that are multiples of four. If no sense data is provided, the SENSE DATA LIST LENGTH field shall be set to zero.

If returning all the sense data provided would cause the SRP_RSP information unit to be longer than TGTMAXRSPIU, the target shall return an SRP_RSP information unit whose length is TGTMAXRSPIU truncated to a multiple of four bytes. The SENSE DATA field shall be truncated as needed to achieve this length. SENSE DATA LIST LENGTH shall contain the length of the truncated SENSE DATA field.

The SENSE DATA field contains the information specified by the SCSI Primary Commands-2 standard for presentation by the REQUEST SENSE command. The proper sense data shall be presented when a SCSI status byte of CHECK CONDITION is presented as specified by the SCSI Primary Commands-2 standard. The SENSE DATA field shall contain the data that would be presented by a REQUEST SENSE command whose ALLOCATION LENGTH parameter contains the value:
`   TGTMAXRSPIU - 40 - RESPONSE DATA LIST LENGTH

5.xx SRP_AER_RSP information unit

An SRP_AER_RSP information unit (see table xx) conveys a response to an SRP_AER_REQ request received by an initiator. SRP_IPS information units shall be sent as a 16 byte VI message.

SRP_AER_RSP is a response information unit sent by an SRP initiator in response to an SRP_AER_REQ that the initiator has received. SRP initiators shall not send SRP_AER_RSP except in response to an SRP_AER_REQ. SRP targets shall not send an SRP_AER_RSP.

Table x – SRP_AER_RSP information unit

Byte Bit	7	6	5	4	3	2	1	0
0	Type							
1-3	Reserved							
4-7	Reserved							
8-15	Tag							

The TYPE field shall contain the value specified in table 1.

The TAG field shall contain the same value as the TAG field in the SRP_AER_REQ request for which this SRP_AER_RSP is a response. [Editor's note: would prefer just to mark this as reserved]