

To: Members of X3T10
From: Charles Monia
Subject: Summary of SAM Rev. 13 to Rev. 15 Changes (X3T10/94-173R0)

Reference (a): Results of Working Group Discussion on SAM,
Rev. 13 Review Comments (X3T10/94-129R0)
(b): Dual Port ECO
(X3T9.2/90-136R3, X3T9.2/91-149R0, X3T9.2/93-041R2)

This document contains the resolution status for written technical comments received for SAM rev 13. It also summarizes other technical changes between the last formally reviewed version of SAM (revision 13) and SAM revision 15 which was distributed in X3T10 1994 mailing 4.

In addition to comment resolutions, the changes in SAM rev 15 include the dual port ECO specified in (b) and the following:

1. Clause 2 was extended to define the criteria for SCSI-3 conformance that apply to implementations and SCSI-3 standards.
2. The initiator identifier was redefined to be a protocol-specific task parameter internal to the logical unit. This change was made to support the dual port ECO and to properly reflect the way implementations, such as SBP, define this parameter.
3. As the result of the committee's decision to make CDB parameter checking optional, SAM requires all standards to specify commands for each option which return data indicating whether or not that option is supported.

In revision 15 of SAM, alterations are indicated with change bars and strike-through.

Status of Proposed Responses to SAM Rev. 13 Written
Comments

The status of technical or informative comments from reference (a) is given here. Each is identified by the number from reference (a) and the initials of the company with which the comment author is affiliated. I have combined comments from different authors where appropriate.

The document references in parentheses refer to items within SAM revision 15.

The status of editorial comments are not included in this summary.

Comment: HP 012, IBM 2 - Section 2.1.81, Page 12,
Paragraph 1 (clause 4.1.86, pp 15)

Pending task is undefined, yet it is used in this definition.

Proposed Resolution:

Comment accepted.

A definition for "pending task" will be added to the glossary.

Status:

Definition added to glossary (see clause 4.1.51).

Comment: HP 023 (I) Section 3.1, Page 22, Paragraph 5

Last sentence. Everything humanly possible should be done to eliminate the use of internal behavior as a description of how something works. Every item in this standard should use externally observable behavior to describe the implementations. If internal behavior is required, then we have not done our jobs.

Remove this sentence and all internal behavior descriptions.

Proposed Resolution:

Comment rejected.

Status:

No change made to document.

Comment: 028 (T) Section 3.5.2, Page 31, Paragraph
Last (5.5.2, pp 32, paragraph last)

Remove this paragraph. We state everything by arrival order so mentioning that we assume in order confuses and implies a requirement on the service delivery subsystem. Removing the paragraph does not change the meaning of arrival.

Proposed Response:

Comment rejected.

This paragraph defines how the model deals with request-response ordering. The second sentence in that paragraph states:

"[The assumption of in-order delivery] is made to simplify the description of behavior and does not constitute a requirement."

Status:

No change made to document.

Comment: HP 030 (T) Section 3.6, Page 33, Paragraph 5
(clause 5.6, page 33)

The target is listed as not being able to originate task management functions. What is the ruling then on the FCP target being able to issue an abort exchange? Is it legal according to SAM for a target to detect that an error has occurred and abort the task due to the detected error?

Proposed Response:

A target-initiated "abort exchange" indicates that there is a problem which cannot be reported with a CHECK CONDITION status. This kind of error may be characterized as a "Service Delivery or Target Failure".

Status:

No change to document.

Comment: HP 031 (T) Section 3.6.1, Page 34, Paragraph 1
(clause 5.6.1, pp 34)

Since an initiator can have more than one initiator identifier, how does a target tell the difference between initiators? Is this going to be protocol specific, left undefined? In FCP for example, a login can tell the difference. In parallel it is more problematic since there is no way to tell if they are the same or if they are different.

Proposed Response:

A target can't tell the difference and will implicitly consider two different initiator identifiers to represent two different physical devices.

Status:

No change to document.

Comment: HP 032 (T) Section 3.6.2, Page 35, Paragraph 10
(clause 5.6.2, pp 35)

There is no need for a base logical unit. It is no different than a logical unit zero. As a matter of fact they both have the same LUN.

Proposed response

Comment accepted.

Status:

Deleted from revision 15.

Comment: HP 033 (T) Section 3.6.3, Page 36, Paragraph 5 (clause 5.6.3, page 36, paragraph 5)

The task set definition, as written, does not allow more than one untagged task in the task set at a time. I would suggest the following notation:

$$\text{Task Set} = 0\{\text{Tagged}\} + 0\{\text{Untagged}\}$$

Proposed response:

Comment accepted.

Status:

Change made to object definition 6 (see clause 5.6.3, pp 36).

Comment: HP 041 (T) Section 4.1, Page 43, Paragraph 3 (clause 6.1, page 43, paragraph 3)

Why is the statement allowed that says that media may be modified even if there is an invalid parameter or invalid field in a CDB? What cases would possibly allow you to modify media when the command is deemed to be incorrect?

Proposed Response:

The invalid parameters referenced in the draft were incorrectly assumed to include command parameter data (i.e., the parameter data sent during the Data Out phase). The requirement stated in SAM should only apply to parameters in the CDB. In that case, SAM should require the logical unit to abort the command without modifying the media.

The sentence will incorporate the following SCSI-2 wording from clause 7.2, pp 79 of rev 10k.

"For all commands, if there is an invalid parameter in the command descriptor block then the target shall terminate the command without altering the medium."

The sentence will be changed to read:

"For all commands, if the logical unit detects an invalid parameter in the command descriptor block then the logical unit shall end the command without altering the media."

Status:

Change incorporated. See clause 6.1, page 44, paragraph 2.

Comment: HP 042 (T) Section 4.1.2, Page 44, Paragraph 2 (clause 6.1.2, pp 45, paragraph 2)

The first sentence, as worded, says that the ACA will never be cleared. It should simply say that if the bit is a one, then the ACA shall be treated according 4.6.

Proposed response:

Comment accepted.

Status:

Change incorporated. See clause 6.1.2, pp 45, paragraph 2.

Comment: HP 043 (T) Section 4.1.2, Page 44, Paragraph 3 (clause 6.1.2, page 45, paragraph 2)

Why is ACA = 0 required? If I want to build a SCSI-3 device, you are requiring that I keep the old CA baggage even if I don't intend to operate with any SCSI-2 initiators. This is an unnecessary requirement which prevents SCSI-4 (yikes!) from eliminating support for CA entirely.

Proposed response:

Comment accepted.

The draft standard will be revised to indicate that support for an ACA bit value of zero is a logical unit option.

Status:

Change incorporated. See clause 6.1.2, pp 45, paragraph 2.

Comment: IBM 9. Page 46 and other places throughout the document (clause 6.2, pp 46)

Statuses and messages have been changed from 'Queue' to 'Task Set'. Was this change agreed to by the committee? If so OK if not it should be voted on.

Proposed response:

Comment rejected.

1. There are no messages defined in SAM.
2. The use of "task set" instead of "queue" throughout SAM was at the request of reviewers, who felt that the task set concept more accurately reflected the new queuing model. The working group consensus reached in January reaffirmed that decision (see X3T10/94-028R0 , response to item 39 on page 35).

Status:

No change to document.

Comment: HP 045 (T) Section 4.3.2, Page 48, Paragraph (clause 6.3.2, pp 50)

An indication and response are required. The model you present here does not follow the confirmed services model presented earlier.

Proposed response:

Comment rejected.

1. The only requirement for confirmed protocol services is the return of a confirmation. The model does not require a confirmed protocol service to generate an indication to or receive a response from the ULP. This is consistent with the protocol service interface defined for P1394 and the definition of a confirmed protocol service presented in clause 3.7.
2. The model assumes that the application client is unaware of the process of transferring data to or from it's data buffer. I believe this view reflects how initiators and host applications are implemented.

Status:

No change to document.

Comment: HP 046 (T) Section 4.3.3, Page 49, Paragraph (clause 6.3.3, pp 50)

An indication and response are required. The model you present here does not follow the confirmed services model presented earlier.

Proposed response:

See item HP 045.

Status:

No change to document.

Comment: HP 048 (T) Section 4.5.2, Page 52, Paragraph
(clause 6.5.2, pp 53)

Considering the confusion over linked commands in the past, perhaps we should add in a statement that clarifies whether or not the linked command is an implied reservation or not. We have argued this one in committee a number of times and concluded only that it was not clear in the current documents. I suggest we try to add into the description the text to make it clear what we do in this case.

Proposed response.

Issue to be resolved by the working group.

Status:

Open. No change to document.

Comment: IBM 17 Section 4.6.1 (clause 6.6.1)

After careful study of this section there seems to be several concepts defined in the SCSI-3 Queuing Model that are not here. The missing concepts are list below:

[Technical editor's note: the cited paragraph numbers and accompanying text within quotation marks are extracted from the queuing model description which appears in annex B of SAM, rev 15.]

"2.1.2 Response to Auto Contingent Allegiance Condition

If a Task becomes a current task because of a previous request for information that information shall be suspended until the ACA is cleared."

Proposed response:

This requirement is specified in clause 8.3.2 pp 70.

Status:

No change to document.

"2.1.3 Auto Contingent Allegiance Processing

All SCSI operations are permitted while processing an ACA Task."

Proposed response:

It is not clear what is meant by "SCSI operations". If this refers to task management functions then this concept is already included in SAM.

Status:

No change to document.

"2.1.4 Clear Auto Contingent Allegiance Task Management
Function

The target shall clear the Auto Contingent Allegiance and complete the current Task on acceptance of this task management function.

If the target accepts a Clear Auto Contingent Allegiance Task Management Function and no Auto Contingent Allegiance

Condition is in effect for that initiator on that task set, then the target shall complete the current Task."

Proposed response:

Comment rejected.

The behavior described above (clearing the current task) seems to reflect a SIP requirement. The existing text (clause 7.3, pp 63) describes the protocol-independent requirements.

Status:

No change to document.

"Section 2.1.4

If a Clear Auto Contingent Allegiance Task Management Function occurs when an ACA Task is pending then the ACA Task shall be aborted and the auto contingent allegiance shall be cleared."

Proposed response:

Comment rejected.

Status:

The required behavior is specified in clause 8.2.1, item f, pp 69.

Comment: IBM 7, IBM 12, IBM 13, HP 050 (T) Section 4.6.1.1, Page 54, Paragraph 1 (clause 6.6.1.1, pp 54)

"The task shall then be entered into the task set if it meets all other conditions for acceptance." This does not convey that the task is the first one to be executed as was done in SCSI-2 CA. Stating that it is accepted is not sufficient. It must be stated that it is executed next and that it is untagged.

Proposed Response:

When describing logical unit behavior for the case where the ACA flag is clear, SAM will be modified to replace all behavioral descriptions with references to the SCSI-2 standard.

Status:

Clause 6.6.1.1 on page 54 contains the changes described above.

Comment: IBM 14 *Page 54 section 4.6.1.1 2nd paragraph (clause 6.6.1.1, pp 64)

[The first sentence] states 'The completion of the new task with...'. I do not know what is meant by 'new task' in that sentence. I assume it is an attempt to reword the 2nd paragraph in section 2.1.1 of the SCSI-3 Queuing Model but the message seems to have been lost.

Proposed response:

The draft will be modified to clarify the antecedent reference.

Status:

Document modified. See SAM revision 15, clause 6.6.1.1, pp 64, last paragraph.

Comment: IBM 15. *Page 54 section 4.6.1.1 3rd paragraph (clause 6.6.1.1, pp 55)

[The] first sentence should be changed to '...faulting command, then the auto contingent allegiance condition shall not be cleared and a new task shall be entered into the...'

Proposed response:

Comment rejected. The last sentence of the cited paragraph describes the required behavior.

Status:

No change to document.

Comment: IBM 16. *Page 54 section 4.6.1.2, 3rd paragraph last sentence (clause 6.6.1.2, pp 55)

I have no idea what this sentence means.

Proposed response:

The paragraph you refer to states:

"The state of all tasks in the task set when an auto contingent allegiance condition is cleared shall be modified as described in clause 6. A task having the ACA attribute shall be aborted".

This paragraph will be reworded to delete the last sentence.

Status:

Clause modified as described above (see 6.6.1.2, pp 55, last sentence).

Comment HP 051 (T) Section 4.6.1.2, Page 54, Paragraph 2 (clause 6.6.1.2, pp 55)

There should be no requirement for me to support the setting of the ACA bit to zero.

Proposed response

See response to item HP 043.

Status:

See HP 043 status.

Comment: IBM 19 section 4.6.2 (clause 6.6.2, pp 55)

The list of things that can occur to free up tags is not listed. The list out of the SCSI-3 Queuing Model follows:

"2.2 Duplicate Tag Handling

When issuing a tagged task the initiator shall not reuse the tag to create a new task until:

-A service response of Command Complete is received
with a status other than INTERMEDIATE or INTERMEDIATE-
CONDITION
MET.
-A service response of Service Delivery or Target Failure
is received. In this case, system implementations shall
guarantee that the task associated with that command
has been terminated.
-A power on condition occurs.
-A Target Reset Task Management request occurs.
-An Abort Task Management request occurs.
-An Abort Task Set Management request occurs.
-A Clear Task Set Management request occurs.
-A unit attention of TASKS CLEARED BY ANOTHER
INITIATOR is reported.
-A unit attention of POWER ON, RESET or TARGET
RESET is reported."

Proposed Response:

Comment rejected. The above list is included in clause 6.4 of SAM (pp 51).

Status:

No change to document.

Comment: IBM 20, Page 58 section 4.6.5 (clause 6.6.5, pp 59).

In this section it must be made clear that the clearing of the unit attention condition does not automatically clear the auto contingent allegiance condition if the ACA bit is set to one.

Proposed response:

Comment accepted.

Status:

Open. Proposed change was inadvertently omitted from revision 15.

Comment: HP 053 Section 5, Page 60, Paragraph 12
(clause 7, pp 61, paragraph 10)

Abort Task should not be required. It is only required if tagged tasks are supported. Abort Task Set makes more sense to be required than does Abort Task

Proposed response:

Comment accepted.

Status:

Clause 7, paragraphs 10 and 11 on pp 61 contain the agreed change.

Comment: HP 056 (T) Section 5.4, Page 63, Paragraph 1
(clause 7.4, pp 64, paragraph 1)

"All data for all terminated tasks shall be cleared." Two things. First, it should be aborted tasks not terminated. Second, the data cleared is the sense data. This implies that I must flush my buffers for any data that these tasks may use. This is not the intent of the statement.

Proposed Response:

1. "Terminated" will be replaced with 'aborted'.
2. The corresponding wording in the SCSI-2 spec.
(rev 10k, section 6.6.4, pp 57, first paragraph)
says:

"....All pending status and data for that logical unit or target routine for all initiators shall be cleared."

While the wording in SAM should be changed to agree with the above, it's not obvious that sense data is included. This item should be discussed at the May work-

ing group.

Status:

1. The issue of whether or not sense data is cleared was not resolved at the working group. The SAM technical editor will post a proposal on the reflector to explicitly include sense data in the above requirement.
2. The wording change in 1 above was incorporated in revision 15 (see clause 7.4, pp 54, paragraph 1).

Comment: HP 057 (T) Section 6.1, Page 67, Paragraph 5 (clause 8.1, pp 68, paragraph 3)

Your current task definition does not include a task which is sending status. Current does not mean only data, it includes status or any other information transfer.

Proposed response:

Comment accepted.

Status:

Incorporated in SAM revision 15 (see clause 8.1, pp 68, paragraph 3 and clause 4.1.16).

Comment: HP 062 (T) Section 6.2.1, Page 68, Paragraph 5 (clause 8.2.1, pp 69)

The occurrence of the ACA condition with QErr set does not effect the task set. The CLEARING of the ACA condition when the QErr bit is set causes the tasks to be cleared.

Proposed response:

Comment accepted.

Status:

Change incorporated in SAM revision 15 (see clause 8.2.1, pp 69).

Comment: HP 063 (I) Section 6.2.1, Page 68, Paragraph All

This list groups a lot of items into the category of abort. Many of these have no correlation to an abort as it is known today. For example, if I am reading from the media and get an Abort Task for a command not "internally active", I just delete it and continue with the current task. If I get a reset, I blow everything away, including the read from the disk. These are very different, yet you are grouping them into the same term.

Proposed Response:

The paragraph will be reworded to clarify that the task abort events listed are relative to a specific task. The state diagrams show how the state of that task changes in response to these events.

Status:

Open. The change called out in the proposed response was inadvertently omitted from revision 15.

Comment: HP 064, IBM 22, Section 6.3, Page 70, Paragraph All (clause 8.3, pp 69)

This entire section is extremely confusing. It is making assumptions about internal states of the device and is not a model based upon the externally observable behavior of the device. When we started work on the queuing model, we assumed that the internal states of a device were out of bounds for discussion. This model has put everything back into the internals of a device. I cannot vote to accept any model which is "device-centric" rather than "bus-centric".

Proposed Response:

The section on task set management will be simplified by reducing the number of states and transitions. A section will be added for each task attribute which fully describes required task behavior.

Status:

This clause has been rewritten as described above (see clause 8.3).

Summary of Other Changes

Throughout:

1. Changed "Command Complete" service response to "Task Complete".
2. Changed "service delivery interface" to "service delivery port" for consistency with the dual port ECO terminology.

Page 8, clause 2

Added requirements precedence and policy for determining whether or not standards and implementations conform to SAM and other SCSI-3 standards.

Page 12, clause 4.1.30

Hard reset: Added dual port changes, replaced functional description with pointer to the applicable clause.

Page 13, clause 4.1.53

Added definition for "port".

Page 23, clause 4.8

The state table notation was deleted. This notation is no longer used by SAM. See the previous section for more information.

Page 44, clause 44, note:

Added requirement for command standards to provide a way for an initiator to obtain information from a logical unit about the options it supports.

Page 47, clause 6.3, paragraph 1

Definition of indication and response protocol services by a protocol standard is now optional.

Page 60, clause 6.6.6, paragraphs 2 and 3

Added dual-port requirements.

Page 64, clause 7.6

Added "TARGET RESET OTHER PORT" task management function.

Page 66, clause 7.8, paragraph 1

Definition of indication and response protocol services by a protocol standard is now optional.

Page 68, clause 8, paragraph 3

Defined conditions that prevent a task from being en-

tered into the task set.

Page 78, Annex A

Added SAM support for dual-port devices.

Page 81, Annex B

Was previously annex A.