

April 18, 1998

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Subject: Response to public review comments on FCP

The accompanying pages document the response to those public review comments received about the draft proposed American National Standard entitled Fibre Channel Protocol for SCSI, document X3T10/993D, Revision 10, dated November 28, 1994. The proposed resolutions to the comments were reviewed in the X3T10 working group meeting of May 9, 1995 in Harrisburg, PA. The resolutions were approved in the X3T10 plenary meeting of May 11, 1995. (see document X3T10/95-211r0, Minutes of X3T10 Plenary Meeting #9, Harrisburg, PA.) The editor believes that these resolutions faithfully reflect the intent of the committee and resolve the concerns of the reviewers.

The comments are identified by letters indicating the reviewer and by numbers identifying the comments from each reviewer. The first section is a table summarizing the comments and the response to each comment. The second section is the text of the original comment and a formal response to the comment, with accompanying explanations and justifications. Change bars indicate changes from revision 1 of this document.

Please note that a new review comment from IBM (IBM 14) has been addressed because of its importance to high performance operation of the protocol in some environments.

Sincerely,

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Response to Public Review Comments

Summary of responses:

The following table summarizes the public review comments received about the dpANS Fibre Channel Protocol for SCSI, document X3T10/993D, Revision 10, dated November 28, 1994.

Table 1:

Comment	T/E	Title of Comment	Sections Changed	Proposed Resolution	Final Resolution
HP 1	T	Provide Task Management Response	Many	Accept	Accept
HP 2	T	Target Reset effects PRLI		Withdrawn	Withdrawn
HP 3	E	Clarify "Ambiguous Exchange"		Rejected	Rejected
IBM 1	E	Section C.1, wording change	C.1	Accept	Accept
IBM 2	E	Section C.2, wording change	C.2	Accept	Accept
IBM 3	E	Section C.2, wording change	C.2	Accept	Accept
IBM 4	E	Section C, wording change	C	Accept	Accept
IBM 5	E	Section C.2, wording change	C.2	Accept	Accept
IBM 6	E	Section C.2, wording change	C.2	Accept	Accept
IBM 7	E	Section C.2, wording change	C.2	Accept	Accept
IBM 8	E	Annex C, wording change	C	Accept	Accept
IBM 9	E	Annex C, wording change	C	Accept	Accept
IBM 10	E	Section C.3, wording change	C.3	Accept	Accept
IBM 11	E	Section C.3.2, wording change	C.3.2	Accept	Accept
IBM 12	E	Section C.3.2, wording change	C.3.2	Accept	Accept
IBM 13	E	Section C.3.2, wording change	C.3.2	Accept	Accept
IBM 14	T	Write XFER_RDY disabled	6.2.6.13		Accept
U 1	T	In Order Delivery	TBD	Accept	Accept
LLNL1	E	Comment on 2	2	Accepted	Accepted
LLNL2	E	Comment on 3.1	2	Partial	Partial
LLNL3	E	Comment on 3.1.3 and 3.1.4	3.1.3/4	Accepted	Accepted
LLNL4	E	Comment on 3.1.15	3.1.1.5	Accepted	Accepted

Table 1:

Comment	T/E	Title of Comment	Sections Changed	Proposed Resolution	Final Resolution
LLNL5	E	Comment on 3.1.25	3.1.25	Accepted	Accepted
LLNL6	T	Comment on 4.2	7.4.4,.5	Partial	Partial
LLNL7	E	Comment on 4.3	4.3	Accepted	Accepted
LLNL8	E	Comment on 5.1	5.1	Accepted	Accepted
LLNL9	E	Comment on 5.2, Table 6	5.2	Accepted	Accepted
LLNL10	E	Comment on 5.5.6	5.5.6	Accepted	Accepted
LLNL11	E	Comment on 5.5.11	5.5.11	Accepted	Accepted
LLNL12	E	Comment on 6.1	6.1	Accepted	Accepted
LLNL13	E	Comment on 6.2.2 - 6.2.4	6.2.2, .4	Accepted	Accepted
LLNL14	E	Comment on 6.2.5	6.2.5	Accepted	Accepted
LLNL15	T	Comment on 6.2.5	6.2.5	Accepted	Accepted
LLNL16	E	Comment on 6.2.6.9 and 6.2.9.10	6.2.6.9	Accepted	Accepted
LLNL17	E	Comment on 6.3	6.3	Accepted	Accepted
LLNL18	T	Comment on 6.3	6.3	Accepted	Accepted
LLNL19	E	Comment on 7.1.2.2	7.1.2.2	Accepted	Accepted
LLNL20	E	Comment on 7.4		Rejected	Rejected
LLNL21	E	Comment on C.2	C.2	Accepted	Accepted
FSI 1	E	Add FQXID		Rejected	Rejected
FSI 2	E	FQXID Definition		Rejected	Accepted
FSI 3	E	Definition of Ports		Rejected	Rejected
FSI 4	E	Unsolicited Command		Rejected	Rejected
FSI 5	E	Starting Exchange		Rejected	Rejected
FSI 6	E	Linking		Rejected	Rejected
FSI 7	E	Task Management	TBD	Accepted	Accepted
FSI 8	E	Task Management		Accepted	Accepted
DEC 1	E	Section 3.1.5	3.1.5	Accepted	Accepted
DEC 2	E	Section 3.1.7	3.1.7	Accepted	Accepted
DEC 3	E	Section 3.1.9	3.1.9	Accepted	Accepted

Table 1:

Comment	T/E	Title of Comment	Sections Changed	Proposed Resolution	Final Resolution
DEC 4	E	Section 3.1.10	3.1.10	Accepted	Accepted
DEC 5	E	Section 3.1.12		Rejected	Accepted
DEC 6	E	Section 3.1.13		Rejected	Accepted
DEC 7	E	Section 3.1.15	3.1.15	Accepted	Accepted
DEC 8	E	Section 3.1.18		Rejected	Accepted
DEC 9	E	Section 3.1.20	3.1.20	Accepted	Accepted
DEC 10	E	Section 3.1.25	3.1.25	Accepted	Accepted
DEC 11	T	Definition of Tag	3.1.28	Partial	Accepted
DEC 12	E	Section 3.1.33	3.1.33	Partial	Accepted
DEC 13	E	Section 3.1.34	3.1.34	Accepted	Accepted
DEC 14	T	Table 2	Table 2	Accepted	Accepted
DEC 15	T	SAM Protocol Services		Rejected	Deferred
DEC 16	T	SAM Protocol Specific Responses		Rejected	Deferred
DEC 17	T	Asynchronous Event Reporting		Rejected	Rejected
EMX 1	T	Annex A Extended link services		X3T11	X3T11
EMX 2	E	Annex A Extended link services	A.2	Accepted	Accepted
EMX 3	E	Annex A Extended link services	A.2	Accepted	Accepted
EMX 4	E	Annex A Extended link services	A.3	Accepted	Accepted
EMX 5	E	Section 6, PRLO/PRLI fields	6.2.6, .7	Accepted	Accepted
EMX 6	I	Annex A Extended link services		Review	Study/X3T11

Text of public review comments and proposed response:

HP Section. Comments by Hewlett Packard, Kurt Chan

HP 1 (Technical) Provide Task Management Response

In the description of Task Management Functions on page 60 of the SCSI-3 Architecture Model (SAM), service responses are required which indicate the status of the function:

- Function Complete
- Function Rejected
- Service Delivery or Target Failure

SAM requires that one of the above service responses be returned for every task management function. However, FCP provides no means of providing that response. There are valid reasons why such a response is needed for multi-initiator, class 3 environments in Fibre Channel (examples provided upon request). It is inappropriate to rely on link layer acknowledgments (on class 1 or class 2 ACKs) to provide this service.

Therefore we suggest the following changes be made to FCP to make it compliant with SAM, and to provide a reliable, class of service-independent FC-4:

Table 5, Page 10

- Change T1 to: Command Request and Task Management Function
- Delete or Reserve T5. If this change is unacceptable for backwards compatibility, add a PRLI login option which specifies whether T1 or T5 is used to perform task management (see next page).

Table 6, Page 11

- Change I4 to: Command or Task Management Function Response.

7.1.2.2, Page 25

Change the first sentence to: "A task management function shall not be requested in the same Exchange as a SCSI Command."

7.4.5, Page 33

Modify RSP_CODE = 00 and add codes 04 and 05 to table 20:

RSP_CODE	Definition
00	No Failure or Task Management Function Complete
04	Task Management Function Not Supported
05	Task Management Function Failed

Insert the following text below table 20:

The task management function may or may not have been performed by the target if RSP_CODE is returned or if no FCP_RSP is returned before the Exchange is aborted. Values 04 and 05 are not valid responses to SCSI commands.

B.1.9, page 53

Change the example to T1 instead of T5 and add the I4 response. Delete the last sentence of the first paragraph.

T1/I4 as a PRLI Option:

If a PRLI option is preferred for backward compatibility, add the following:

- Add note to table 5, page 10: “Using T1 to transfer Task Management functions is only allowable when enabled via PRLI.”
- Add note to table 6, page 11: “Using I4 to transfer Task Management functions is only allowable when enabled via PRLI.”
- Add as PRLI bit 7, word 3 to table 8, page 17: “Task Management Request Response sent as T1/I4.” Add description of this PRLI option:

Setting this bit indicates a request for the SCSI Initiator to transmit Task Management Functions using T1, and for the SCSI Target to respond to Task Management Functions using I4.

The text then provides the behaviors selected if Word 3, Bit 7 is to be defined.

HP 1: Response to comment HP 1.

The comment is accepted. The PRLI option is not selected, so all implementations are required to make use of the T1/I4 mechanism for transmitting Task Management Functions. No modification to the PRLI text is required.

HP 2(Technical) Target Reset effect on login parameters

Login parameters should be in the set of objects within a Target which are restored to their default conditions upon receipt of Target Reset.

After review, HP has withdrawn this comment.

HP 3(Technical) Clarify “Ambiguous Exchange”

The wording regarding “ambiguous exchanges” should be clarified by making error recovery within FCP profile-specific. Various profiles are explicit and complete in defining error recovery. The standard should only provide mechanisms by which the appropriate level of error recovery for the application can be assured. The following modifications should help clarify this.

Section 7.1.2.2

Attempts to define the term “ambiguous exchange” and the use of this concept to invoke error recovery is confusing and overly complex. Replace the last two paragraphs of TARGET RESET with:

The TARGET RESET is transmitted by the initiator (exchange originator) using a new exchange. Additional FC-PH recovery may be necessary following TARGET RESET.

Section 7.1.2.2

Attempts to define the term “ambiguous exchange” and the use of this concept to invoke error recovery is confusing and overly complex. Replace the last two paragraphs of CLEAR TASK SET with:

The CLEAR TASK SET is transmitted by the initiator (exchange originator) using a new exchange. Additional FC-PH recovery may be necessary following CLEAR TASK SET.

Section 7.1.2.2

Attempts to define the term “ambiguous exchange” and the use of this concept to invoke error recovery is confusing and overly complex. Replace the second and third paragraphs of ABORT TASK SET with:

The ABORT TASK SET is transmitted by the initiator (exchange originator) using a new exchange. Additional FC-PH recovery may be necessary following ABORT TASK SET.

HP 3: Response to comment HP 3.

The comment is rejected. For the operation of these task management functions to be sufficiently standard to operate correctly, the two ends of the link must each reset any command which may be in an unknown (ambiguous) state. Alternatively, all outstanding commands must always be aborted by the initiator.

IBM Section. Comments by IBM, George Penokie

IBM 1 (Editorial) Section C.1, wording change

Page 58, Section C.1 - The statement “based on the SCSI committee’s RAID addressing model” should read “based on the addressing model contained within the SCSI-3 Controller Commands Standard (X3T10/1047D)”.

IBM 1: Response to comment IBM 1.

Accepted.

IBM 2 (Editorial) Section C.2, wording change

Page 58, Section C.2 - The section name should be changed to “Definition of SCSI-3 Controller Commands (SCC) addressing model”.

IBM 2: Response to comment IBM 2.

Accepted.

IBM 3 (Editorial) Section C.2, wording change

Page 58, Section C.2 - In the first sentence the statement “RAID addressing model” should be “SCC addressing model” and the statement “SCSI disk array (SDA)” should be “SCSI-3 storage array”. In the last sentence the statement “of an SDA logical unit, all physical SCSI logical units, and volume logical units.” should be “of an SCSI-3 storage array, all peripheral device logical unit numbers, and all volume set logical unit numbers.”

IBM 3: Response to comment IBM 3.

Accepted.

IBM 4 (Editorial) Section C, wording change

Rest of Annex C - All “SDA” should be changed to “SCSI-3 storage array”.

IBM 4: Response to comment IBM 4.

Accepted.

IBM 5 (Editorial) Section C.2, wording change

Page 58, Section C.2, equations at end of page - The following should be changed as indicated:

P = Peripheral device

V = Volume Set

B = SCSI bus within the SCSI-3 Storage Array

IBM 5: Response to comment IBM 5.

Accepted.

IBM 6 (Editorial) Section C.2, wording change

Page 58, Section C.2, last sentence on page - The statement “address of a Volume” should be “address of a volume set”.

IBM 6: Response to comment IBM 6.

Accepted.

IBM 7 (Editorial) Section C.2, wording change

Page 59, Section C.2, Table 44 - “Physical logical unit/SDA” should be “Peripheral device logical unit/SCSI-3 storage array” and “Volume logical unit” should be “Volume set logical unit.”

IBM 7: Response to comment IBM 7.

Accepted.

IBM 8 (Editorial) Annex C, wording change

Rest of Annex C - All “RAID” should be changed to “SCSI-3 storage array”.

IBM 8: Response to comment IBM 8.

Accepted.

IBM 9 (Editorial) Annex C, wording change

Rest of Annex C - All “physical device” should be changed to “peripheral device”.

IBM 9: Response to comment IBM 9.

Accepted.

IBM 10 (Editorial) Section C.3, wording change

Page 59, Section C.3, first sentence - The statement “logical volumes” should be “volume sets”.

IBM 10: Response to comment IBM 10.

Accepted.

IBM 11 (Editorial) Section C.3.2, wording change

Page 60, Section C.3.2 - The title of this section should be “Addressing of volume set logical unit: example”.

IBM 11: Response to comment IBM 11.

Accepted.

IBM 12 (Editorial) Section C.3.2, wording change

Page 60, Section C.3.2, first and second sentence - The statement “more disk drive Volumes. Volumes managed” should be “more volume sets. Volume sets managed”.

IBM 12: Response to comment IBM 12.

Accepted.

IBM 13 (Editorial) Section C.3.2, wording change

Page 60 and 61, Section C.3.2 - The term “physical logical unit” should be “peripheral device logical unit” contained within the body of the standard. If it remains it may cause confusion.

IBM 13: Response to comment IBM 13.

Accepted.

IBM 14 (Technical) Write XFER_RDY disabled definition

FCP login now has two fields which control the use of FCP_XFER_RDY. These fields, labeled WRITE XFR_RDY DISABLED and READ XFER_RDY DISABLED, state that when XFER_RDYs are disabled, they must NEVER be used. This means that when they are disabled, split reads are impossible, and ALL writes--even multimegabyte writes--MUST be sent without an FCP_XFER_RDY.

I do not think that this was the intent, especially for writes. Can we make a wording change to FCP to mean that when FCP_XFER_RDY not disabled, then (as it already says) XFER_RDY must ALWAYS be used, but when it is enabled, then it may or may not be used at the option of either the target or the initiator.

The "Maximum Burst Size" parameter in the disconnect/reconnect Mode page can continue to limit the amount of data transferred in each sequence as it does now. This allows a target to limit the amount of data sent to it immediately after a Write command.

IBM 14: Response to comment IBM 14.

The committee elected to clarify the definition of the WRITE XFER_RDY DISABLED BIT. When 0, every write data sequence must be preceded by the XFER_RDY sequence. When the bit is 1, indicating that XFER_RDY is disabled, then only the first write data sequence of a command shall be provided without an XFER_RDY indication. Subsequent write data sequences, if any, shall be preceded by the XFER_RDY sequence.

Unisys Corporation Section, Comments by Jerry Witalka

U 1 (Technical) In Order Delivery

My current reading of the FCP specification requires all Initiators to support an FCP_XFER_RDY DATA_RO field that specifies out of order data delivery (SAM random buffer access). I believe this is an unacceptable burden for those Initiators that are required to support unlimited scatter/gather operations. Our host software is allowed to specify scatter gather boundaries of a single main storage word. Theoretically, we could be given a single 10000 byte disk read request that could be mapped to a 200 entry scatter/gather list specifying 200 different main storage buffer locations. If we had to support out of order data delivery, it could take an unacceptable amount of processing time to pore through the scatter/gather list and figure out where the starting storage address is for this Data IU as opposed to always processing the scatter/gather list sequentially.

Given this, I would like to request a change to FCP to allow an Initiator to require in order data delivery (SAM sequential buffer access) for all data transfers. SIP has effectively provided this functionality with the Enable Modify Data Pointer (EMDP) bit in the Disconnect/Reconnect mode page. The definition of this bit in the SCSI-3 Primary Commands could be expanded to require the FCP_XFER_RDY DATA_RO field specify in order data delivery or a new bit could be added to the Process Login FCP Service parameter page to require in order data delivery.

U 1: Response to comment U 1.

The committee recommends that the use of the Enable Modify Data Pointer bit in the Disconnect/Reconnect mode page be defined for FCP. Implementation of this bit will not be made mandatory in FCP for the following reasons.

- 1) The architecture described in this comment does not make maximum use of parallel access disk systems that may return data most efficiently out of order. As a result, the performance of systems that require that all delivery of data be in order may suffer.
- 2) Class 2 and Class 3 data may be delivered out of order by some fabrics. The fabric login process that requests in order delivery on a frame by frame basis is outside the definition of FCP, but might be required for systems like those described.

Lawrence Livermore National Laboratories Section, Comments by Lansing Sloan

LLNL 001 (Editorial) Comment on 2

We believe FC-PH may be listed as a normative reference now (and deleted from clause 8).

LLNL 001: Response to comment LLNL 001.

Accepted. (Verify with editors).

LLNL 002 (Editorial) Comment on 3.1

Many of the definitions include the text “[SAM]”. Some have “[FC- PH]” or “[FC- AL]”. Such text seems helpful but should the meanings should be explained, or the text deleted. Many of the terms with “[SAM]” are also defined in SAM Revision 016, though not necessarily in SAM's “definitions” clause 4.1.

LLNL 002: Response to comment LLNL 002.

Partial. Section 2 explains how the references are generated and does not specify where in the referenced document the referenced information is found. The editor will use ANSI standard references. Brackets are acceptable to avoid the repetitive wording: “As specified by...” Section 3 will get an additional indication that some of these are definitions from other documents collected here for the convenience of the reader.

LLNL 003 (Editorial) Comment on 3.1.3 and 3.1.4

The terms “autosence buffer pointer” and “autosense returned flag” have “[SAM]” in their definitions in the FCP document but do not appear to be defined in SAM Revision 016. (Both appear in SAM 012 clause 9.1 but not in SAM 016 clause 6.3.)

LLNL 003: Response to comment LLNL 003.

Since they are not used in the FC-4 document either, they should be deleted. Accepted.

LLNL 004 (Editorial) Comment on 3.1.15

Since operation associators are 64 bits long, not 32, the FQXID with operation associators is a 176-bit concatenation, not 112.

LLNL 004: Response to comment LLNL 004.

Accepted.

LLNL 005 (Editorial) Comment on 3.1.25

The terms “SCSI command service” has “[SAM]” in its definition in the FCP document but does not appear to be defined in SAM Revision 016. (It is in SAM 012 clause 9.1 but not in SAM 016 clause 6.3, where it appears to have been replaced by “Execute Command” or “Send SCSI Command protocol service”.)

LLNL 005: Response to comment LLNL 005.

The proper term is Execute Command. FCP will be changed accordingly. Accepted. The definition will have to be modified in a number of places in FCP.

LLNL 006 (Technical) Comment on 4.2, 4th paragraph, 2nd sentence

This sentence states that if an unusual condition has been detected then SCSI REQUEST SENSE and FCP response information are returned. Is SCSI REQUEST SENSE supposed to be returned even if Auto-sense is not specified? (If the answer is yes, that should be made explicit in FCP, since it sort of contradicts SAM.) Similarly, if FCP response information is supposed to be returned regardless of auto-sense, that should be stated. (SAM presumably does not cover this.) Clauses 7.4, 7.4.5, and/or 7.4.6 may be better places to clarify this.

LLNL 006: Response to comment LLNL 006.

Section 7.4.6 specifies that the proper FCP_SNS_INFO shall be presented when the SCSI status byte of CHECK CONDITION or COMMAND TERMINATED is presented as specified by SAM. It further indicates that FCP devices should always use autosense. Three additional issues have been identified while working with Mr. Sloane to resolve this problem.

- 1) There is no specification defining when FCP Response Information must be provided. Section 7.4.5 will be modified to indicate that FCP Response Information is provided when any of the RSP_CODE conditions are detected by the target.
- 2) There is a discrepancy in the definitions of the FCP_RSP_LEN field. Section 7.4.4 will be modified to indicate that FCP allows a length of zero, four, or eight when FCP Response Information is provided. Other lengths are reserved for future standardization.
- 3) The document is not perfectly clear about whether or not the FCP_RSP_LEN field is always provided, even if the FCP_RSP_LEN_VALID bit is set to zero. The text of

section 7.4.4 will be clarified to indicate that both length fields are always present, whether or not they are valid.

LLNL 007 (Editorial) Comment on 4.3, 2nd paragraph, 2nd sentence

The sentence says that task management functions... are always... the only IU in a new Exchange. According to 7.1.2.2, that's not true for "terminate task", which appears to be done only in existing Exchanges. Consider appending ", except for Terminate Task" to the end of the sentence.

LLNL 007: Response to comment LLNL 007.

Accepted.

LLNL 008 (Editorial) Comment on 5.1, 1st paragraph and Table 3

Please state clearly in the paragraph what the FCP_Port address identifiers are. Please use words that clearly say "D_ID" and "S_ID" in table 3 are the identifiers. (The closest words found in a quick scan are in the definitions of "target identifier" and "initiator identifier".)

LLNL 008: Response to comment LLNL 008.

These abbreviations and definitions will be added to sections 3.1 and 3.2.

LLNL 009 (Editorial) Comment on 5.2, Table 6

In the last line of the Note (and before the Key), delete the comma after "I2". Also delete "are usable to".

LLNL 009: Response to comment LLNL 009.

Accepted

LLNL 010 (Editorial) Comment on 5.5.6

Delete the "is" that precedes "identifies".

LLNL 010: Response to comment LLNL 010.

Accepted.

LLNL 011 (Editorial) Comment on 5.5.11, 2nd sentence

In "... Base Address is beginning address ...", insert "the" after "is".

LLNL 011: Response to comment LLNL 011.

Accepted.

LLNL 012 (Editorial) Comment on 6.1, second paragraph, second sentence

Change “separated processes” to “separate processes” following the third instance of “logically”.

LLNL 012: Response to comment LLNL 012.

Accepted.

LLNL 013 (Editorial) Comment on 6.2.2 through 6.2.4

Each of these has words “for each FC-4” that I think are inappropriate in FCP. Clause 6.2.4 has three instances of the phrase. The last paragraph before 6.1.1 certainly says the parameters for the other FC-4's are outside the scope of FCP (properly). Probably the five instances of “for each FC-4” should be replaced by “for FCP”.

LLNL 013: Response to comment LLNL 013.

The intent was to indicate that a PRLI could be performed for more than one FC-4 at a time. The best way to do this would be to indicate in 6.2 at the end of the first paragraph that image pairs for more than one FC-4 can be included in each PRLI command. Then the term “for each FC-4” could be entirely removed.

LLNL 014 (Editorial) Comment on 6.2.5, first sentence

Change “effects” to “affects.”

LLNL 014: Response to comment LLNL 014.

Accepted.

LLNL 015 (Technical) Comment on 6.2.5, last paragraph, last sentence

Should “default” precede “PRLI” in: “... PRLI shall be present at the completion of PLOGI”?

LLNL 015: Response to comment LLNL 015.

The intent of this phrase is to indicate that implicit PRLI, if implemented, is present at the completion of PLOGI. The sentence will be changed to read:

If default PRLI information is complete enough so that N_Port login (PLOGI) is sufficient to perform an implicit PRLI, then PLOGI shall establish the same reset state and Unit Attention condition that would normally be established by PRLI.

LLNL 016 (Editorial) Comment on 6.2.6.9 and 6.2.6.10

In the first paragraph, fourth sentence, of each, a sentence starts with “If either the originator or the responder do not...”. Change “do” to “does” in each clause.

LLNL 016: Response to comment LLNL 016.

Accepted.

LLNL 017 (Editorial) Comment on 6.3

In the second and third paragraphs, change “No further communication under the affected FC-4...” to “No further FCP communication...”.

LLNL 017: Response to comment LLNL 017.

Accepted.

LLNL 018 (Technical) Comment on 6.3, next to last paragraph

The first sentence talks about “... the referenced process image...”, and the other two sentences talk about a “PA”. However, the content of this paragraph seems equally appropriate to communication between entities neither of which requires a PA. If so, the paragraph should be rewritten so that it does not seem to apply only when PAs are used. The best correction is unclear, but replacing “PA” with “image pair” may help.

LLNL 018: Response to comment LLNL 018.

The first case shall be changed to refer to “communication with an image that...”

The second case shall be changed to refer to “image..”

Accepted.

LLNL 019 (Editorial) Comment on 7.1.2.2, first paragraph

Replace the first sentence with something like: “Except for TERMINATE TASK, a Task management function shall be transmitted by the initiator (Exchange Originator) using a new Exchange. There is no response from the target for a Task Management function.”

LLNL 019: Response to comment LLNL 019.

Accepted.

LLNL 020 (Editorial) Comment on 7.4, first sentence

Insert “payload” after “IU” or in place of “IU”.

LLNL 020: Response to comment LLNL 020.

IU is the correct term. Rejected.

LLNL 021 (Editorial) Comment on C.2

In the second line below Table 43, there should be one colon (not two) following “Generalized Address.”

LLNL 021: Response to comment LLNL 021.

Accepted.

FSI Consulting Services Section, Comments by Gary Stephens

FSI 1 (Editorial) Add FQXID

Page 2, 3.1.15 Add the term “(FQXID)” behind the term name to be consistent with other places where the abbreviation appears behind the term.

FSI 1: Response to comment FSI 1.

Already contained in section 3.2, Abbreviations. The convention is, except for the glossary and the abbreviations, that the abbreviation is enclosed in parentheses after the defining words the first time the abbreviation is used in the text. Change is not needed.

FSI 2 (Editorial) FQXID definition

Page 2, 2.1.15 In the process of a full Fibre Channel exchange, both the S_ID and D_ID fields may change. This optional function makes it difficult to specify a fixed name for the FQXID as specified in option b). Add some text to the standard to explain the migration of these values in a full Fibre Channel implementation. Such use is not prohibited by the standard and therefore must be described and mapped to FCP constructs.

FSI 2: Response to comment FSI 2.

After careful review, the committee recommended that section 5.1, Table 3, should be accompanied by text that indicates that other definitions of FQXID are outside the scope of the FCP standard. This recognizes that the usage of operation associators and X_ID reassignment is not defined for FCP, but is theoretically possible to define.

FSI 3 (Editorial) Definition of ports

Page 4, 4. 1, paragraph 4, line 2. The phrase “by a pair of N_Ports” to “by a pair of FCP_Ports or a set of FCP_Ports using initial process associators”. See comment 2. General The term N_Port should be removed from the document except in the definition of FCP_Port. The term N_Port does not include the definition of an NL_Port for FC-AL. The definition of FCP_Port should include the NL_Port for FC-AL.

FSI 3: Response to comment FSI 3.

After reviewing the text, the meaning described above appears to be included correctly. This change is not required.

FSI 4 (Editorial) Unsolicited Command

Page 5, Table 1. row 4 Remove the term Unsolicited in the FCP equivalent column. The command service request can be used for either an unsolicited command (i.e., the first one for a new task) and also for subsequent linked commands which are solicited by the previous FCP_RESPONSE IU.

FSI 4: Response to comment FSI 4.

The term is correct as defined in FC-PH. The same category is used for both the first command and subsequent linked commands. No change is required.

FSI 5 (Editorial) Starting Exchange

Page 5, 4.2, paragraph 2 line 1 Change “starts an exchange by sending” to “starts an exchange for the first request by sending”.

FSI 5: Response to comment FSI 5.

The statement appears to be correct. X_ID reassignment, which might appear to be an exception, is actually included in this statement, since reassignment of the X_ID does not terminate an exchange, but extends it under a different name. Command linking, which might appear to be an exception, is actually not part of this statement, since this indicates how an exchange begins. No change is required.

FSI 6 (Editorial) Linking

Page 5, 4.2, paragraph 2, line 3. Change “The FCP_CMND” to “The first FCP_CMND”. Each FCP_CMND does not start an exchange in the case of linking.

FSI 6: Response to comment FSI 6.

The reference is correct as stated. The FCP I/O Operation for linked commands starts with the first command in the link and continues with subsequent commands. No change is required.

FSI 7 (Editorial) Task Management

Page 7, Table 2 Must be updated to match SAM functions for task management along with corresponding text additions.

FSI 7: Response to comment FSI 7.

Accepted. The task management definitions in SAM will be reviewed and any new information or changes will be reflected if required in FCP.

FSI 8 (Editorial) Task Management

Page 10, 5.3, Table 5 Adjust the T1 IU to include confirmed task management.

FSI 8: Response to comment FSI 8.

Accepted, See HP 1

Digital Equipment Corporation Section, Comments by Charles Monia

DEC 1 (Editorial) Section 3.1.5

All text after the first sentence is explanatory material which is outside the scope of the definition and should be deleted.

DEC 1: Response to comment DEC 1.

Accepted.

DEC 2(Editorial) Section 3.1.7

See comment 001.

DEC 2: Response to comment DEC 2.

Accepted.

DEC 3 (Editorial) Section 3.1.9

See comment 001

DEC 3: Response to comment DEC 3.

Accepted.

DEC 4 (Editorial) Section 3.1.10

See comment 001.

DEC 4: Response to comment DEC 4.

Accepted.

DEC 5 (Editorial) Section 3.1.12

See comment 001.

DEC 5: Response to comment DEC 5.

After careful consideration, the committee recommended that the comment be accepted. If reference to the individual services is required, it shall be provided in the body of the text.

DEC 6 (Editorial) Section 3.1.13

See comment 001.

DEC 6: Response to comment DEC 6.

After careful consideration, the committee recommended that the comment be accepted. The defining relationships shall be provided in the body of the text as required.

DEC 7 (Editorial) Section 3.1.15

See comment 001

DEC 7: Response to comment DEC 1.

Accepted.

DEC 8 (Editorial) Section 3.1.18

See comment 001.

DEC 8: Response to comment DEC 8.

After careful consideration, the committee recommended that the comment be accepted. The defining relationships shall be provided in the body of the text as required.

DEC 9 (Editorial) Section 3.1.20

See comment 001.

DEC 9: Response to comment DEC 9.

Accepted.

DEC 10 (Editorial) Section 3.1.25

See comment 001.

DEC 10: Response to comment DEC 10.

Accepted

DEC 11 (Technical) Definition of tag, Section 3.1.28

The definition for “tag” in the first sentence should be changed to: “The initiator-specified component of the task identifier.” All text following the first sentence should be deleted.

DEC 11: Response to comment DEC 11.

After careful consideration, the committee recommended that the comment be accepted. The defining relationships shall be provided in the body of the text as required.

DEC 12 (Editorial) Section 3.1.33

See comment 001.

DEC 12: Response to comment DEC 12.

After careful consideration, the committee recommended that the comment be accepted. The defining relationships shall be provided in the body of the text as required.

DEC 13 (Editorial) Section 3.1.34

See comment 001.

DEC 13: Response to comment DEC 13.

Accepted

DEC 14 (Technical) Table 2

The names in parentheses in column 1 appear to be the names of SIP messages corresponding to the specified task management functions. These names should be deleted.

DEC 14: Response to comment DEC 14.

Accepted.

DEC 15 (Technical) SAM Protocol Services

In clauses 6.3 and 7.7 of SAM, protocol services to be provided by an LLP are defined that support the command and task management functions. The FCP protocol description should reference the service and its arguments by name. I would expect to see a clause in FCP for each applicable SAM task management or command protocol service. In addition to showing the service interface and its parameters, the clause should map each SAM parameter into its FCP-equivalent and describe corresponding FCP behavior.

DEC 15: Response to comment DEC 15.

This comment is really an editorial request. The functionality required by SAM is included in FCP, but is not organized to explicitly relate the required services to the FCP implementation of those services. A side effect of this organization is that the verification of compliance with SAM is more difficult. A Project Proposal for FCP-2, which has as one of its major goals the rewriting of FCP to precisely relate the FCP functionality and the required SAM services, has been submitted to X3T10 for approval and forwarding.

DEC 16 (Technical) SAM Protocol Specific Responses

As required by clauses 6 and 7 of SAM, FCP should identify the protocol-specific responses corresponding to the following service responses:

Task Complete, Linked Command Complete, Linked Command Complete (with flag), Service Delivery or Target Failure, Function Complete.

DEC 16: Response to comment DEC 16.

This comment is really an editorial request. The functionality required by SAM is included in FCP, but is not organized to explicitly relate the required services to the FCP implementation of those services. A side effect of this organization is that the verification of compliance with SAM is more difficult. A Project Proposal for FCP-2, which has as one of its major goals the rewriting of FCP to precisely relate the FCP functionality and the required SAM services, has been submitted to X3T10 for approval and forwarding.

DEC 17 (Technical) Asynchronous Event Reporting

The mechanism for Asynchronous Event Reporting is not defined as required by clause 6.6.4.1 of SAM.

DEC 17: Response to comment DEC 17.

Asynchronous Event Reporting is defined as a SEND command from a device that normally acts as a target, but is temporarily acting as an initiator. This is explained at the end of section 4.2. No changes are required.

Emulex Section, Comments by Greg Scherer

EMX 1 (Technical) Annex A (normative) Extended link services

Background for the comment:

In Annex A of FCP an FC-4 login/logout service is defined in order to implement specific FCP functionality. This login/logout service is stated to be generic and therefore designed to support multiple FC-4's within it's framework.

The login service (PRLI) supports FC-4 TYPE and or Process Associators to be exchanged during login, in order to differentiate between separate FC-4 logins (e.g. FCP, IPI, etc.), or even separate FC-4 image pairs (FCP image pair 1, FCP image pair 2, etc.). This architecturally allows two N_PORT's with independent FC-4's to communicate using independent FC-4 login parameters.

My issue comes from the fact that the logout service (PRLO) does not support FC-4 TYPE specific logout. This means that if two N_PORT's choose not to use Process Associators, (that will ensure image pair uniqueness), any PRLO (logout) from a single FC-4 will affect all others. Although today there may not be many coexisting FC-4's that use PRLI/PRLO, I believe the intent in Annex A was to document an enabling service that could be used in a much broader scope in the future.

Specific comment:

In Annex A the PRLO / ACC payloads define Parameter Page Word 0 Bit 31:16 as RESERVED. This is the same field in the PRLI / ACC payload that is defined as the FC-4 TYPE and TYPE code expansion. Without the TYPE and TYPE code expansion area defined in the PRLO / ACC payload it is not possible (without using Process Associators) to logout one FC-4 on a given N_PORT without potentially affecting others.

Recommendation:

Add FC-4 TYPE and TYPE code expansion fields to the PRLO / ACC payloads, as per the definition and field position of TYPE and TYPE code expansion fields defined in the PRLI / ACC payloads.

In any case, tables 11 and 12 (PRLO / ACC payloads listed in section 6) must be made to match tables 29 and 31 (from Annex A) as they currently contradict each other regarding the definition of Parameter Page Word 0 Bit 31:16 (TYPE and TYPE code expansion fields).

EMX 1: Response to comment EMX 1.

Since the actual standardization of this function is being carried forward as an FC-PH-2 activity, this will ultimately be a comment against that document. The editor will review FC-PH-2 for conformity and make those corrections that are presently defined. This is a desirable characteristic which should be carried forward.

The contradiction will be resolved. This comment is accepted in principle, but requires supporting activities from another organization to be completed.

EMX 2 (Editorial) Annex A (normative) Extended link services

Page 39 first bullet:

- Word 0, Bit 14 Establish Image Pair
- Should be bit 13 (as listed in table 24).

EMX 2: Response to comment EMX 2.

Accepted.

EMX 3 (Editorial) Annex A (normative) Extended link services

Page 41 fourth bullet:

- Word 0, Bit 14 Establish Image Pair
Image pair established only if bit 14.....
- Should be bit 13 (as listed in table 26).

EMX 3: Response to comment EMX 3.

Accepted.

EMX 4 (Editorial) Annex A (normative) Extended link services

Table 31 entry 7 is 13-0 should be 7-0:

Item	Word	Bit
Logout parm response page	0-3	31- 0
Reserved	0	31-16

Originator PA Valid	0	15
Responder PA Valid	0	14
Reserved	0	13-12
Response code	0	11- 8
Reserved	0	13- 0 <-----

EMX 4: Response to comment EMX 4.

Accepted.

EMX 5 (Editorial) Section 6 PRLO / PRLI Field definitions

Tables 8 and 10 document Parameter Page payload Word 0 bit 13 as RESERVED. This same bit in tables 24 and 26 (of Annex A) is defined as “Establish Image Pair” an “Image Pair Established” respectively. The bit definitions in both sets of tables (8 / 24 and 10 / 26) and text should match.

EMX 5: Response to comment EMX 5.

Accepted. Section 6 will be updated.

EMX 6 (Improvement) Annex A (normative) Extended link services

I would like to see more detail in the general description for PRLI Parameter Page Word 0, bit 13 “Establish Image Pair”. If this bit = 1 (Establish Image Pair and exchange parameters), must bits 15-14 (Process Associators) also be =1? There is no indication in the text that they are tightly coupled, although I believe that they are. Relationships such as these should be clearly defined (even though potentially obvious).

EMX 6: Response to comment EMX 6.

This revision did not require Process Associators to establish an image pair. When the PA is invalid, then the image is of the whole node. This was kept vague so that either mechanism could be used. The editor will review the text with respect to the latest revision of FC-PH-2.

| The editor has reviewed this and is in discussion with the editor of FC-PH-2