Negotiating CISC

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1 Overview

In a discussion culminating at the FCP-4 work group meeting on 7 November 2006, interest was expressed in a means to negotiate use of Continuously Increasing Sequence Count (CISC) between an initiator FCP_Port and a target FCP_Port. This document proposes an FCP-specific way of negotiating use of CISC.

2 Issue

CISC is one of two options that an FC_Port may use in assigning the SEQ_CNT for the first frame of a new Sequence. CISC implies that after the first Frame of the first Sequence in an Exchange, each successive Sequence will be assigned a SEQ_CNT one greater than the SEQ_CNT of the last frame of the prior Sequence from the same Sequence Initiator. The only other alternative is to start the new Sequence with SEQ_CNT equal to zero. By default, these behaviors may be mixed on a Sequence-by-Sequence basis (for what it's worth), but an FC_Port may commit at N_Port Login (see FC-LS) with another FC_Port to send all its sequences using CISC rules. This allows the receiving FC_Port to use SEQ_CNT to detect certain errors more quickly.

It is important to realize that the Login indication is <u>not</u> a negotiation, it is simply a commitment by one FC_Port to another. Either party to N_Port Login may commit to CISC independently of the other.

While there are some advantages to the CISC commitment for detection of certain error cases, there is also known to be a large established base of FCP devices that can not tolerate CISC behavior in certain circumstances. But as mentioned, CISC is simply a commitment, not a negotiation. CISC is an offer you can't refuse...with the results of the figure of speech for some devices. (This is because FC-FS-3 and its predecessors allow CISC at any time.)

In order that consenting devices may engage in CISC without embarrassing repercussions, a means is needed to negotiate consent rather than commitment.

3 Proposal

For application to the FCP-4 protocol, the indication of CISC at N_Port Login by an initiator FCP_Port will be treated as an offer rather than a commitment. A reserved bit in PRLI LS_ACC will be assigned to accept or reject the offer. The setting of zero rejects the offer, to protect legacy devices.

No facility is provided for an initiator FCP_Port to reject CISC from the target. If the target offers it, the target shall send it and the initiator shall deal with it.

This change shall not apply to any other protocols operating within the same N_Port Login session; for them, the original meaning of CISC will pertain.

The relaxed rule for CISC in the event of Sequence retry is left alone. It's caused enough contention over the years.

4 Instructions to editor

4.1 Conventions

This proposal references FCP-4 version 00a for numbers of clauses, subclauses, tables, figures, etc. Deletions are indicated by ~~red strikeout text~~. Additions are indicated by blue text.

4.2 Text changes

6.3.5 PRLI accept FCP Service Parameter page format

The FCP Service Parameter page for the PRLI accept is shown in table 9.

Table 9 — FCP Service Parameter page, PRLI accept

FCP service parameter	Word	Bit
SCSI FCP (08h)	0	31–24
Reserved for TYPE Code Extension	0	23–16
ORIGINATOR PROCESS_ASSOCIATOR VALID	0	15
RESPONDER PROCESS_ASSOCIATOR VALID	0	14
IMAGE PAIR ESTABLISHED	0	13
Reserved	0	12
ACCEPT RESPONSE CODE	0	11–8
Reserved	0	7–0
Originator Process_Associator	1	31–0
Responder Process_Associator	2	31–0
Reserved	3	~~31–11~~ 31-12
CISC PERMITTED	3	11
REC_SUPPORT	3	10
TASK RETRY IDENTIFICATION REQUESTED	3	9
RETRY	3	8
CONFIRMED COMPLETION ALLOWED	3	7
DATA OVERLAY ALLOWED	3	6
INITIATOR FUNCTION	3	5
TARGET FUNCTION	3	4
OBSOLETE	3	3
OBSOLETE	3	2
READ FCP_XFER_RDY DISABLED (shall be one)	3	1
WRITE FCP_XFER_RDY DISABLED	3	0

With the following exceptions, the service parameter definitions are identical for the PRLI request (see table 7) and accept FCP Service Parameter pages.

Word 0, Bit 13: IMAGE PAIR ESTABLISHED**:** The IMAGE PAIR ESTABLISHED bit is defined in FC-LS. If the IMAGE PAIR ESTABLISHED bit is set to zero, the image pair was not established. The ACCEPT RESPONSE CODE has additional information.

If the IMAGE PAIR ESTABLISHED bit is set to one, the image pair was established.

PRLI ACCEPT RESPONSE CODE: The PRLI ACCEPT RESPONSE CODE field is defined in FC-LS. The values of the PRLI ACCEPT RESPONSE CODE field indicate whether the image pair was successfully created. If the image pair was not created, the value of the PRLI ACCEPT RESPONSE CODE indicates why the request failed or was rejected.

Word 3, Bit 11: CISC_PERMITTED**:** The CISC_PERMITTED bit value set by the PRLI Responder together with the SEQ_CNT bit value set in the N_Port Login protocol by the PRLI Initiator determine the rules for SEQ_CNT assignment that shall be used by the PRLI Initiator for all Sequences it initiates to the PRLI Responder within the protocol specified in this standard, in accord with table 8.

Table 10 — SEQ_CNT rules for PRLI Responder

CISC_PERMITTED by PRLI Responder in PRLI	SEQ_CNT by PRLI Initiator in N_Port Login	SEQ_CNT Rules for PRLI Initiator
0	0	SEQ_CNT shall be zero for the first frame of every Sequence sent by PRLI Initiator
0	1	SEQ_CNT shall be zero for the first frame of every Sequence sent by PRLI Initiator
1	0	SEQ_CNT shall be zero or CISC [a] for the first frame of every Sequence sent by PRLI Initiator
1	1	SEQ_CNT shall be CISC [a] for the first frame of every Sequence sent by PRLI Initiator
[a] The CISC rules are those specified in FC-FS-3 as modified by this standard (see 8.2)		

The value of the CISC_PERMITTED bit in the PRLI shall have no effect on SEQ_CNT management for Sequences of protocols other than the protocol specified in this standard.

Word 3, Bit 10: REC_SUPPORT**:** When the REC ELS supported (REC_SUPPORT) bit is set to one, the Responder is indicating that it supports, as a target FCP_Port, the receipt of the REC ELS. The capability of the target FCP_Port to retransmit unsuccessfully transmitted data is determined by the RETRY bit (i.e., a REC_SUPPORT bit set to one does not indicate the target FCP_Port supports retransmission of data). When the REC_SUPPORT bit is set to zero, the Responder is indicating that it may not support receipt of the REC ELS.