Ladder Diagrams for Error Recovery For FCP -2 Rev 04
Out-Of-Order Delivery- Annex D

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D.1 Class 3 Error Detection

(Continue with error recovery)
D.1 Class 2 Error Detection

(Continue with error recovery)
D.2 Class 3 FCP_CMD Lost

(Continue with error recovery)
D.2 Class 2 FCP_CMD Lost

- E_D_TOV
  - ABTS
  - REC
  - R_A_TOV
  - RRQ

- FCP_CMND
  - X

- BA_ACC
  - LS_RJT
  - (continue with error recovery)

- ACC
D.2.1 Class 2 Lost ACK on FCP_CMND

Note that the issuance of RRQ is not necessary in this case, since the Target will not have established a Recovery Qualifier. However, the Initiator cannot reclaim the resources associated with its Recovery Qualifier until the ACK is received (out of order) or the R_A_TOV time-out expires.
D.3 Class 3 FCP_XFER_RDY Lost

WAIT REC_TOV. IF FCP_XFER_RDY IS RETURNED, CONTINUE WITH EXCHANGE--REC ARRIVED BEFORE FCP_XFER_RDY SENT

ERROR RECOVERY
D.3 Class 2 FCP_XFER_RDY Lost

Error Recovery Addition

A new SEQ_ID must be used in the retransmission of FCP_XFER_RDY. For Class 2, the SEQ_CNT value used must be one greater than the value used in the ABTS frame.
D.4 Class 2 FCP_XFER_RDY Rcvd, ACK Lost

Error Recovery

None:
The ACCs returned for the REC indicates that the Initiator holds Sequence Initiative and the Exchange is open. No error recovery is required.

Note: The Target may elect not to issue the RRQ since no Recovery Qualifier was established by the Initiator in this case. It must still let R_A_TOV expire before reclaiming the resources associated with its Recovery Qualifier.
D.5 Class 3 FCP_RESP Lost, No FCP_CONF Req.

WAIT REC_TOV. IF FCP_RESP RECEIVED, COMPLETE THE EXCHANGE. OTHERWISE DO ERROR RECOVERY
**D.5 Class 2 FCP_RESP Lost, No FCP_CONF Req.**

Error Recovery Addition

A new SEQ_ID must be used in the retransmission of FCP_RESP. For Class 2, the SEQ_CNT value used must be one greater than the value used in the ABTS frame.
D.6 Class 2 FCP_RESP Rcvvd, ACK Lost

None:
The BA_RJT for the ABTS indicates the Exchange is unknown and therefore complete. No error recovery is required.

The Target must establish a Recovery Qualifier. The associated resources cannot be reused for a period of R_A_TOV or until the ACK to FCP_RESP is delivered (out of order). Note: The Target may elect not to issue the RRQ as no Recovery Qualifier was established by the initiator.
D.7 Class 3 Lost Write Data, Last Frame of Seq.

(Continue with error recovery)
D.7 Class 2 Lost Write Data, Last Frame of Seq.

New Sequence Ids shall be used for the retransmission of FCP_XFER_RDY and FCP_DATA. For Class 2, the starting Sequence count value used with the retransmission of FCP_DATA frames shall be one greater than the value used in ABTS.
D.8 Cl 3, Lost Write Data, Not Last Fr. of Seq.

(Continue error recovery)
D.8 Class 2 Lost Write Data, Not Last Frame of Seq.

Error Recovery Addition
New Sequence IDs shall be used for retransmission of FCP_XFER_RDY and FCP_DATA. For Class 2, the Sequence count value used with the retransmission of FCP_DATA shall be one greater than the value used in ABTS.
D.9 Class 3 Lost Read Data, Last Frame of Seq.

IF FCP_DATA (seq=1, cnt=1) IS RECEIVED DURING REC_TOV, THEN COMPLETE THE EXCHANGE.

(Continue error recovery)
D.9 Class 2 Lost Read Data, Last Frame of Seq.

Error Recovery Addition
New Sequence IDs shall be used for retransmission of FCP_XFER_RDY and FCP_DATA. For Class 2, the Sequence count value used with the retransmission of FCP_DATA shall be one greater than the value used in ABTS.
D.10 Class 3 Lost Read Data, Not Last Frame of Seq

IF FCP_DATA (seq=1, cnt=0, RO=0) IS RECEIVED WITHIN REC_TOV, THEN FINISH THE EXCHANGE.

(Continue error recovery)
Error Recovery Addition
New Sequence IDs shall be used for retransmission of FCP_XFER_RDY and FCP_DATA. For Class 2, the Sequence count value used with the retransmission of FCP_DATA shall be one greater than the value used in ABTS.
D.11 Class 2 ACK Lost on Read.

Error Recovery

None:
The initiator has received the FCP_DATA frame or sequence. No error recovery is required.
Note: The BA_ACC indicates the FCP_DATA sequence was received, the Target continues the Exchange.
Note: The Target must establish its Recovery Qualifier. The resources associated with the Recovery Qualifier can be reclaimed on receipt of the ACK(out of order) or after R_A_TOV. The issuance of RRQ is optional as no Recovery Qualifier was established by the Initiator in this case.
D.12 Class 2  ACK Lost on Write

None: The Target received the FCP_DATA sequence. No error recovery is required.
Note: The BA_ACC indicates the data sequence was received, the Target and Initiator continue the Exchange. The Initiator must establish its Recovery Qualifier. The resources associated with the Recovery Qualifier can be reclaimed on receipt of the ACK (out of order) or after R_A_TOV. The issuance of the RRQ is optional as no Recovery Qualifier was established by the Target. FCP_RESP can be received at any time after FCP_DATA(seq1, cnt1 has been sent, but prior to the expiration of R_A_TOV.
None.
LS-RJT indicates that the Initiator received FCP_RESP and sent FCP_CONF.
Note that if FCP_CONF is received after LS_RJT, it is discarded as there is no context for it.
D.??  Class 2 FCP_CONF Lost

* Second FCP_CONF must be sent with a different SEQ_ID. The SEQ_CNT value used in the retransmission of FCP_CONF must be one greater than the value used in the ABTS frame.
D.??? Class 2 ACK Lost on FCP_CONF

None:
The Initiator must establish a Recovery Qualifier on receipt of the BA_RJT. The resources associated with the Recovery Qualifier can be retired on the receipt of the ACK (out of order) or when REC_TOV Time-out has expired. Note that the issuance of RRQ is optional as no Recovery Qualifier was established by the Target.
D.13  REC or REC Response Lost

Change E_D_TOV in the text to $2 \times R_A_TOV$ to agree with the text in 12.6.2
Change $E_D$ TOV in the text to $2 \times R_A$ TOV to agree with the text in 12.6.3.