Date: May 4, 2004

To: T10 Committee (SCSI)

From: Jim Coomes (Seagate)

Subject: FCP-3, Impact of protection information on data length fields

Revision history

Revision 2 - (May 4, 2004) - modifidied application client data buffer to application client buffer, in FCP_DATA IUs to in FCP_DATA IU payloads, and included changes to the FCP_BIDIRECTIONAL_READ_DL.

Revision 1 - (April 26, 2004) - modify suggested wording to be more generic about included bytes and align with FCP-3r03 wording changes.

Revision 0 - (March 2, 2004) - first revision.

Overview

An end to end data integrity function is approved for random access block devices and included in SBC-2. This function permits additional bytes (protection information) to be appended to blocks of user data. As defined, the additional bytes added to the data transfer for block transfer commands are not included in the TRANSFER LENGTH field (a block count) in the CDBs. They are implied.

The FC_DL field in the FCP_CMND IU and the FCP_BURST_LEN field in the FCP_XFER_RDY IU are byte counts indicating the transfer length for use by layers below the application client. These layers are not aware of the block size and cannot determine the number of additional bytes added for protection information implied by the transfer request. The value in the FC_DL and the FCP_BURST_LEN fields should include the protection information bytes.

In the Disconnect-Reconnect mode page, the function of the MAXIMUM BURST SIZE field is coupled to the FCP_BURST_LEN field in the FCP_XFER_RDY IU and should also include protection bytes.

For consistency, the FIRST BURST SIZE field in the Disconnect-Reconnect mode page should also include the protection information bytes.

Changes to FCP-3

9.1.2.9 FCP_DL

For a SCSI read operation, the FCP_DL field contains a count of the ~~greatest~~ maximum number of ~~data~~ all bytes to be transferred to the application client ~~data~~ buffer in FCP_DATA IU payloads by the SCSI CDB. The FCP_DL field is the Data-In Buffer Size defined by SAM-3.

For a SCSI write operation, the FCP_DL field contains a count of the ~~greatest~~ maximum number of ~~data~~ all bytes to be transferred from the application client ~~data~~ buffer in FCP_DATA IU payloads by the SCSI CDB. The FCP_DL field is the Data-Out Buffer Size defined by SAM-3

For a bidirectional SCSI operation, the FCP_DL field contains a count of the ~~greatest~~ maximum number of ~~data~~ all bytes to be transferred from the application client ~~data~~ buffer in FCP_DATA IU payloads by the SCSI CDB. The FCP_DL field is the Data-Out Buffer Size defined by SAM-3.

An FCP_DL value of zero indicates that no data transfer is expected regardless of the state of the RDDATA and WRDATA bits and that no FCP_XFER_RDY or FCP_DATA IUs shall be transferred.

9.1.2.10 FCP_BIDIRECTIONAL_READ_DL

For a bidirectional SCSI operation, the FCP_BIDIRECTIONAL_READ_DL field contains a count of the ~~greatest~~ maximum number of ~~data~~ all bytes to be transferred to the application client ~~data~~ buffer in FCP_DATA IU payloads by the SCSI CDB. The FCP_BIDIRECTIONAL_READ_DL field is the Data-In Buffer Size defined by SAM-3.

An FCP_BIDIRECTIONAL_READ_DL value of zero indicates that no read data transfer is expected regardless of the state of the RDDATA bit and that no FCP_DATA IUs shall be transferred for read data.

9.2 FCP_XFER_RDY IU

9.2.3 FCP_BURST_LEN

The FCP_BURST_LEN field contains a value indicating the amount of buffer space prepared for all bytes to be transferred in the next FCP_DATA IU and requests the transfer from the initiator of an IU of that length. The value in the FCP_BURST_LEN field is the same as the SCSI data delivery request byte count. See SAM-3.

The value in the FCP_BURST_LEN field shall not exceed the maximum burst length defined by the disconnect-reconnect page of MODE SELECT and MODE SENSE commands. See 10.2.7. The sum of the value of FCP_BURST_LEN field and the value of FCP_DATA_RO shall not exceed the value of FCP_DL. The value in the FCP_BURST_LEN field shall not be zero.

10.2 Disconnect-Reconnect mode page

10.2.7 MAXIMUM BURST SIZE FIELD

The MAXIMUM BURST SIZE field indicates the maximum size of all bytes in a FCP_DATA IU that the device server shall transfer to the initiator or request from the initiator. This parameter does not affect how much data is transferred in a single interconnect tenancy. This value is expressed in increments of 512 bytes (e.g., a value of 1 means 512 bytes, two means 1024 bytes, etc.). The device server may round this value down as defined in SPC-3. A value of zero indicates there is no limit on the amount of data transferred per data transfer operation. This value shall be implemented by all FCP devices. The application client and device server may use the value of this parameter to adjust internal maximum buffering requirements.

10.2.10 FIRST BURST SIZE

When write transfer ready is disabled, the FIRST BURST SIZE field indicates the maximum amount of all bytes ~~data~~ that shall be transmitted in the first FCP_DATA IU sent from the initiator to the target. If all data is transmitted in the first IU, no subsequent FCP_XFER_RDY IUs shall be transmitted by the target. If the maximum amount of data has been transmitted, but more data remains to be transferred, the target shall request that data with subsequent FCP_XFER_RDY IUs.

When write transfer ready is enabled, the FIRST BURST SIZE field is ignored and permission to transmit data from the initiator to the target is managed using FCP_XFER_RDY IUs. For data transmissions from the target to the initiator, the FIRST BURST SIZE field is ignored.

The FIRST BURST SIZE field value is expressed in increments of 512 bytes (e.g., a value of one means 512 bytes, two means 1024 bytes). A value of zero indicates that there is no first burst size limit. The FIRST BURST SIZE field shall be implemented by all FCP devices that support the disabling of write transfer ready. The application client and device server may use the value of this parameter to adjust internal maximum buffering requirements.