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To: T10 Technical Committee
From: Bill Galloway
Subj: SAS Zero length data frames

The current version of SAS allows devices to send zero length DATA frames and zero request length XFER_RDY frames. To prevent end devices from adding special circuitry to handle receiving these nonsensical requests, they need to be eliminated.

Change information unit size for DATA frames in table 76 from "0 to 1024" to "1 to 1024".

Change the following paragraphs:

9.2.2.3 XFER_RDY information unit

The WRITE DATA LENGTH field indicates how many bytes of write data the initiator port may transmit to the logical unit (using DATA frames). If the value in the MAXIMUM BURST SIZE field in the Disconnect-Reconnect mode page is not zero, the maximum value in the WRITE DATA LENGTH field is constrained by the value in the MAXIMUM BURST SIZE field (see 10.1.2.1.4). The minimum value for the WRITE DATA LENGTH field shall be one.

9.2.2.4 DATA information unit

…
The DATA field contains the read or write data. The maximum size of the data IU is the maximum size of any IU in an SSP frame (see 9.2.1). The minimum size of the data IU shall be one byte.

9.2.5.2 Target port error handling

…
If a target port receives a DATA frame with an unknown TARGET PORT TRANSFER TAG, it shall terminate the command with a CHECK CONDITION status with a sense key of ABORTED COMMAND and an additional sense code of ILLEGAL TARGET PORT TRANSFER TAG RECEIVED.

If a target port receives a DATA frame with an unknown TAG, it shall discard the frame.

If a target port receives a DATA frame with more write data than expected, it shall discard the frame and terminate the command with a CHECK CONDITION status with a sense key of ABORTED COMMAND and an additional sense code of TOO MUCH WRITE DATA.

If a target port receives a zero length DATA frame, it shall discard the frame and terminate the command with a CHECK CONDITION status with a sense key of ABORTED COMMAND and an additional sense code of INFORMATION UNIT TOO SHORT.

9.2.5.3 Initiator port error handling

…

If an initiator port receives an XFER_RDY frame in response to a command with no write data, it shall discard the frame. It may then transmit an ABORT TASK request to abort the command.

If an initiator port receives an XFER_RDY frame requesting more write data than expected, it shall transmit an ABORT TASK to abort the command.

If an initiator port receives an XFER_RDY frame requesting zero bytes, it shall transmit an ABORT TASK to abort the command.

If an initiator port receives a DATA frame with more read data than expected, it shall discard the frame and transmit an ABORT TASK to abort the command. It may receive a RESPONSE for the command before being able to abort it.

If an initiator port receives a DATA frame with zero bytes, it shall discard the frame and transmit an ABORT TASK to abort the command. It may receive a RESPONSE for the command before being able to abort it.

9.2.6.2.2 ST_ISF1:Send_Frame state

9.2.6.2.2.1 State description

…

If the ST_ISF state machine was initiated as the result of receiving an XFER_RDY Arrived parameter, then this state shall check the length of the XFER_RDY information unit. If the length of the information unit is not 12 bytes, then this state shall send a Delivery Failure parameter to the ST_IPR:Process_Received_Response state. This state machine shall terminate after sending the parameter. If the length of the XFER_RDY information unit is 12 bytes, then this state shall check the write data length in the XFER_RDY information unit. If the write data length is zero or exceeds the amount of data remaining to be transfered for the data-out command, then this state shall send a Delivery Failure parameter to the ST_IPR:Process Received_Response state. This state machine shall terminate after sending the parameter. If the length of the XFER_RDY frame and the write data length is correct, then this state shall transition to the ST_ISF3:Prepare_Send_Data_Out state.

9.2.6.2.5 ST_IRD1:Receive_Data_In state

9.2.6.2.5.1 State description

The ST_IRD state machine shall be initiated when a Data-In Arrived parameter is received from the ST_IFR (frame router) state machine.

This state shall check the length of the DATA information unit. If the length of the information unit is zero or exceeds the amount of data remaining to be transfered for the data-in command, then this state shall send a Delivery Failure parameter to the ST_IPR:Process_Received_Response state. This state machine shall terminate after sending the parameter.

9.2.6.3.6 ST_TTS4:Receive_Data_Out state
9.2.6.3.6.1 State description

…

If this state was entered as the result of receiving a DATA frame from the ST_TFR state machine, then this state shall check the length of the data. If the length of the data exceeds that specified by the XFER_RDY frame that requested the data, then this state shall send a Data-Out Received data-out delivery service confirmation to the SCSI target device's application layer with a delivery result argument of DELIVERY SUCCESSFUL (TOO MUCH WRITE DATA). This confirmation shall include the tag. The ST_TTS state machine shall terminate after sending the confirmation.

If this state was entered as the result of receiving a DATA frame from the ST_TFR state machine, then this state shall check the length of the data. If the length of the data is zero, then this state shall send a Data-Out Received data-out delivery service confirmation to the SCSI target device's application layer with a delivery result argument of DELIVERY SUCCESSFUL (INFORMATION UNIT TOO SHORT). This confirmation shall include the tag. The ST_TTS state machine shall terminate after sending the confirmation.