Accredited Standards Committee
X3, Information Processing Systems

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Reply to: John Scheible

To: X3T10.1 Membership
From: John Scheible

Subject: Protecting against fast make/break in a web

PROPOSAL 1 (Transient errors without Line Fault)

BACKGROUND

The current Link ERP process handles Line Fault as a special case. If the Link ERP process detects a Line Fault for less than 1 ms, the Link ERP process proceeds with Link ERP rather than immediately exiting (failing) Link ERP.

However, Line Fault detection is optional. If transient errors could cause other errors, then perhaps the 1 ms delay should be expanded to other errors. It depends on the reason for the 1 ms delay. Since the delay is as large as 1 ms, I assume the error is long lasting (or causes a lot of brief errors for a long time).

If this type or condition can cause a NO CHARACTERS RECEIVED error in a node without a higher priority Line Fault implemented, then we should expand the time-out for the NO CHARACTERS RECEIVED error.

If this type of condition can cause a character corruption into a DIS character (seen as a REMOTE PORT DISABLED), then we should expand the time-out for the REMOTE PORT DISABLED error. QUESTION: Does today's hardware allow the firmware to detect DIS characters either directly or by resetting the DIS detected indication and seeing if it is reset?

If the proposal is adopted, TL2 devices would simply recover some errors transparently that TL1 devices would fail Link ERP. This type of error should rarely occur.

PROPOSAL

Change the first three bullets of 11.1.3 "Link ERP process definition" as follows:

   a) The Link Status Byte is built. If the port detects a line fault that persists for more than 1 ms the port enters the Disabled state, and Link ERP process exits with an ALERT CODE value of PERMANENT LINE FAULT.

   b) If the port is detects that it is not receiving characters for more than 1 ms, the port enters the Disabled state, and the Link ERP process exits with an ALERT CODE value of NO CHARACTERS RECEIVED.

   c) If the port is detecting DIS characters the port enters the Disabled state and the Link ERP process exits with an ALERT CODE value of REMOTE PORT DISABLED.

PROPOSAL 2 (Handling quick hot swap scenarios, LRC, self healing connectors)

BACKGROUND

Today, according to the SSA-TL2, an LRC circuit or shunting connector that heals the network in less that 1 ms could pass Link ERP without detecting an error. For a node with line fault detection, the hardware will detect the line fault, interrupt the processor, the processor will begin Link ERP, the Link ERP process will then wait for 1 ms to determine the line fault still exists. If it goes way in less time that 1 ms plus that overhead, then Link ERP proceeds and has a 25% chance of not detecting the error (the RSN and TSN match what the node can send).

A reasonably simple protection is to have each node issue a QUERY NODE SMS to path 0 on each of its ports and remember the UNIQUE ID field returned in the resulting QUERY NODE REPLY SMS when it first establishes communication. Then, the Link ERP process will perform an additional step when it detects a suspicious error (Line Fault, No Characters Received, Loss of Synchronization). The extra step would be to issue a QUERY NODE SMS to path 0 of the affected port and compare the returned UNIQUE ID field value with that remembered from when communication was first established. If they do not match, then the node would generate a break (NO CHARACTERS RECEIVED) asynchronous alert followed by a make (PORT NOW OPERATIONAL) asynchronous alert, then remembers the new UNIQUE ID.

This process could either be optional or mandatory, but in any case should occur very infrequently.

Sincerely,

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