To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 07-284r0 SAS-2 OPEN_REJECT ZONE VIOLATION priority

Revision history
Revision 0 (18 June 2007) First revision

Related documents
sas2r10 - Serial Attached SCSI - 2 (SAS-2) revision 10
06-322r4 - SAS-2 Response to abandon-class OPEN_REJECT (Rob Elliott, HP)

Overview
If an expander device attempts to forward a connection request through its ECM to an expander phy, but both:
    a)   zoning is enabled and the connection request has no permission to access the phy; and
    b)   the does not support the connection rate

then SAS-2 currently requires that OPEN_REJECT (CONNECTION RATE NOT SUPPORTED) be returned rather than OPEN_REJECT (ZONE VIOLATION). However, the reverse appears to be preferable.

In response to ZONE VIOLATION, a SAS-2 originator (usually an initiator) is expected to consult the zone manager to fix the problem (outside the scope of the standard) before reattempting the request. Non-zoning cognizant initiators (e.g., SAS-1.1 initiators) that stumble into this response treat it as an abandon-class OPEN_REJECT and are expected to abandon attempts to open connections to that destination.

In response to CONNECTION RATE NOT SUPPORTED, the originator retries using a slower connection rate. Non-zoning cognizant initiators (e.g., SAS-1.1 initiators) might consult the link rates reported during the discover process and be puzzled why a request faster than 1.5 Gbps was not accepted as expected. Once the request falls back to 1.5 Gbps, SAS-2 defines this response as an abandon-class OPEN_REJECT. SAS-1.1 was unclear, however (see 06-322); it is plausible that the originator might retry forever.

Thus, ZONE VIOLATION results in the originator abandoning the request immediately rather than retrying several futile times, which is the desired behavior.

Suggested changes

7.12.4.2.5 Arb Reject confirmation

The ECM shall generate the following Arb Reject confirmation when any of the following conditions are met and all the Arb Won conditions (see 7.12.4.2.3) are not met:

    1)   Arb Reject (Bad Destination) if the source expander logical phy and destination expander logical phy(s) are in the same expander port and are using the direct routing method;
    2)   Arb Reject (Retry) if the expander device is unable to process the connection request because it has reduced functionality (see 4.6.8);
    3)   if the source expander logical phy and destination expander logical phy(s) are in the same expander port and are using the table routing method or the subtractive routing method:
        A)   Arb Reject (No Destination) if the expander device is not configuring; and
        B)   Arb Reject (Retry) if the expander device is configuring;
    4)   if there are no destination expander logical phys (i.e., there is no direct routing or table routing match and there is no subtractive phy):
        A)   Arb Reject (No Destination) if the expander device is not configuring; and
        B)   Arb Reject (Retry) if the expander device is configuring;
    5)   ~~Arb Reject (Connection Rate Not Supported) if none of the destination expander logical phys supports the connection rate;~~
    6)   if access to the destination expander logical phy(s) is prohibited by zoning (see 4.9.3):
        A)   Arb Reject (Zone Violation) if the zoning expander device is unlocked; and
        B)   Arb Reject (Retry) if the zoning expander device is locked;
    7)   Arb Reject (Connection Rate Not Supported) if none of the destination expander logical phys supports the connection rate;

and

8) Arb Reject (Pathway Blocked) if all the destination expander logical phys that support the connection rate contain blocked partial pathways (i.e., are all returning Phy Status (Blocked Partial Pathway)) and pathway recovery rules require this Request Path request be rejected to release path resources (see 7.12.4.5).