

To: T10 Technical Committee
 From: Rob Elliott, HP (elliott@hp.com)
 Date: 2 November 2002
 Subject: 02-443r1 SAS Handling Link Rate Not Supported

Revision History

Revision 0 (25 October 2002) First revision

Revision 1 (2 November 2002) Incorporated feedback from 29 October 2002 SAS protocol teleconference. Group preferred I_T_L_Q storage per command, allowing updates on CONNECTION RATE NOT SUPPORTED. Group did not discuss STP connections from an STP target; the last inbound connection rate is suggested for those.

Related Documents

sas-r02c - Serial Attached SCSI revision 2c

Overview

Pak-lung Seto of Intel raised two questions on the T10 reflector about issues not addressed in sas-r02b.

1. What CONNECTION RATE (aka CONNECTION LINK RATE) does the target use in its OPENS?
2. What does a target do when it receives OPEN_REJECT (CONNECTION RATE NOT SUPPORTED)?

Suggested Changes

1. What CONNECTION RATE should the target use in its OPENS?

(for 7.7.3 OPEN address frame) (maybe something belongs in 7.12.2.1 Opening a connection too):

When requesting an SSP connection to an SSP initiator port, an SSP target port shall set the CONNECTION RATE field to the connection rate in effect when the command was received unless it has received an OPEN_REJECT (CONNECTION RATE NOT SUPPORTED). Once an OPEN_REJECT (CONNECTION RATE NOT SUPPORTED) has been received, the target port may update the connection rate for future requests based on

- a) the last value received in a connection request from the initiator port; or
- b) 1.5 Gbps.

The target port should send frames in an open connection to the initiator port regardless of whether the saved connection rate for that command matches the current connection rate; it should not close the connection just to reopen the connection at the saved connection rate.

When requesting an STP connection to an STP initiator port, an STP target port shall set the CONNECTION RATE field to the the last value received in a connection request from the initiator port unless it has received an OPEN_REJECT (CONNECTION RATE NOT SUPPORTED).

2. What does a device do when it receives OPEN_REJECT (CONNECTION RATE NOT SUPPORTED)? This should not happen in normal operation, but could occur if there is a wide link with multiple link rates (already an unusual case) and all the fastest physical links go offline.

I suggest this rule for targets (for 7.12.2.2 Connection request responses):

If a target port receives an OPEN_REJECT (LINK RATE NOT SUPPORTED) in response to one of its connection requests that has the CONNECTION RATE field set to greater than 1.5 Gbps, it shall retry the connection request with the CONNECTION RATE field set to 1.5 Gbps.

For initiators, an unexpected OPEN_REJECT(LINK RATE NOT SUPPORTED) should not happen, since a CHANGE should arrive before that response arrives. However, the initiator may still see OPEN_REJECT(LINK RATE NOT SUPPORTED) for a connection request in flight when CHANGE arrives. After new discovery, the initiator should repeat its connection request with a proper connection rate. This adversely affects option b) in issue #1.

For 7.7.3 OPEN address frame:

When requesting a connection to a target port, an initiator port shall set the CONNECTION RATE field to a value supported by the pathway. For each wide link in the pathway, at least one physical link in the wide

link in the pathway shall support the connection rate. For each narrow link in the pathway, that physical link shall support the connection rate.