To: T10 Technical Committee
From: Bob Sheffield(robert.l.sheffield@intel.com)
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Subject: 06-270r1: SAT - ATA resets and ATA nexus Loss

Revision history
Revision 0 (4 June 2006) First revision
Revision 1 (12 June 2006) Incorporate comments from SAT WG 7,8 June 2006

Related documents
SAT-r08 - SCSI / ATA Translation revision 08
06-121r1 SAT-r08_LB_Comment_Resolution.pdf

Overview

Letter ballot comments received for SAT (see 06-121) for subclause 6.5 SAM-3 I_T nexus loss suggest clarifications required for how a SATL deals with nexus loss - both an I_T nexus loss where the SATL device server loses contact with the initiator port, and loss of the nexus between the SATL and the ATA device.

One ballot comment suggests rewriting the subclause to clarify that it applies to the loss of the I_T nexus between the SATL and an initiator port, and suggests handling the condition differently depending on whether the SATL receives commands from multiple initiator ports or not. Further discussion in the SAT WG on the topic resulted in a recommendation to add a new subclause in the architecture clause (i.e., 5) to describe the handling of a nexus loss between the SATL and the ATA device, as well as handling of ATA hardware reset, ATA software reset; with the key element being to state the requirement that the SATL reestablish any operating parameters in the ATA device (e.g., SET FEATURES) so that it is consistent with current mode parameter settings (and LOG parameters and INQIRY data?). This proposal provides suggested changes to resolve the letter ballot comments on subclause 6.5.

Suggested changes

Add the following definition:

3.1.x ATA nexus loss event: A transport-specific event where an ATA host port is no longer in communication with an ATA device port (see ATA8-AAM).

Add subclauses 5.4 and 5.5 as follows:

5.4 ATA nexus loss

An ATA nexus loss event (see 3.1.x) occurs when the SATL loses communication with the ATA device. If an ATA nexus loss event occurs:

    a)   the SATL shall terminate all commands being processed for the corresponding logical unit; and
    b)   the SATL shall establish a unit attention condition for each I_T nexus with the the additional sense code set to:
        A)   if the SATL is able to determine that the ATA device is no longer physically present, REPORTED LUNS DATA HAS CHANGED; or
        B)   if the SATL is unable to determine if the ATA device is physically present or not, INQUIRY DATA HAS CHANGED.

    NOTE 1 - The method by which the SATL determines physical presence or absence of the ATA device is outside the scope of this standard (e.g., using cold presence detect, see SATA 2.5, or a change in the ELEMENT STATUS CODE field in the device or array device element, see SES-2).

    NOTE 2 - SAM-3 and SPC-3 define how the SATL processes subsequent commands when the logical unit is no longer available (i.e., incorrect logical unit selection).

If the ATA nexus is restored or the SATL detects a power-on condition for an ATA device, the SATL shall perform the processing described in 5.5 for those events.

5.5 ATA hardware and software reset processing

An ATA hardware reset may be caused either by the SATL or by the ATA device. If an ATA hardware reset or an ATA software reset occurs except as part of processing a SCSI task management function (see 6.3), then the SATL shall:

a) terminate processing of all tasks for each logical unit affected by the reset;
b) restore the ATA volatile settings (see 3.1.x) of the ATA device (e.g., by sending an ATA SET FEATURES command) to values consistent with the saved values of mode pages if savable mode pages are supported and available, or default values if savable mode pages are not supported or are not available; and
c) establish a unit attention condition for each I_T_L nexus with the additional sense code set to POWER ON, RESET, OR BUS DEVICE RESET OCCURRED.

Modify subclause 6.5 as follows:

6.5 ~~SAM-3~~ I_T nexus loss

The SATL may detect an I_T nexus loss <u>event</u> (see SAM-3). If the SATL detects an I_T nexus loss <u>event</u> ~~(e.g., in a SAS domain the expander device with an STP/SATA bridge transmits a BROADCAST (CHANGE) and the subsequent REPORT PHY SATA response from the affected phy contains an STP I_T NEXUS LOSS OCCURRED bit set to one)~~ the SATL~~:~~ <u>handles the I_T nexus loss differently depending on whether the SATL provides multiple initiators access to the emulated SCSI logical unit.</u>

1) ~~shall issue an ATA hardware reset (see 3.1.7) to the affected ATA device;~~
2) ~~shall terminate processing of any commands to the affected ATA device; and~~
3) ~~should establish a unit attention with the additional sense code set to I_T NEXUS LOSS OCCURRED.~~

<u>If the SATL does not provide multiple initiator ports access to the emulated SCSI logical unit, the SATL shall handle the I_T nexus loss as follows:</u>

1) <u>abort any outstanding ATA command(s);</u>
2) <u>delete all tasks in the task set from the SATL internal context; and</u>
3) <u>establish a unit attention with the additional sense code set to I_T NEXUS LOSS OCCURRED.</u>

<u>If the SATL provides multiple initiator ports access to the emulated SCSI logical unit, the SATL shall handle the I_T nexus loss as follows:</u>

1) <u>allow any outstanding ATA command(s) for each I_T nexus that is not lost to complete;</u>
2) <u>abort any remaining ATA command(s) (see 6.3.2 and 6.3.3);</u>
3) <u>delete all tasks in the task set from the SATL internal context for tasks associated with the I_T nexus that the I_T nexus loss event occured; and</u>
4) <u>establish a unit attention with the additional sense code set to I_T NEXUS LOSS OCCURRED for the SCSI initiator port associated with the I_T nexus that was lost.</u>