To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 21 January 2004
Subject: 03-368r2 SAM-3 Status precedence

Revision history
Revision 0 (31 October 2003) First revision
Revision 1 (8 November 2003) Incorporated comments from November 2003 CAP WG.
Revision 2 (21 January 2004) Incorporated comments from January 2004 CAP WG.

Related documents
sam3r10 - SCSI Architecture Model - 3 revision 10
02-155r6 - Response to T10 letter ballot comments on SAM-2 (Compaq 33 comment)

Overview
During SAM-2 letter ballot comment resolution, the status precedence (section 5.3.2) was modified to allow power on unit attentions to be reported ahead of RESERVATION CONFLICTs. The new wording, though, makes it illegal to return a BUSY or a CHECK CONDITION/ILLEGAL REQUEST ahead of a power on unit attention.

1. The BUSY and TASK SET FULL statuses are usually highest priority of all, since they can reject a command outright without looking at it. Some implementations might let certain commands be processed, so this should not be mandated. They should be allowed at any level of precedence.

2. The CHECK CONDITION status with ILLEGAL REQUEST sense key should be allowed (but not mandated) to be returned with higher priority than RESERVATION CONFLICT status. If the device server cannot properly parse the CDB, it won't know if a reservation conflict exists. It should be allowed at any level of precedence.

Some reasons a CHECK CONDITION status ILLEGAL REQUEST sense key might be returned ahead of RESERVATION CONFLICT (with the additional sense code noted):

a) invalid logical unit number (LOGICAL UNIT NOT SUPPORTED);
b) invalid task attribute (INVALID MESSAGE ERROR);
c) unsupported value in the OPERATION CODE field (INVALID COMMAND OPERATION CODE);
d) unsupported value in the SERVICE ACTION field (INVALID FIELD IN CDB);
e) unsupported value in the NACA bit in the control byte (INVALID FIELD IN CDB);
f) a variable length CDB with a problem in its ADDITIONAL CDB LENGTH field (INVALID FIELD IN CDB);
g) a CDB that is the wrong size for the operation code (e.g. a START STOP UNIT CDB which doesn't even have a START bit);

Other checks that are related to actually processing the command might return ILLEGAL REQUEST with lower priority than RESERVATION CONFLICT (e.g., parameter data problems), so this status/sense key combination also needs to be allowed at a lower priority. It should be allowed at any level of precedence.

3. A priority between ACA ACTIVE and RESERVATION CONFLICT should be selected. Both conditions could apply simultaneously. Since ACA is more of a "temporary" problem, it should have higher priority.

Suggested changes to SAM-3

5.3.2 Status precedence

~~If more than one condition applies to a completed task, the precedence for deciding the condition to be reported shall be:~~

~~1) Reporting a CHECK CONDITION status for any of the following unit attention conditions:~~
~~A) POWER ON, RESET, OR BUS DEVICE RESET OCCURRED;~~
~~B) POWER ON OCCURRED;~~
~~C) SCSI BUS RESET OCCURRED;~~
~~D) BUS DEVICE RESET FUNCTION OCCURRED;~~
~~E) DEVICE INTERNAL RESET;~~

~~F) TRANSCEIVER MODE CHANGED TO SINGLE-ENDED;~~
~~G) TRANSCEIVER MODE CHANGED TO LVD; or~~
~~H) I_T NEXUS LOSS OCCURRED;~~
~~2) Reporting a BUSY, RESERVATION CONFLICT, ACA ACTIVE or TASK SET FULL status; and~~
~~3) Reporting any other status.~~

~~NOTE 1 - The names of the unit attention conditions listed in the subclause (e.g., SCSI BUS RESET OCCURRED) are based on usage in previous versions of this standard. The use of these unit attention condition names is not to be interpreted as a description of how the unit attention conditions are represented by any given SCSI transport protocol.~~

If a device server detects that more than one of the following conditions applies to a completed task, it shall select the condition to report based on the following precedence:

1) a CHECK CONDITION status for any of the following unit attention conditions (i.e., with a sense key of UNIT ATTENTION and an additional sense code of):
   A) POWER ON, RESET, OR BUS DEVICE RESET OCCURRED;
   B) POWER ON OCCURRED;
   C) SCSI BUS RESET OCCURRED;
   D) BUS DEVICE RESET FUNCTION OCCURRED;
   E) DEVICE INTERNAL RESET; or
   F) I_T NEXUS LOSS OCCURRED;
2) an ACA ACTIVE status;
3) a RESERVATION CONFLICT status; and
4) a status of:
   A) CHECK CONDITION status, for any reason not listed in 1);
   B) GOOD status;
   C) CONDITION MET status;
   D) INTERMEDIATE status;
   E) INTERMEDIATE-CONDITION MET status; or
   F) TASK ABORTED status.

NOTE 2 - The names of the unit attention conditions listed in the subclause (e.g., SCSI BUS RESET OCCURRED) are based on usage in previous versions of this standard. The use of these unit attention condition names is not to be interpreted as a description of how the unit attention conditions are represented by any given SCSI transport protocol.

A device server may report these status codes with any level of precedence:

a) BUSY status;
b) TASK SET FULL status; or
c) CHECK CONDITION status for a sense key of ILLEGAL REQUEST.

Editor's Note 1: the January CAP WG asked that TRANSCEIVER MODE CHANGED TO LVD and TRANSCEIVER MODE CHANGED TO SINGLE-ENDED be removed from the list. They are still referenced several other times in the standard; those uses are not removed by this proposal.
