Command Cleared Notification Proposal

• Summary
  – A new SCSI Status value of **0x40 - Command Cleared**
  – Sent by the target whenever an I/O is canceled by a task management function.
    • Sent for each I/O canceled - even to initiator that sent task management function.
  – Indicates the command was cleared by a task management function.
    • e.g. Target Reset, Clear Queue, Lun Reset, Persistent Reserve w/Preempt, etc.
    • Not applicable to Abort Task.
Reason for Change

• Desire to restart I/Os canceled by other initiators quickly
  – e.g. Wolfpack uses resets in resource management: used to clear reservations
  – currently first indication is Power Up Unit Attention on next I/O (which may never come)
    OR
  – I/O timeout - 30, 60, 90 seconds typical

• Avoid “ambiguous” exchange problem in FC
Rules

• Sent for all I/Os canceled
  – even to initiator that sent the Task Management function
• Sent **before** any target initiated action on “newer” commands
  – I.e. must cleanup all canceled commands before processing new commands
  – For example, after Target reset a Power Up Unit Attention must be delivered **after** all Command Cleared statuses.
• Target must still send Power Up UA (if applicable), but **not** Commands Cleared by other Initiator UA (redundant).
Rules
(continued)

• FC Details
  – Target must have Sequence Initiative (SI) to send.
    • Small window (on time scale) during life of command where initiator has SI. Target must wait for SI before sending FCP_RESP.
      – Free resources after RR_TOV
      – Initiator running with Command Cleared enabled should ABTS any I/O not completed with status.
  – Order of returning Command Cleared status on canceled I/Os and Task Management Function Complete not specified
Example 1

Unless initiator keeps track of I/O order, it does not know if Cmd 1 is going to complete or not.
Example 2

Initiator A

- Cmd 1
- Cmd 2
- Cmd 3

Target

- Target Reset
- Task Mgmt Cmpl

Initiator B

- Cmd #1 Cleared
- Cmd #2 UA:29/00
- Cmd #3 Good Status
After Command Cleared Status

• Host Action: Retry I/O
  – simple!

• Target reaction to retry - choice:
  – queue I/O, process after sending all Command Cleared Statuses
    • may lead to premature Queue-Full
  – Busy I/Os until after sending all Command Cleared Statuses
    • causes more retries by host
Mode page to Enable

• Obviously this will cause problems if target uses new status and host is not aware.
• Enable via new bit in Control Mode Page (0x0A)
  – Suggest byte 3, bit 3
### SAM 2 Status Codes
(for reference)

#### Table 13 — Status codes

<table>
<thead>
<tr>
<th>Status Code</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0h</td>
<td>GOOD</td>
</tr>
<tr>
<td>2h</td>
<td>CHECK CONDITION</td>
</tr>
<tr>
<td>4h</td>
<td>CONDITION MET</td>
</tr>
<tr>
<td>8h</td>
<td>BUSY</td>
</tr>
<tr>
<td>10h</td>
<td>INTERMEDIATE</td>
</tr>
<tr>
<td>14h</td>
<td>INTERMEDIATE-CONDITION MET</td>
</tr>
<tr>
<td>18h</td>
<td>RESERVATION CONFLICT</td>
</tr>
<tr>
<td>22h</td>
<td>Obsolete</td>
</tr>
<tr>
<td>28h</td>
<td>TASK SET FULL</td>
</tr>
<tr>
<td>30h</td>
<td>ACA ACTIVE</td>
</tr>
<tr>
<td>All other codes</td>
<td>Reserved</td>
</tr>
</tbody>
</table>