To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 16 January 2006
Subject: 05-368r2 SPC-4 SBC-3 SMC-3 Allow more commands through Write Exclusive reservations

Revision history
Revision 0 (17 October 2005) First revision
Revision 1 (11 November 2005) Incorporated comments from November CAP WG - merged the bits in PR IN REPORT CAPABILITIES into a single ALLOW COMMANDS field
Revision 2 (16 January 2006) Incorporated comments from January 2006 CAP WG and SMC WG.

Related documents
spc4r02 - SCSI Primary Commands - 4 revision 2
sbc3r03 - SCSI Block Commands - 3 revision 3
smc3r00 - SCSI Media Changer Commands - 3 revision 0
05-331r1 Allow Mode Sense Through Read Only Persistent Reservation (incorporated in spc4r02) (George Penokie, IBM)

Overview
05-331 allows MODE SENSE, a read command that does not have any side-effects, to be processed on any I_T nexus if there is a Write Exclusive (i.e. read-only) persistent reservation in effect.

There are several other harmless read commands that should also be allowed in SPC-4, SBC-3, and SMC-3:

  a) READ ATTRIBUTE (if the media can be read, the attributes containing media metadata should be allowed to be read)
  b) READ BUFFER (sometimes used for vendor-specific data)
  c) RECEIVE DIAGNOSTIC RESULT (to allow diagnostic page access, particularly for SES)
  d) REPORT SUPPORTED OPERATION CODES and REPORT SUPPORTED TASK MANAGEMENT FUNCTIONS (used to test if commands are supported without triggering an error)
  e) READ DEFECT DATA (no side effects)
  f) READ ELEMENT STATUS (if media can be read, then the status of an element should be allowed too)

Suggested changes to SPC-4

5.6.1 Persistent Reservations overview

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Table 1 — SPC commands that are allowed in the presence of various reservations

Command	Write Excl	Excl Access	From registered I_T nexus (RR all types)	Write Excl RR	Excl Access RR
MODE SENSE(6) / MODE SENSE(10)	Allowed [b]	Conflict	Allowed	Allowed [b]	Conflict
READ ATTRIBUTE	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict
READ BUFFER	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict
RECEIVE COPY RESULTS	Conflict	Conflict	Allowed	Conflict	Conflict
RECEIVE DIAGNOSTIC RESULTS	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict
REPORT SUPPORTED OPERATION CODES	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict
REPORT SUPPORTED TASK MANAGEMENT FUNCTIONS	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict
TEST UNIT READY	Allowed [b]	Allowed [b]	Allowed	Allowed [b]	Allowed [b]

[a] ...
[b] Logical units claiming compliance with previous versions of this standard (e.g., SPC-2, SPC-3) may return RESERVATION CONFLICT in this case. Logical units may report whether certain commands are allowed in the PERSISTENT RESERVE IN command REPORT CAPABILITIES service action parameter data ALLOW COMMANDS field (see 6.11.4).

6.11.4 REPORT CAPABILITIES service action

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Table 2 — PERSISTENT RESERVE IN parameter data for REPORT CAPABILITIES

Byte\Bit	7	6	5	4	3	2	1	0
0				LENGTH (0008h)				
1								
2	Reserved			CRH	SIP_C	ATP_C	Reserved	PTPL_C
3	TMV	ALLOW_COMMANDS			Reserved			PTPL_A
4				PERSISTENT RESERVATION TYPE MASK				
5								
6				Reserved				
7								

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The ALLOW COMMANDS field indicates whether certain commands allowed through certain types of persistent reservations and is defined in table 3.

Table 3 — ALLOW_COMMANDS field

Code	Description
000b	No information is provided about whether certain commands are allowed through certain types of persistent reservations.
001b	The device server allows the TEST UNIT READY command (see table 1 in 5.6.1) through Write Exclusive and Exclusive Access persistent reservations and does not provide information about whether the following commands are allowed through Write Exclusive persistent reservations: a) the MODE SENSE, READ ATTRIBUTE, READ BUFFER, RECEIVE DIAGNOSTIC RESULTS, REPORT SUPPORTED OPERATION CODES, and REPORT SUPPORTED TASK MANAGEMENT FUNCTION commands (see table 1 in 5.6.1); and b) the READ DEFECT DATA command (see SBC-3).
010b	The device server allows the TEST UNIT READY command (see table 1 in 5.6.1) through Write Exclusive and Exclusive Access persistent reservations and does not allow the following commands through Write Exclusive persistent reservations (i.e., as defined in a previous version of this standard): a) the MODE SENSE, READ ATTRIBUTE, READ BUFFER, RECEIVE DIAGNOSTIC RESULTS, REPORT SUPPORTED OPERATION CODES, and REPORT SUPPORTED TASK MANAGEMENT FUNCTION commands (see table 1 in 5.6.1); and b) the READ DEFECT DATA command (see SBC-3).
011b	The device server allows the TEST UNIT READY command (see table 1 in 5.6.1) through Write Exclusive and Exclusive Access persistent reservations and allows the following commands through Write Exclusive persistent reservations: a) the MODE SENSE, READ ATTRIBUTE, READ BUFFER, RECEIVE DIAGNOSTIC RESULTS, REPORT SUPPORTED OPERATION CODES, and REPORT SUPPORTED TASK MANAGEMENT FUNCTION commands (see table 1 in 5.6.1); and b) the READ DEFECT DATA command (see SBC-3).
All others	Reserved

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Suggested changes to SBC-3

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Table 4 — SBC ~~2~~ 3 commands that are allowed in the presence of various reservations

Command	Write Excl	Excl Access	From registered I_T nexus (RR all types)	Write Excl RR	Excl Access RR
READ DEFECT DATA	~~Conflict~~ Allowed [b]	Conflict	Allowed	~~Conflict~~ Allowed [b]	Conflict

[a] ...
[b] Logical units claiming compliance with previous versions of this standard (e.g., SBC-2) may return RESERVATION CONFLICT in this case. Logical units may report whether certain commands are allowed in the PERSISTENT RESERVE IN command REPORT CAPABILITIES service action parameter data ALLOW COMMANDS field (see SPC-4).

Suggested changes to SMC-3

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Table 5 — SMC commands that are allowed in the presence of various reservations

Command	Addressed LU is reserved by another initiator	Write Excl	Excl Access	From registered I_T nexus (RR all types)	Write Excl RR	Excl Access RR
READ ATTRIBUTE	See SPC-4~~Conflict Conflict Conflict Allowed Conflict Conflict~~					