To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 24 November 2003
Subject: 03-359r1 SPC-3 Disable implicit asymmetric access

Revision history
Revision 0 (20 October 2003) First revision
Revision 1 (24 November 2003) Incorporated comments from November CAP WG - changed to an Extended Control mode page (a subpage of Control, not Extended), dropped the supported bit.

Related documents
spc3r15 - SCSI Primary Commands - 3 revision 15
03-343 SPC-3 Report supported asymmetric access states

Overview
Target devices supporting implicit asymmetric logical unit access might be able to disable implicit switching. A standard control for this, in a mode page, is desirable.

Suggested changes

5.8.2 Explicit and implicit asymmetric logical unit access

Asymmetric logical unit access may be managed explicitly by an application client using the REPORT TARGET PORT GROUPS (see 6.24) and SET TARGET PORT GROUPS (see 6.28) commands.

Alternatively, asymmetric logical unit access may be managed implicitly by the SCSI target device based on the type of transactions being routed through each target port and the internal configuration capabilities of the target port group(s) through which the logical unit may be accessed. The logical units may attempt to maintain full performance across the target port groups that are busiest and that show the most reliable performance, allowing other target port groups to select a lower performance target port asymmetric access state.

If both explicit and implicit asymmetric logical unit access are implemented the precedence of one over the other is vendor specific.

5.8.3 Discovery of asymmetric logical unit access behavior

SCSI logical units with asymmetric logical unit access may be identified using the INQUIRY command. The value in the asymmetric logical units access (ALUA) field (see 6.4.2) indicates whether or not the logical unit supports asymmetric logical unit access and if so whether implicit or explicit management is supported.

5.8.6 Implicit asymmetric logical units access management

SCSI target devices with implicit asymmetric logical units access management are capable of setting the target port group asymmetric access state of each target port group using mechanisms other than the SET TARGET PORT GROUPS command.

All logical units that report in the standard INQUIRY data (see 6.4.2) that they support asymmetric logical units access and support implicit asymmetric logical unit access (i.e., the ALUA field contains 01b or 11b) shall:

a) Implement the INQUIRY command Device Identifier VPD page identifier types 4h (see 7.6.4.6) and 5h (see 7.6.4.7); and

b) Support the REPORT TARGET PORT GROUPS command as described in 6.24.

Implicit logical unit access state changes may be disabled with the IMPEN bit in the Additional Control mode page (see 7.8.4.x).

6.4.2 Standard INQUIRY data

The contents of the asymmetric logical unit access (ALUA) field (see table 78) indicate the support for asymmetric logical unit access (see 5.8).

Table 1 — ALUA field contents

Value	Description
00b	The SCSI target device does not support asymmetric logical unit access or supports a form of asymmetric access that is vendor specific. Neither the REPORT TARGET GROUPS nor the SET TARGET GROUPS commands is supported.
01b	Only implicit asymmetric logical unit access (see 5.8.6) is supported. The SCSI target device is capable of changing target port asymmetric access states without a SET TARGET PORT GROUPS command. The REPORT TARGET PORT GROUPS command is supported and the SET TARGET PORT GROUPS command is not supported.
10b	Only explicit asymmetric logical unit access (see 5.8.7) is supported. The SCSI target device only changes target port asymmetric access states as requested with the SET TARGET PORT GROUPS command. Both the REPORT TARGET PORT GROUPS command and the SET TARGET PORT GROUPS command are supported.
11b	Both explicit and implicit asymmetric logical unit access are supported. Both the REPORT TARGET PORT GROUPS command and the SET TARGET PORT GROUPS commands are supported.

7.4.5 Mode page and subpage formats and page codes

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Table 222 defines the mode pages that are applicable to all device types that implement the MODE SELECT and MODE SENSE commands.

Table 2 — Mode page codes

Page code	Mode page name	Reference
0Ah	Control mode page	7.4.6.2
02h	Disconnect-Reconnect	7.4.7
15h	Extended	7.4.8
16h	Extended Device-Type Specific	7.4.9
1Ch	Informational Exceptions Control	7.4.10
09h	obsolete	
1Ah	Power Condition	7.4.11
18h	Protocol Specific LUN	7.4.12
19h	Protocol Specific Port	7.4.13
01h	(See specific device type)	
03h - 08h	(See specific device type)	
0Bh - 14h	(See specific device type)	
1Bh	(See specific device type)	
1Dh - 1Fh	(See specific device type)	
00h	Vendor specific (does not require page format)	
20h - 3Eh	(See specific device type)	
3Fh	Return all pages (valid only for the MODE SENSE command)	

Editor's Note 1: Replace that table with the following table (editor willing):

Table 3 — Mode page and subpage codes

Page code	Subpage code	Mode page name	Reference
00h	00h - FEh	Vendor specific (does not require page format)	
01h	00h - FEh	(See specific device type)	
02h	00h	Disconnect-Reconnect	7.4.7
	01h - FEh	Reserved	
03h - 08h	00h - FEh	(See specific device type)	
09h	00h	obsolete	
0Ah	00h	Control mode page	7.4.6.2
	01h	Additional Control mode page	7.4.6.3
0Bh - 14h	00h - FEh	(See specific device type)	
15h	00h	Extended	7.4.8
	01h - FEh	Reserved	
16h	00h	Extended Device-Type Specific	7.4.9
	01h - FEh	Reserved	
17h	00h - FEh	Reserved	
18h	00h	Protocol Specific LUN	7.4.12
	01h - FEh	(See specific SCSI transport protocol)	
19h	00h	Protocol Specific Port	7.4.13
	01h - FEh	(See specific SCSI transport protocol)	
1Ah	00h	Power Condition	7.4.11
	01h - FEh	Reserved	
1Bh	00h - FEh	(See specific device type)	
1Ch	00h	Informational Exceptions Control	7.4.10
	01h - FEh	Reserved	
1Dh - 1Fh	00h - FEh	(See specific device type)	
20h - 3Eh	00h - FEh	(See specific device type)	
3Fh	00h and FFh	Return multiple pages (valid only for the MODE SENSE command)	6.9
00h - 3Eh	FFh	Return multiple pages (valid only for the MODE SENSE command)	6.9

7.4.6 Control mode page

7.4.6.1 Control mode page overview

The Control mode page and its subpages provide controls over SCSI features that are applicable to all device types.

Table 4 — Control mode page and subpages

Subpage	Mode page name	Reference
00h	Control mode page	7.4.6.2
01h	Additional Control mode page	7.4.6.3
all others	Reserved	

Editor's Note 2: This proposes documenting the subpage in the same section as the main mode page. An alternative is to define it as a peer in 7.4.x and treat the fact that it is a subpage sharing a mode page code with another page as incidental.

7.4.6.2 Control mode page overview

The Control mode page (see table 223) provides controls over several SCSI features that are applicable to all device types such as tagged queuing and error logging..

Table 5 — Control mode page

Byte\Bit	7	6	5	4	3	2	1	0
0	PS	SPF (0b)	PAGE CODE (0Ah)					
1	PAGE LENGTH (0Ah)							
4								
n	...							

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Editor's Note 3: Change all 14 cross references in SPC-3 currently pointing to 7.4.6 to point to 7.4.6.2

7.4.6.3 Additional Control mode page [new]

The Additional Control mode page (see table 231) is a subpage of the Control mode page (see 8.3.6) and provides controls over SCSI features that are applicable to all device types. The mode page policy for this subpage shall be shared.

Table 6 — Additional Control mode page [new table]

Byte\Bit	7	6	5	4	3	2	1	0
0	PS	SPF (1b)	PAGE CODE (0Ah)					
1	SUBPAGE CODE (01h)							
2	(MSB)		PAGE LENGTH (1Ch)					
3								(LSB)
4	Reserved							IMPEN
5			Reserved					
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Editor's Note 4: Assign subpage code 01h to this page wherever that is done (e.g. in the new mode page table in 7.4.5). Up to the editor to decide if annex C.5 needs to track subpages.

An implicit asymmetric logical unit access enabled (IMPEN) bit set to one specifies that implicit asymmetric logical unit access (see 5.8) be enabled. An IMPEN bit set to zero specifies that implicit asymmetric logical unit access be disabled and indicates that implicit asymmetric logical unit access is disabled or not supported.