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To: T10 Committee (SCSI)

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Subject: Names, Addresses, Identifiers, Oh my!

1 Overview

There needs to be a clear understanding of what SCSI identifiers, addresses and names are and how those relate to the objects defined in SAM-2 and the different protocol standards. This proposal does that.

2 SCSI objects

The following is a list of SCSI objects.

- a) initiator port (was initiator device)
- b) target port (was target device)
- c) logical unit
- d) initiator device (new)
- e) target device (new)

3 SCSI object and nexus relationship

The I_T_L_Q nexus defines the routing for tasks and task management functions and the identification of tasks. The relationship between the nexus elements and the SCSI objects is defined in table 1.

Table 1 - Nexus element to SCSI object relationship

Nexus element	SCSI object	Use
I	Initiator port	Routing and task identification information
T	Target port	Routing and task identification information
L	Logical unit	Routing and task identification information
Q	Task	Task identification information

4 Identifiers and names

SAM-2 defines the identifiers and name for the SCSI objects. The size of the identifiers and names are as shown in table 2. Table 2 also lists if SAM-2 requires protocols to support identifiers and names for SCSI objects.

Table 2 - Object size and support requirements

Object	Identifier (note 1)		Name (note 2)	
	Size	Protocol Support	Size	Protocol Support
Initiator port	not specified	mandatory	not specified	optional
Target port	not specified	mandatory	implementation specific (note 3)	optional
Logical unit	8 bytes (max)	mandatory	implementation specific (note 3)	mandatory
Initiator device	not defined	not defined	not specified	optional
Target device	not defined	not defined	not specified	optional
Note: 1-As defined in the current version of SAM-2 2-There are no names currently defined in SAM-2 3-Reported in VPD page 83h identifier.				

Each protocol defines the size and format of identifiers and names for each object. See table 3 for a list of the size of the identifiers for each protocol. See table 4 for a list of the size of the names for each protocol. See table 5 for a list of the format of the identifiers for each protocol. See table 6 for a list of the formation of the names for each protocol.

Table 3 - Object identifier size for each protocol

Object	Identifier				
	SPI-4	FCP-2	SRP	iSCSI	SBP-3
Initiator port	4 bits (note 1)	3 bytes	16 bytes	258 bytes	2 bytes
Target port	4 bits (note 1)	3 bytes	16 bytes	258 bytes	11 bytes
Logical unit	6 bits (data group transfers) 8 bytes (max) (packetized transfers)	8 bytes (max)	8 bytes (max)	8 bytes (max)	2 bytes
Initiator device	not defined	not defined	not defined	256 bytes	not defined
Target device	not defined	not defined	not defined	256 bytes	not defined
Note: 1-SPI uses a bit-significant representation of the SCSI port identifier, therefore, the maximum number of SCSI ports is 16.					

Table 4 - Object name size for each protocol

Object	Name				
	SPI-4	FCP-2	SRP	iSCSI	SBP-3
Initiator port	none	8 bytes	16 bytes	258 bytes	8 bytes
Target port	none	8 bytes	16 bytes	258 bytes	11 bytes
Logical unit	implementation specific (note 1)	8 or 16 byte (note 1)	implementation specific (note 1)	implementation specific (note 1)	implementation specific (note 1)
Initiator device	none	not defined	not defined	256 bytes	not defined
Target device	none	not defined	not defined	256 bytes	not defined
Note: 1-Reported in VPD page 83h identifier					

Table 5 - Object identifier format for each protocol

Object	Identifier				
	SPI-4	FCP-2	SRP	iSCSI	SBP-3
Initiator port	bit significant (a max of 16 ports; one for each bit)	binary value	EUI 64 + 8 byte extension (note 1)	iSCSI name + Initiator Session Identifier (ISID) (note 2) (note 4)	binary value
Target port	bit significant (a max of 16 ports; one for each bit)	binary value	EUI 64 + 8 byte extension (note 1)	iSCSI name + Target Portal Group Tag (note 2) (note 5)	EUI 64 + Discovery ID (note 3)
Logical unit	binary value (6 bit) or As specified in SAM-2 (8 byte)	As specified in SAM-2	As specified in SAM-2	As specified in SAM-2	As specified in SAM-2
Initiator device	not defined	not defined	not defined	iSCSI name (note 2)	not defined
Target device	not defined	not defined	not defined	iSCSI name (note 2)	not defined
<p>Note:</p> <ol style="list-style-type: none"> 1- Required to be worldwide unique and recommend to be EUI 64 + 8 byte extension 2- The iSCSI name should be worldwide unique, 255 bytes maximum in UTF-8 format with null termination. 3- See IEEE P1212 for more information on the Discovery ID 4- The Initiator Session Identifier (ISID) is a non-zero two byte integer 5- The Target Portal Group Tag is a non-zero two byte integer 					

Table 6 - Object name format for each protocol

Object	Name				
	SPI-4	FCP-2	SRP	iSCSI	SBP-3
Initiator port	none	FC name_identifier	EUI 64 + 8 byte extension) (note 2)	iSCSI name + Initiator Session Identifier (ISID) (note 3) (note 5)	EUI 64
Target port	none	FC name_identifier	EUI 64 + 8 byte extension) (note 2)	iSCSI name + Target Portal Group Tag (note 3) (note 6)	EUI 64 + Discovery ID (note 4)
Logical unit	VPD page 83h identifier	8 or 16 byte (FC name_identifier) (note 1)	implementation specific (note 1)	implementation specific (note 1)	As specified in SAM-2
Initiator device	none	not defined	not defined	iSCSI name (note 3)	not defined
Target device	none	not defined	not defined	iSCSI name (note 3)	not defined

Note:
1- Reported in VPD page 83h identifier
2- Required to be worldwide unique and recommend to be EUI 64 + 8 byte extension
3- The iSCSI name should be worldwide unique, 255 bytes maximum in UTF-8 format with null termination.
4- See IEEE P1212 for more information on the Discovery ID
5- The Initiator Session Identifier (ISID) is a non-zero two byte integer
6- The Target Portal Group Tag is a non-zero two byte integer

5 SCSI Command usage

There are operations defined within SPC that depend on the device server knowing identifier and/or name information. These include:

- a) reservations
- b) persistent reservations;
- c) access controls;
- d) extended copy; and
- e) 3rd party XOR.

Each of those operations has different requirements in the amount of information needed about the identifier and/or name. In addition which object is used varies depending on the operation.

Table 7 - Reservation

Protocol	Logical Unit's view of the I_T Nexus					
	Initiator port		Initial Target Port (note 2)		Third Party Initiator port	
	Identifier	Name	Identifier	Name	Identifier	Name
SPI-4	Used	Not used	Used	Not Used	Used	Not Used
FCP-2	Used	Not used	Used	Not Used	Used	Not Used
SRP	Used (note 1)	Not used	Used (note 1)	Used (note 1)	Not used	Not used
iSCSI	Used (note 1)	Not used	Used (note 1)	Used (note 1)	Not used	Not used
SBP-3	Used (note 1)	Not used	Used (note 1)	Used (note 1)	Not used	Not used
Note: 1-The identifier and name are the same value. 2-The target port that receives RESERVE command.						

Table 8 - Persistent Reservations

Protocol	Logical Unit's view of the I_T Nexus			
	Initiator port		Target port	
	Identifier	Name	Identifier	Name
SPI-4	Used	Not used	Used	Not Used
FCP-2	Used	Used (note 1)	Used	Not Used
SRP	Used (note 2)	Used (note 2)	Used (note 2)	Used (note 2)
iSCSI	Used (note 2)	Used (note 2)	Used (note 2)	Used (note 2)
SBP-3	Used (note 2)	Used (note 2)	Used (note 2)	Used (note 2)
Note: 1-Only used at login to set the identifier to previous value. 2-The identifier and name are the same value				

Table 9 - Access Controls

Protocol	Logical Unit's view of the I_T Nexus (TransportID)						AccessID
	Initiator port		Initiator Device		Target port		
					Initial		
	Identifier	Name	Identifier	Name	Identifier	Name	
SPI-4	Used	Not Used	Not Used	Not Used	Not Used	Not Used	Used
FCP-2	Used (note 1)	Used	Not Used	Not Used	Not Used	Not Used	Used
SRP	Used (note 2)	Used (note 2)	Not Used	Not Used	Not Used	Not Used	Used
iSCSI	Not Used	Not Used	Used (note 2)	Used (note 2)	Not Used	Not Used	Used
SBP-3	Used (note 2)	Used (note 2)	Not Used	Not Used	Not Used	Not Used	Used
Note: 1-Not specified in parameter data determined using name 2-The identifier and name are the same value							

Table 10 - Extended copy target descriptors

Protocol	Logical Unit's view of the extended copy operation			
	Copy target port (note 1)		Copy target device (note 1)	
	Identifier	Name	Identifier	Name
SPI-4	Used	Not Used	Not Used	Not Used
FCP-2	Used	Used	Not Used	Not Used
SRP	Used (note 2)	Used (note 2)	Not Used	Not Used
iSCSI	?	Used	Used (note 2)	Used (note 2)
SBP-3	Used (note 2)	Used (note 2)	Not Used	Not Used
Note: 1-The descriptor type of the extended copy operation determines which is used. 2-The identifier and name are the same value				

Table 11 - 3rd party XOR (XDWRITE EXTENDED, REBUILD, and REGENERATE) target descriptors

Protocol	Logical Unit's view of the I_T nexus	
	XOR target port (note 2)	
	Identifier	Name
SPI-4	Used	Not Used
FCP-2	Used (note 1)	Not Used
SRP	Used (note 3)	Used (note 3)
iSCSI	Used	Used
SBP-3	Used (note 3)	Used (note 3)
Note: 1-Only used if on private loops because there is only one byte available for the identifier. 2-There is an option for having larger than 1 byte target port identifiers but it is not defined 3-The identifier and name are the same value		