



Date: 28 May 2003  
 To: T10 Technical Committee  
 From: Ralph O. Weber  
 Subject: TransportID Cleanup

During the May SPC-3 editing review, a technical problem was discovered with the definition of TransportIDs (SPC-3 r13 subclause 7.5.4).

TransportIDs are supposed to reference initiator ports as the following citations prove:

- "An initiator port is identified by a TransportID if that initiator port..." (SPC-3 r12 7.5.4)
- "An application client may use a TransportID to identify an initiator port..." (SPC-3 r13 7.5.4)
- "If the SPEC\_I\_PT bit is set to one for the REGISTER or REGISTER AND IGNORE EXISTING KEY service actions, the additional parameter data shall include a list of transport IDs (see table 107) and the device server shall apply the registration to the I\_T nexus for each initiator port specified by a TransportID." (SPC-3 r13 6.12.3, PERSISTENT RESERVE OUT parameter list)  
 [Note: this text is unchanged since 01-100r4 was incorporated in SPC-3 r06.]
- "An initiator port is allowed access to the logical units in an ACE containing a TransportID type access identifier when the identification for the initiator port matches that found in the TransportID in a way that is consistent with the TransportID definition (see 7.5.4)." (SPC-3 r13 8.3.1.3.2, Access identifiers)

All currently defined TransportID formats identify initiator ports (matching the expectations for TransportIDs cited above) except one. TransportID for initiators using SCSI over Internet SCSI (SPC-3 r13 7.5.4.6) identify an initiator device, not an initiator port.

To cleanup existing ambiguities and establish a situation where future definition of incorrect TransportID formats are avoided, the following changes are proposed.

**Change 1:** In all 7.5.4 subclauses, change the title from "TransportID for initiators using SCSI over..." to "TransportID for initiator [ports](#) using SCSI over..."

**Change 2:** So that iSCSI TransportIDs can be specified in a backwards compatible manner, add a new field to the general TransportID format as follows.

TransportIDs (see table 258) shall be at least 24 bytes long and shall be a multiple of four bytes in length.

**Table 258 — TransportID format**

| Bit<br>Byte | 7                           | 6 | 5        | 4 | 3                   | 2 | 1 | 0 |
|-------------|-----------------------------|---|----------|---|---------------------|---|---|---|
| 0           | FORMAT CODE                 |   | Reserved |   | PROTOCOL IDENTIFIER |   |   |   |
| 1           | SCSI protocol specific data |   |          |   |                     |   |   |   |
| n           |                             |   |          |   |                     |   |   |   |

The PROTOCOL IDENTIFIER field (see table 238 in 7.5.1) identifies the SCSI protocol to which the TransportID applies.

[The FORMAT CODE field identifies the format of the TransportID. All format code values not specified in this standard are reserved.](#)

**Change 3:** Modify all 7.5.4 subclauses (except the iSCSI subclause) to add the format code field by:

- Restructuring byte 0 bits 7-4 to match the field structure in the modified table 258; and
- Placing "FORMAT CODE (00b)" in the FORMAT CODE field.

Examination of the structure of the 7.5.4 subclauses shows that no other changes are needed.

**Change 4:** Rewrite 7.5.4.6 (TransportID for initiators using SCSI over Internet SCSI) as follows:

**7.5.4.6 TransportID for initiator ports using SCSI over Internet SCSI**

An iSCSI TransportID identifies an iSCSI initiator port using one of the TransportID formats listed in table x1.

**Table x1 — iSCSI TransportID formats**

| Format code | Description                                                                                                                                |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 00b         | Initiator port is identified using the world wide unique initiator device name of the iSCSI initiator device containing the initiator port |
| 01b         | Initiator port is identified using the world wide unique initiator port identifier                                                         |
| 10b-11b     | Reserved                                                                                                                                   |

iSCSI TransportIDs with a format code set to 00b may be rejected. iSCSI TransportIDs with a format code set to 01b should not be rejected.

A iSCSI TransportID with format code set to 00b (see table x2) identifies an iSCSI initiator port based on the world wide unique initiator device name of the iSCSI initiator device containing the initiator port.

**Table x2 — iSCSI initiator device TransportID format**

| Bit<br>Byte | 7                 | 6 | 5        | 4 | 3                        | 2 | 1 | 0 |
|-------------|-------------------|---|----------|---|--------------------------|---|---|---|
| 0           | FORMAT CODE (00b) |   | Reserved |   | PROTOCOL IDENTIFIER (5h) |   |   |   |
| 1           | Reserved          |   |          |   |                          |   |   |   |
| 3           |                   |   |          |   |                          |   |   |   |
| 4           | (MSB)             |   |          |   |                          |   |   |   |
| 4m          | ISCSI NAME (LSB)  |   |          |   |                          |   |   |   |

The null-terminated, null-padded (see 4.4.2) iSCSI NAME field shall contain the iSCSI name of an iSCSI initiator node (see iSCSI). The first iSCSI NAME field byte containing an ASCII null character terminates the iSCSI NAME field without regard for the specified length of the iSCSI TransportID.

NOTE 1 - The maximum length of the iSCSI TransportID is 228 bytes because the iSCSI name length does not exceed 223 bytes.

If a iSCSI TransportID with format code set to 00b is appears in a PERSISTENT RESERVE OUT parameter list (see 6.12.3), all initiator ports known to the device server with an iSCSI node name matching the one in the TransportID shall be registered.

If a iSCSI TransportID with format code set to 00b is appears in an ACE access identifier (see 8.3.1.3.2), the logical units listed in the ACE shall be accessible to any initiator port with an iSCSI node name matching the value in the TransportID. The access controls coordinator shall reject any command that attempts to define more than one

ACEs with an iSCSI TransportID access identifier containing the same iSCSI name. The command shall be terminated with a CHECK CONDITION status, the sense key shall be ILLEGAL REQUEST, and the additional sense code shall be INVALID FIELD IN PARAMETER LIST.

A iSCSI TransportID with format code set to 01b (see table x3) identifies an iSCSI initiator port based on its world wide unique initiator port identifier.

**Table x3 — iSCSI initiator port TransportID format**

| Bit<br>Byte | 7                 | 6 | 5        | 4 | 3                        | 2 | 1 | 0     |
|-------------|-------------------|---|----------|---|--------------------------|---|---|-------|
| 0           | FORMAT CODE (01b) |   | Reserved |   | PROTOCOL IDENTIFIER (5h) |   |   |       |
| 1           | Reserved          |   |          |   |                          |   |   |       |
| 3           |                   |   |          |   |                          |   |   |       |
| 4           | (MSB)             |   |          |   |                          |   |   |       |
| n-1         | ISCSI NAME        |   |          |   |                          |   |   | (LSB) |
| n           | I SEPARATOR (69h) |   |          |   |                          |   |   |       |
| n+1         | (MSB)             |   |          |   |                          |   |   |       |
| 4m          | ISCSI SESSION ID  |   |          |   |                          |   |   | (LSB) |

The ISCSI NAME field shall contain the iSCSI name of an iSCSI initiator node (see iSCSI). The ISCSI NAME field shall not be null-terminated (see 4.4.2) and shall not be padded.

The I SEPARATOR field shall contain the ASCII lower case "i" character.

The null-terminated, null-padded ISCSI SESSION ID field shall contain the session identifier for the iSCSI initiator port (see iSCSI). The first ISCSI SESSION ID field byte containing an ASCII null character terminates the ISCSI SESSION ID field without regard for the specified length of the iSCSI TransportID.

**Change 5:** While preparing this proposal it was discovered that the PERSISTENT RESERVE OUT SPEC\_I\_PT additional parameter data assumes that TransportIDs have a fixed length. While this true for all TransportID formats except iSCSI, the variable length nature of iSCSI TransportIDs makes it impossible to parse the current PERSISTENT RESERVE OUT SPEC\_I\_PT additional parameter data for iSCSI TransportIDs.

To correct this problem the following changes are proposed for 6.12.3 (PERSISTENT RESERVE OUT parameter list). **Warning: these changes are not backwards compatible.**

**Table 107 — PERSISTENT RESERVE OUT ~~specify initiator ports~~ SPEC\_I\_PT additional parameter data**

| Bit<br>Byte | 7                                                                  | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-------------|--------------------------------------------------------------------|---|---|---|---|---|---|---|
| 24          | TRANSPORTID PARAMETER DATA LENGTH (n - 27)                         |   |   |   |   |   |   |   |
| 27          |                                                                    |   |   |   |   |   |   |   |
|             | TransportIDs list                                                  |   |   |   |   |   |   |   |
| 28          | First TRANSPORTID LENGTH<br><b>**backward incompatible field**</b> |   |   |   |   |   |   |   |
| 31          |                                                                    |   |   |   |   |   |   |   |
| 2832        | First TransportID                                                  |   |   |   |   |   |   |   |
|             |                                                                    |   |   |   |   |   |   |   |
|             | ⋮                                                                  |   |   |   |   |   |   |   |
| i           | Last TRANSPORTID LENGTH<br><b>**backward incompatible field**</b>  |   |   |   |   |   |   |   |
| i+3         |                                                                    |   |   |   |   |   |   |   |
| i+4         | Last TransportID                                                   |   |   |   |   |   |   |   |
| n           |                                                                    |   |   |   |   |   |   |   |

The TRANSPORTID PARAMETER DATA LENGTH field specifies the number of bytes of ~~TransportIDs~~ TransportID information that follows.

The command shall be terminated with a CHECK CONDITION status and the sense key set to ILLEGAL REQUEST:

- a) If the value in the parameter list length field in the CDB does not include all of the additional parameter list bytes specified by the TRANSPORTID PARAMETER DATA LENGTH field; or
- b) If the value in the TRANSPORTID PARAMETER DATA LENGTH field results in the truncation of a TransportID.

Each TRANSPORTID LENGTH field specifies the number of bytes in the TransportID immediately following it in the parameter data. Each TransportID length shall be at least 24 bytes and shall be a multiple of four bytes.

The format of a TransportID is specified in 7.5.4.

**Notes on Changes**

- Providing for backwards compatibility would require changing other parts of the PERSISTENT RESERVE OUT parameter data.
- Since this parameter data format does not appear in a published standard and since no existing implementations have been identified, opting for the simpler solution in this proposal is acceptable and prudent.
- Several more verbose ways of describing the parameter data format are available in the event the description above is found to be unclear.