To: INCITS Technical Committee T10

From: Kevin Butt, IBM

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Document: T10/03-167r0

Subject: Remove Element Reservations from SPC-3

Element Reservations have been removed from SMC-2. The SMC WG has requested I present a proposal to remove Element reservations from SPC-3.

I have used SPC-3r15 as the base document.

5.6.1 Reservations overview

Reservations may be used to allow a device server to execute commands from a selected set of I_T nexuses (i.e., combinations of initiator ports accessing target ports) and reject commands from I_T nexuses outside the selected set. The device server uniquely identifies I_T nexuses using protocol specific mechanisms.

Application clients may add or remove I_T nexuses from the selected set using reservation commands. If the appli-cation clients do not cooperate in the reservation protocol, data may be unexpectedly modified and deadlock conditions may occur.

~~The scope of a reservation shall be one of the following:~~

~~a) Logical unit reservations - a logical unit reservation restricts access to the entire logical unit; and~~

~~b) Element reservations - an element reservation restricts access to a specified element within a medium changer.~~

The scope of a reservation shall be Logical unit reservations which restricts access to the entire logical unit.

Reservations may be further qualified by restrictions on types of access (e.g., read, write). ~~However, any restrictions based on the type of reservation are independent of the scope of the reservation.~~

Reservation restrictions are placed on commands as a result of access qualifiers associated with the type of reservation. The details of which commands are allowed under what types of reserva-

tions are described in table 31. ~~If any element is reserved within a logical unit, that logical unit shall be considered reserved for the commands listed in table 31 and the allowed/conflict information in table 31 shall apply.~~

5.6.2.5 Reserving

An application client creates a persistent reservation by issuing a PERSISTENT RESERVE OUT command with RESERVE service action through a registered I_T nexus with the following parameters:

a) RESERVATION KEY set to the value of the reservation key that is registered for the I_T_L nexus; and
b) TYPE and SCOPE fields set to the persistent reservation being created.

Only one persistent reservation with a scope of logical unit is allowed at a time per logical unit. ~~Multiple persistent reservations with a scope of element may be created in a logical unit that contains multiple elements. However, there shall only be one persistent reservation per element.~~

6.11.4 PERSISTENT RESERVE IN parameter data for READ RESERVATION

6.11.4.1 Format of PERSISTENT RESERVE IN parameter data for READ RESERVATION

The format for the parameter data provided in response to a PERSISTENT RESERVE IN command with the READ RESERVATION service action is shown in table 99.

The PRGENERATION field shall be as defined for the PERSISTENT RESERVE IN READ KEYS parameter data (see 6.11.3).

The ADDITIONAL LENGTH field contains a count of the number of bytes to follow in reservation descriptor(s). If the allocation length specified by the PERSISTENT RESERVE IN command is not sufficient to contain the entire parameter list, then only the first portion of the list (byte 0 to the allocation length) shall be sent to the application client. The incremental remaining bytes shall be truncated, although the ADDITIONAL LENGTH field shall still contain the actual number of bytes of reservation descriptor(s) and shall not be affected by the truncation. This shall not be considered an error.

The format of the reservation descriptors is defined in table 100. There shall be a reservation

descriptor for the persistent reservation, if any, present in the logical unit and a reservation descriptor for each element, if any, having a persistent reservation.

If a persistent reservation is present in the logical unit that does not contain elements, there shall be a single reservation descriptor in the list of parameter data returned by the device server in response to the PERSISTENT RESERVE IN command with READ RESERVATION service action. The reservation descriptor for each persistent reservation shall contain the RESERVATION KEY under which the persistent reservation is held (see 5.6.2.6). The TYPE and SCOPE of each persistent reservation as present in the PERSISTENT RESERVE OUT command that created the persistent reservation shall be returned (see 6.11.4.2 and 6.11.4.3).

If a persistent reservation is present in the logical unit that does contain elements, there shall be a reservation descriptor in the list of parameter data returned by the device server in response to the PERSISTENT RESERVE IN command with READ RESERVATION service action for the LU_SCOPE persistent reservation that is held, if any~~, and each ELEMENT_SCOPE persistent reservation that may be held~~. The reservation descriptor shall contain the RESERVATION KEY under which the persistent reservation is held. The TYPE and SCOPE of the persistent reservation as present in the PERSISTENT RESERVE OUT command that created the persistent reservation shall be returned (see 6.11.4.2 and 6.11.4.3).

~~If the SCOPE is an ELEMENT_SCOPE persistent reservation, the SCOPE-SPECIFIC ADDRESS field shall contain the element address, zero filled in the most significant bits to fit the field. If the SCOPE is a LU_SCOPE persistent reservation, the SCOPE-SPECIFIC ADDRESS field shall be set to zero.~~ The obsolete field in Bytes 8 through 11 was defined in a previous standard. The obsolete field in Bytes 14 and 15 was defined in a previous standard.

6.11.4.2 Persistent reservations Scope

6.11.4.2.1 Summary of persistent reservations Scope

The value in the SCOPE field shall indicate whether a persistent reservation applies to an entire logical unit or to ~~an element~~a scope defined in a previous standard. The values in the SCOPE field are defined in table 101.

6.11.4.2.2 Logical unit scope

A SCOPE field value of LU_SCOPE shall indicate that the persistent reservation applies to the entire logical unit.
The LU_SCOPE scope shall be implemented by all device servers that implement PERSISTENT RESERVE OUT.

~~**6.11.4.2.3 Element scope**~~

~~A SCOPE field value of ELEMENT_SCOPE shall indicate that the persistent reservation applies to the element of the logical unit defined by the SCOPE-SPECIFIC ADDRESS field in the PERSISTENT RESERVE OUT parameter list.~~

~~An element is defined by the SMC-2 standard. The ELEMENT_SCOPE scope is optional for all device servers that implement PERSISTENT RESERVE OUT.~~

6.11.5 PERSISTENT RESERVE IN parameter data for REPORT CAPABILITIES

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Table 103.
~~An ES_C (Element Scope Capable) bit set to one indicates that the device server supports a SCOPE value of ELEMENT_SCOPE (see 6.11.4.2) in PERSISTENT RESERVE OUT commands (see 6.12). An ES_C bit set to zero indicates that the device server does not support a SCOPE value of ELEMENT_SCOPE in PERSISTENT RESERVE OUT commands.~~

6.12.3 PERSISTENT RESERVE OUT parameter list
Table 107 — PERSISTENT RESERVE OUT parameter list
obsolete in table SCOPE-SPECIFIC ADDRESS
The obsolete field in Bytes 16 and 19 was defined in a previous standard for use with an obsolete scope (see table 101). If the obsolete scope is not supported Bytes 16 and 19 should be zero.

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~~If the scope is an ELEMENT_SCOPE persistent reservation, the SCOPE-SPECIFIC ADDRESS field shall contain the element address, zero filled in the most significant bits to fit the field. If the service action is REGISTER, REGISTER AND IGNORE EXISTING KEY, or CLEAR or if the~~

~~scope is a LU_SCOPE persistent reservation, the SCOPE-SPECIFIC ADDRESS field shall be set to zero.~~

Table 109 — PERSISTENT RESERVE OUT service actions and valid parameters

EDITORS NOTE: The Allowed SCOPE column cannot be removed, since a device operating with a previous version of the standard might try to use SCOPE. That would need to get rejected in cases where it was previously allowed.

Service Action	Allowed SCOPE	Parameters (part 1 of 2)			
		TYPE	RESERVATION KEY	SERVICE ACTION RESERVATION KEY	~~SCOPE-SPECIFIC ADDRESS~~
REGISTER	ignored	ignored	valid	valid	~~ignored~~
REGISTER AND IGNORE EXISTING KEY	ignored	ignored	ignored	valid	~~ignored~~
RESERVE	LU_SCOPE ~~ELEMENT_SCOPE~~	valid	valid	ignored	~~ignored~~ ~~valid (element)~~
RELEASE	LU_SCOPE ~~ELEMENT_SCOPE~~	valid	valid	ignored	~~ignored~~ ~~valid (element)~~
CLEAR	ignored	ignored	valid	ignored	~~ignored~~
PREEMPT	LU_SCOPE ~~ELEMENT_SCOPE~~	valid	valid	valid	~~ignored~~ ~~valid (element)~~
PREEMPT & ABORT	LU_SCOPE ~~ELEMENT_SCOPE~~	valid	valid	valid	~~ignored~~ ~~valid (element)~~