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T E X A S

Date: 6 March 2000
To: T10 Technical Committee
From: Ralph O. Weber
Subject: SAM-2 Models for Multiple Port Devices

The January working group discussed the target device model figures for devices with multiple ports in SAM-2 revision 12. This document reviews that discussion and provides the basis for further discussions.

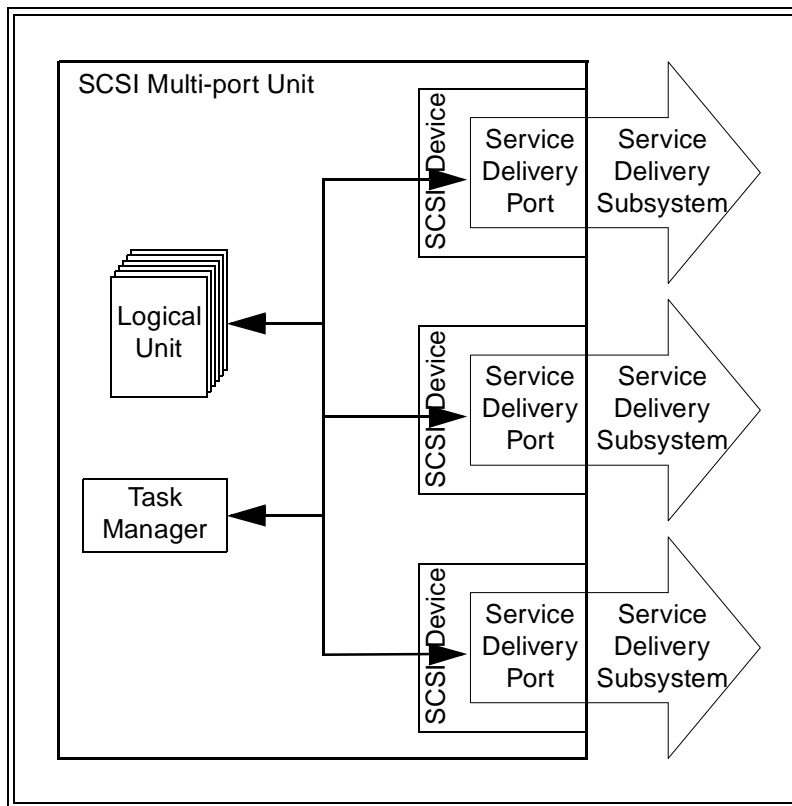Currently, the SAM-2 model for a target device with multiple ports is shown in figure 1.

Figure 1 — Current SAM-2 SMU target structure model

The broadly held concern from the January meeting is that this figure conflicts with other parts of SAM-2 that show the logical unit as part of the SCSI Device (see SAM-2 revision 12 figure 13, pdf page 45 in sam2r12.pdf). The boxes representing the SCSI Device should be drawn to include the logical units.

Figure 2 is figure 1 redrawn to have the SCSI Devices including the logical unit(s).
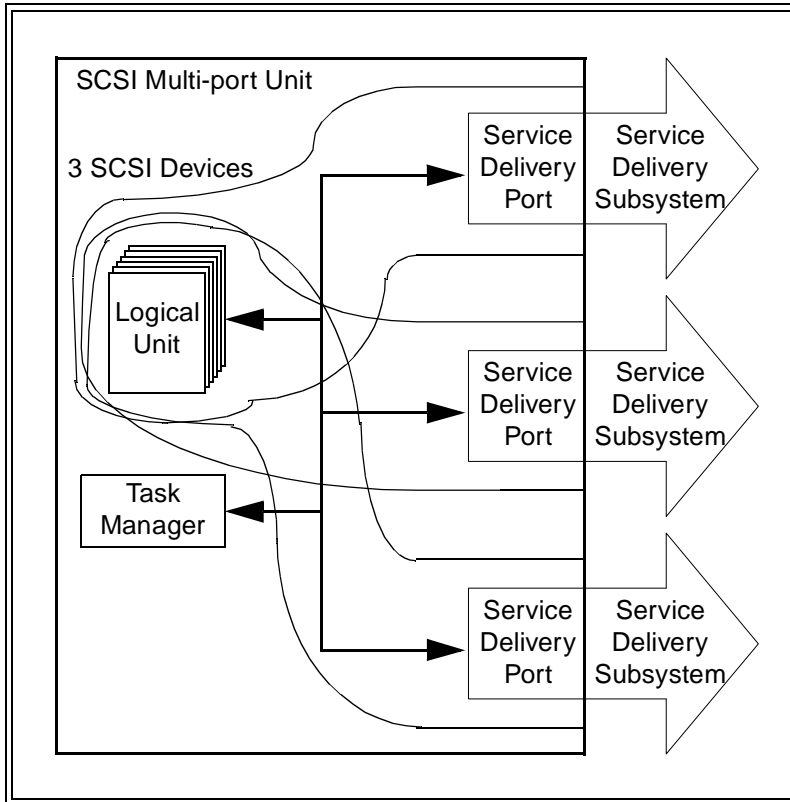

Figure 2 — SMU target structure model (with modified SCSI Device definition)

A more pervasive change (that has the interesting effect of making the figure simpler) would be to us the name "SCSI Device" in place of the name "SCSI Multi-port Unit".

Figure 3 shows the model with "SCSI Device" in the place of the name "SCSI Multi-port Unit".
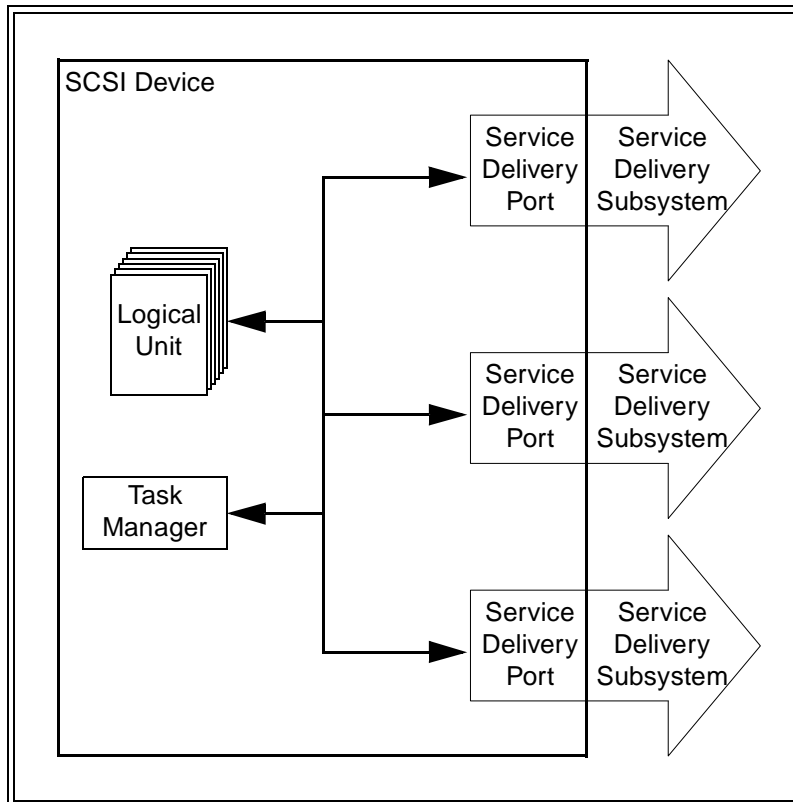

Figure 3 — SCSI Device Model for Multiple Port Devices

The following are examples of wording in the current SCSI documents that tend to support the use of the term "SCSI Device" as a description of devices with multiple ports:

3.1.55 media information: Information stored within an SCSI device, which is non-volatile (retained through a power cycle) and accessible to an initiator through the execution of SCSI commands. [sam2r12.pdf page 29]

4.11 Hierarchies of Dependent Logical Units -- The following sentence describing Figure 24 (an example hierarchy diagram) "One of the SCSI devices contains a dual ported SCSI bridge controller." [sam2r12.pdf page 56]

5.1.3 -- The SEND DIAGNOSTIC command provides a means to request that an SCSI device perform a self test. [spc2r15.pdf page 40]

The following are examples of wording in the current SCSI documents that may need revision if the term "SCSI Device" is expanded to encompass devices with multiple ports:

3.1.23 destination device: The SCSI device to which a service delivery transaction is addressed. See source device (3.1.93). [sam2r12.pdf page 28]

3.1.75 reset event: A protocol-specific event which may trigger a hard reset response from an SCSI device as described in 5.6.6. [sam2r12.pdf page 30]

3.1.78 SCSI device: A device that is connected to a service delivery subsystem and supports an SCSI appli-cation protocol. [sam2r12.pdf page 31]

3.1.79 SCSI device identifier: An address by which an SCSI device is referenced within a domain. Depending on the device model is use, the SCSI device identifier is either an Initiator Identifier or a Target Identifier (see 4.7.3). [sam2r12.pdf page 31]

3.1.93 source device: The SCSI device from which a service delivery transaction originates. See destination device (see 3.1.23). [sam2r12.pdf page 31]

3.1.97 target: An SCSI device which receives SCSI commands and directs such commands to one or more logical units for execution. [sam2r12.pdf page 32]

4.1-- As such, the model does not address other requirements which may be essential to some I/O system implementations such as the mapping from SCSI device addresses to network addresses, the procedure for discovering SCSI devices on a network and the definition of network authentication policies for SCSI initiators or targets. [sam2r12.pdf page 38] *This wording might be taken to mean that the relationships between the multiple ports in an SCSI Device might be subject to discovery.*

4.4 -- A domain is made up of SCSI devices and a service delivery subsystem, which transports commands and data. An SCSI device, in turn, may consist of logical units and so forth. [sam2r12.pdf page 41]

4.5 -- As described in 4.7, an SCSI Device originating a command is called an Initiator; an SCSI Device containing logical units that service commands is called a Target. [sam2r12.pdf page 43]

4.6 -- Each Service Delivery Port resides in one SCSI Device (see 4.7). [sam2r12.pdf page 43]

4.7 -- In the basic structural model, an SCSI Device (see figure 12) is composed of a Service Delivery Port (see 4.6) combined with an Initiator, or a Target, or both an Initiator and a Target. [sam2r12.pdf page 45]

4.7.1 -- An Initiator Identifier is a field containing up to 64 bits that is a SCSI device identifier for the initiator device. [sam2r12.pdf page 46]

4.7.2 -- A Target Identifier is a field containing up to 64 bits that is a SCSI device identifier for the target device. [sam2r12.pdf page 46]

4.7.3 SCSI device identifier -- SCSI Device Identifier is the object name used to represent either an Initiator Identifier when the SCSI Device implements the initiator model or a Target Identifier when the SCSI Device implements the target model. SCSI Device Identifier is used when either initiator or target model might be applicable or when other context in the description identifies the initiator or target usage. [sam2r12.pdf page 46]

4.10 Devices With Multiple Service Delivery Ports *Clearly there are several changes required in this clause, but they should not affect the choice to expand the definition of SCSI Device.* [sam2r12.pdf pages 50 to 55]

5.6.4.1 Asynchronous Event Reporting -- Each SCSI protocol specification shall describe a mechanism for Asynchronous Event Reporting, including a procedure whereby an SCSI device can selectively enable or disable asynchronous event reports from being sent to it by a specific target. [sam2r12.pdf page 78]

3.1.27 initiator: An SCSI device containing application clients that originate device service requests to be processed in a device server. A detailed definition of an initiator may be found in SAM-2. [spc2r15.pdf page 30]

3.1.52 target: An SCSI device containing logical units that receive and execute commands from an initiator. A detailed definition of a target may be found in SAM-2. [spc2r15.pdf page 32]

5.4.2 -- An initiator may establish registrations for multiple logical units in a SCSI device using any combination of unique or duplicate keys. [spc2r15.pdf page 48]

7.15 -- The READ BUFFER command (see table 85) is used in conjunction with the WRITE BUFFER command as a diagnostic function for testing memory in the SCSI device and the integrity of the service delivery subsystem. [spc2r15.pdf page 140]

7.21 -- A SCSI device that is capable of supporting a LUN address other than zero shall support the REPORT LUNS command on logical unit zero. [spc2r15.pdf page 156]

7.28 -- The WRITE BUFFER command (see table 123) is used in conjunction with the READ BUFFER command as a diagnostic function for testing logical unit memory in the target SCSI device and the integrity of the service delivery subsystem. [spc2r15.pdf page 185]

Only SAM-2 and SPC-2 were inspected to prepare this list. Not all the occurrences of "SCSI Device" are covered by the above lists. "SCSI Device" appears many other times in SAM-2 and SPC-2, but their relationship to the issues in this document was ambiguous.

Another concern with the model for devices multiple ports relates to whether different views of the logical units can be accessible through different ports. As figure 4 shows, minor changes are required in figure 2 to accommodate the "different logical units" concept.
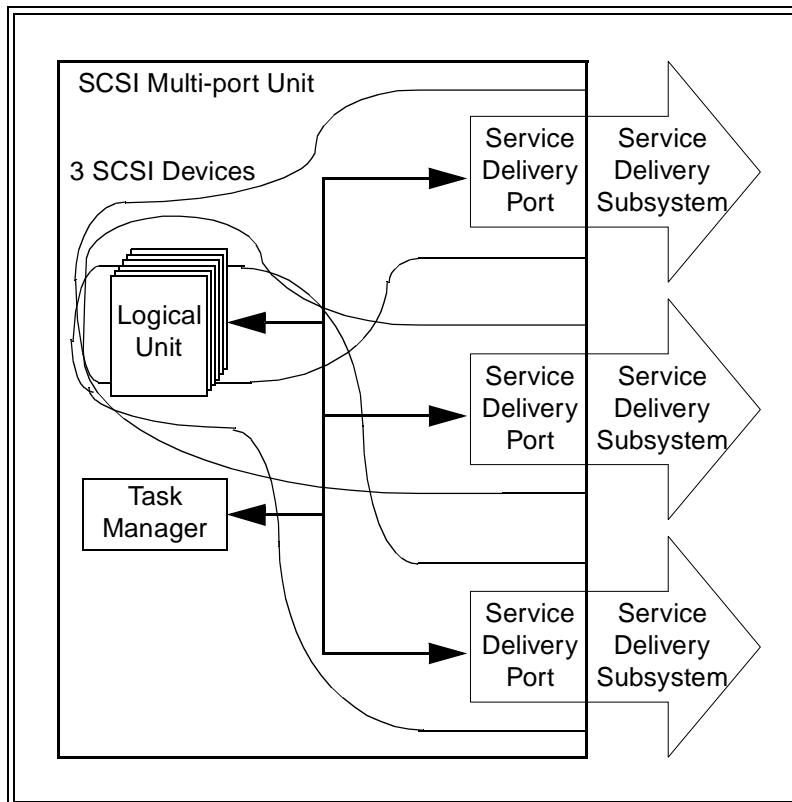

Figure 4 — SMU target structure model (with different LU views at different ports)

This document is not a final proposal and additional work will be required to write a proposal. Advice is sought from the SCSI Working Group regarding the material to be included in a proposal for changes in the SAM-2 model for devices with multiple ports.