

T10/01-172 revision 4

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To: T10 Committee (SCSI)

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Subject: SRP to SAM-2 Protocol

I suggest you make this a normative annex A. The annex starts on the next page.

Annex A

(normative)

SRP interface protocol and services

A.1 Service interface protocol

This standard describes a SCSI device's behavior in terms of functional levels, service interfaces between levels and peer-to-peer protocols. For a full description of the model used in this standard see the SCSI Architecture Model-2 Standard. Figure A.1 shows the model as it appears from the point of view of this standard.

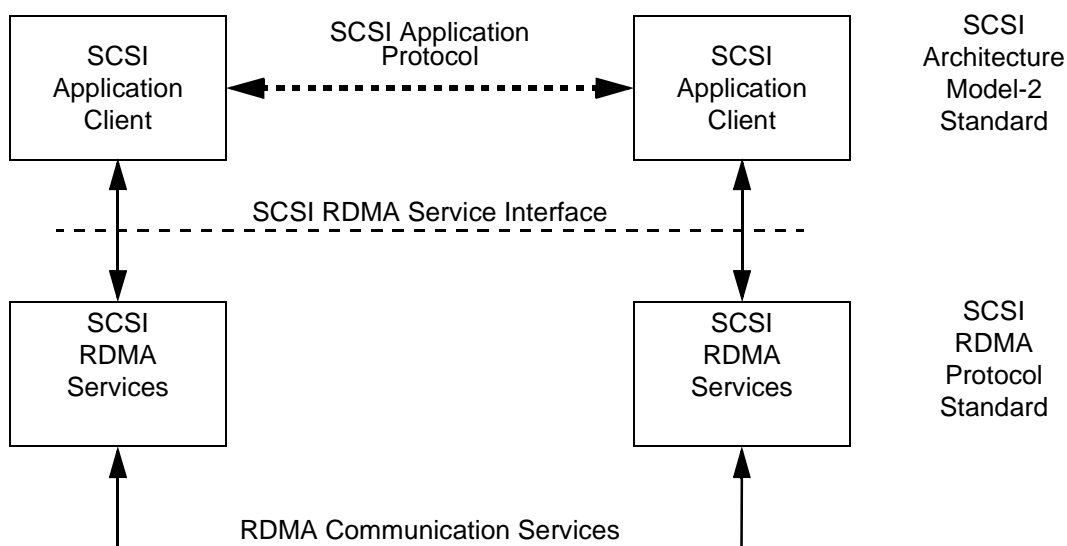


Figure A.1 - SCSI RDMA Protocol reference mode

Services between service levels are either four step confirmed services or two step confirmed services. A four step confirmed service consists of a service request, indication, response, and confirmation. A two step confirmed service consists of a service request and confirmation.

Figure A.2 shows the service and protocol interactions for a four step confirmed service.

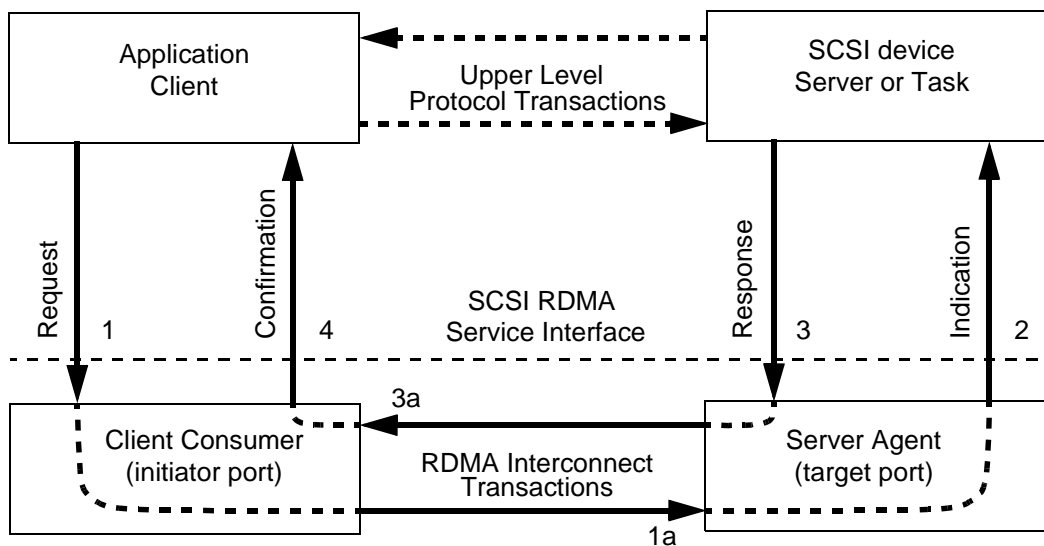


Figure A.2 - Model for a four step confirmed service

The SCSI RDMA four step confirmed service protocol consists of the following interactions:

- 1) A request to the client consumer to invoke a service;
- 2) An indication from the server agent notifying the SCSI device server or task manager of an event;
- 3) A response from the SCSI device server or task manager in reply to an indication;
- 4) A confirmation from the client consumer upon service completion.

Only application clients shall request a four step confirmed service be invoked.

Figure A.3 shows the service and protocol interactions for a two step confirmed service.

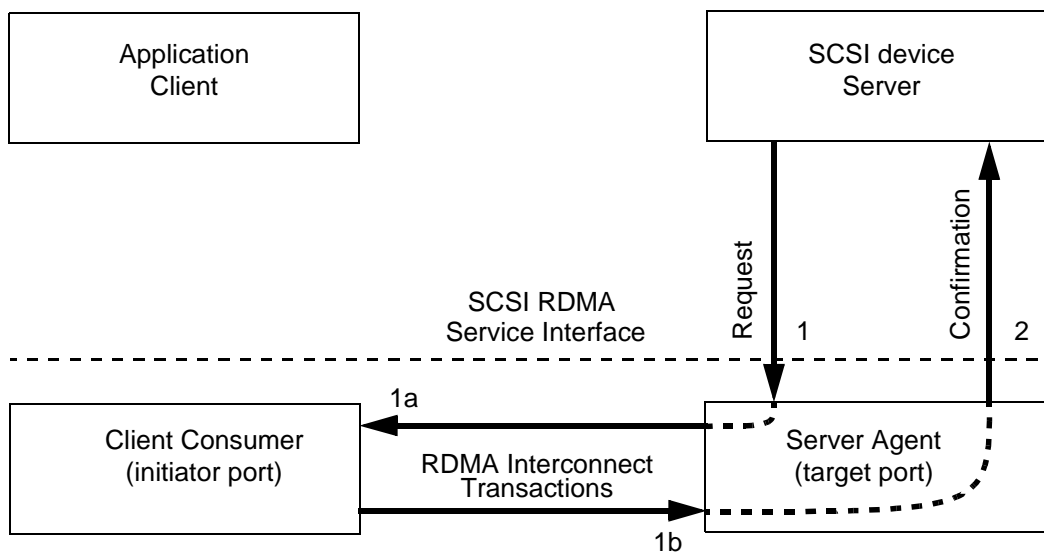


Figure A.3 - Model for a two step confirmed service

The SCSI RDMA two step confirmed service interface consists of the following interactions:

- 1) A request to the server agent to invoke a service;
- 2) A confirmation from the server agent upon service completion.

Only SCSI device servers shall request a two step confirmed service be invoked.

A.2 SRP services

SRP provides services to enable an application client to request and manage tasks (see SCSI Architecture Model-2 Standard) and to enable a device server to receive commands and move data to and from an application client. The SRP services are described in terms of the services the SCSI initiator port and SCSI target port provide.

A.3 Procedure objects

See table A.1 for a list of the procedure objects used when passing services across the SRP service interface. See table A.1 for the definitions of the names used within this standard and the equivalent SCSI Architecture Model-2 Standard names of the procedure objects, the name of the standard where the objects are defined, the standard where the binary contents of the objects are defined, and the routing of the objects. The routing shows:

- a) the source of the object
- b) the final destination of the object, and
- c) the routing of the object.

Table A.1 - SAM-2 Procedure objects

Procedure Object	Standard where object format defined	Object routing
application client buffer offset	SAM-2	DS → targ → init
data-out buffer size	SAM-2	AC → init
data-in buffer size	SAM-2	AC → init
command descriptor block	SAM-2/cmd ^a	AC → init → targ → DS
data-in buffer	cmd ^b	DS → targ → init → AC
data-out buffer	cmd ^b	AC → init → targ → DS
device server buffer	cmd ^b	DS → targ → init
I_T_L_x nexus	this standard	AC → init → targ → DS or AC → init → targ → TM or DS → targ → init
request byte count	SAM-2	DS → targ
service response	this standard ^c	DS → targ → init → AC or targ → DS
autosense request	SAM-2	AC → init → targ → DS
sense data	SPC-2	DS → targ → init → AC
status	SAM-2	DS → targ → init → AC
task attribute	this standard	AC → init → targ → DS
Key: AC=application client, cmd=SCSI command standards, DS=device server, init=initiator port, SAM-2=SCSI Architecture Model-2 Standard, TM=task manager, targ=target port		
^a The portions not defined in the SCSI Architecture Model-2 Standard are defined in the SCSI command standards (e.g., SCSI-3 Block Commands Standard, SCSI Primary Commands-2 Standard). ^b Parameter lists are defined within one of the SCSI command standards (e.g., SCSI-3 Block Commands Standard, SCSI Primary Commands-2 Standard). SCSI standards do not define non-parameter list information. ^c The SERVICE DELIVERY OR TARGET FAILURE value of the service response is not defined in SCSI.		

A.4 Application client SCSI command services

A.4.1 Application client SCSI command services overview

The SCSI command services shall be requested by the application client using a procedure call defined as:

Execute Command (IN (I_T_L_x nexus, command descriptor block, [task attribute], [data-in buffer size], [data-out buffer], [data-out buffer size], autosense request), OUT ([data-in buffer], [sense data], status, service response))

A.4.2 Send SCSI command service

The send SCSI command service is a four step confirmed service (see figure A.2) that provides the means

to transfer a command data block to a device server.

Processing the execute command procedure call for a send SCSI command service shall be composed of the four step confirmed service shown in table A.2.

Table A.2 - Processing of execute command procedure call for a send SCSI command service

Step (step number) ^a	Source/ Destination	Protocol service name	SCSI Protocol Service Interface procedure calls
request (1)	application client to client consumer	send SCSI command request	Send SCSI command (IN (I_T_L_x nexus, command descriptor block, [task attribute], [data-in buffer size], [data-out buffer], [data-out buffer size], autosense request))
information unit transfer (1a)	client consumer to server agent	SRP_CMD IU or SRP_Task_Management IU	See 5x7 and 5x6
indication (2)	server agent to device server	send SCSI command indication	SCSI command received (IN (I_T_L_x nexus, command descriptor block, [task attribute], autosense request))
If the send SCSI command requires a data transfer see A.5.2 for data-in delivery services and A.5.3 for data-out delivery services			
response (3)	device server to server agent	send SCSI command response	Send command complete (IN (I_T_L_x nexus, [sense data], status, service response))
information unit transfer (3a)	server agent to client consumer	SRP_RSP IU	See 5x8
confirmation (4)	client consumer to application client	send SCSI command confirmation	Command complete received (IN (I_T_L_x nexus, [data-in buffer], [sense data], status, service response))
^a See figure A.2 for step number			

A.5 Device server SCSI command services

A.5.1 Device server SCSI command services overview

The SCSI data buffer movement services shall be requested from the device server using a procedure call defined as:

Move data buffer (IN (I_T_L_x nexus, device server buffer, application client buffer offset, request byte count)).

Either data-in delivery, data-out delivery, both data-in and data-out delivery, or neither data delivery may be used while processing one command. If both are used, the device server shall combine the data-in and data-out service responses into one service response.

A.5.2 Data-in delivery service

The data-in delivery service is a two step confirmed service (see figure A.3) that provides the means to transfer a parameter list or data from a device server to a SCSI initiator port.

Processing the execute command procedure call for a data-in delivery service shall be composed of the two step confirmed service shown in table A.3.

Table A.3 - Processing of execute command procedure call for a data-in delivery service

Step (step number) ^a	Source/ Destination	Protocol service name	SCSI Protocol Service Interface procedure call
request (1)	device server to server agent	data-in delivery request	Send data-in (IN (I_T_L_x nexus, device server buffer, application client buffer offset, request byte count))
data-in transfer (1a and 1b)	server agent to client consumer	RDMA data-in transfer	See 4x1.
confirmation (2)	server agent to device server	data-in delivery confirmation	Data-In delivered (IN (I_T_L_x nexus))
^a See figure A.3 for step number			

A.5.3 Data-out delivery service

The data-out delivery service is a two step confirmed service (see figure A.3) that provides the means to transfer a parameter list or data from a SCSI initiator port to a device server.

Processing the execute command procedure call for a data-out delivery service shall be composed of the two step confirmed service shown in table A.4.

Table A.4 - Processing of execute command procedure call for a data-out delivery service

Step (step number) ^a	Source/ Destination	Protocol service name	SCSI Protocol Service Interface procedure call
request (1)	device server to server agent	data-out delivery request	Receive data-out (IN (I_T_L_x nexus, application client buffer offset, request byte count, device server buffer))
data-out transfer (1a and 1b)	server agent to client consumer	RDMA data-out transfer	See 4x1.
confirmation (2)	server agent to device server	data-out delivery confirmation	Data-out received (IN (I_T_L_x nexus))
^a See figure A.3 for step number			

A.6 Task management services

A.6.1 Task management functions overview

The task management services shall be requested from the application client using a procedure call defined as:

Function name (IN (nexus), service response)

A.6.2 Task management functions

This standard handles task management functions as a four step confirmed service that provides the means to transfer task management functions to a task manager.

The task management functions are defined in the SCSI Architecture Model-2 Standard. This standard defines the actions taken by the SRP services to carry out the requested task management functions.

A.6.3 ABORT TASK

The SRP services request the SCSI initiator port issue an SRP_TASK_MGMT information unit with a TASK MANAGEMENT FLAGS field set to indicate an ABORT TASK function (see xxx) to be sent to the selected SCSI device.

A.6.4 ABORT TASK SET

The SRP services request the SCSI initiator port issue an SRP_TASK_MGMT information unit with a TASK MANAGEMENT FLAGS field set to indicate an ABORT TASK SET function (see xxx) to be sent to the selected SCSI device.

A.6.5 CLEAR ACA

The SRP services request the SCSI initiator port issue an SRP_TASK_MGMT information unit with a TASK MANAGEMENT FLAGS field set to indicate an CLEAR ACA function (see xxx) to be sent to the selected SCSI device.

A.6.6 CLEAR TASK SET

The SRP services request the SCSI initiator port issue an SRP_TASK_MGMT information unit with a TASK MANAGEMENT FLAGS field set to indicate an CLEAR TASK SET function (see xxx) to be sent to the selected SCSI device.

A.6.7 LOGICAL UNIT RESET

The SRP services request the SCSI initiator port issue an SRP_TASK_MGMT information unit with a TASK MANAGEMENT FLAGS field set to indicate an LOGICAL UNIT RESET function (see xxx) to be sent to the selected SCSI device.