

To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: T10/02-404r2 SAM-3 Sense Data Length for Execute Command

Revision history

Revision 0 (9 October 2002) first revision

Revision 1 (6 November 2002) Incorporated comments from November CAP WG.

Revision 2 (20 January 2003) Incorporated comments from January CAP WG.

Related documents

sam3r03 - SCSI Architecture Model - 3 revision 3

spc3r09 - SCSI Primary Commands - 3 revision 9

sas-r02a - Serial Attached SCSI revision 2a

Overview

SCSI commands return variable length sense data, especially with the new long sense data format. Although the data is self-describing, there is no guarantee that all the sense data arrive successfully. However, the Execute Command () RPC just returns [Sense Data] without indicating its length; such a field should be added.

Suggested changes to SAM-3

5.1 The Execute Command remote procedure

An application client requests the processing of a SCSI command by invoking the SCSI transport protocol services described in 5.4, the collective operation of which is conceptually modeled in the following remote procedure:

Service response =Execute Command (
IN (I_T_L_x Nexus, CDB, [Task Attribute], [Data-In Buffer Size], [Data-Out Buffer],
[Data-Out Buffer Size], [Autosense Request], [Command Reference
Number]),
OUT ([Data-In Buffer], [Sense Data], [Sense Data Length], Status))

Input Arguments:

I_T_L_x Nexus: Either an I_T_L nexus or an I_T_L_Q nexus (see 4.11).

CDB: Command descriptor block (see 5.2).

Task Attribute: A value specifying one of the task attributes defined in 8.5. This argument shall not be specified for an untagged command or the second and subsequent commands in a sequence of linked commands. Untagged tasks shall implicitly have the SIMPLE attribute. The attribute of a task that processes linked commands shall be set according to the Task Attribute argument specified for the first command in the sequence.

Data-In Buffer Size: The number of bytes available for data transfers to the Data-In Buffer (see 5.4.3).

Data-Out Buffer: A buffer containing command specific information to be sent to the logical unit, such as data or parameter lists needed to service the command. The buffer size is indicated by the Data-Out Buffer Size argument. The content of the Data-Out Buffer shall not change during the lifetime of the command (see 5.5) as viewed by the application client.

Data-Out Buffer Size: The number of bytes available for data transfers from the Data-Out Buffer (see 5.4.3).

Autosense Request: An argument requesting the automatic return of sense data by means of the autosense mechanism specified in 5.9.4.3. It is not an error for the application client to provide this argument when autosense is not supported by the SCSI transport protocol or logical unit. SCSI transport protocols may require that the Autosense Request argument always request automatic return of the sense data.

Command Reference Number (CRN): When this argument is used, all sequential commands of an I_T_L nexus shall include a CRN argument that is incremented by one. The CRN shall be set to one for each I_T_L nexus involving the SCSI port after the SCSI port receives a hard reset or detects I_T nexus loss. The CRN shall be set to one after it reaches the maximum CRN value supported by the protocol. The CRN value zero shall be reserved for use as defined by the SCSI transport protocol. It is not an error for the application client to provide this argument when CRN is not supported by the SCSI transport protocol or logical unit.

Output Arguments:

Data-In Buffer: A buffer to contain command specific information returned by the logical unit by the time of command completion. The Execute Command RPC shall not return a status of GOOD, CONDITION MET, INTERMEDIATE, or INTERMEDIATE-CONDITION MET unless the buffer contents are valid. The application client shall not assume that the buffer contents are valid unless the command completes with a status of GOOD, CONDITION MET, INTERMEDIATE, or INTERMEDIATE-CONDITION MET. While some valid data may be present for other values of status, the application client should obtain additional information from the logical unit, such as sense data, to determine the state of the buffer contents. If the command ends with a service response of SERVICE DELIVERY OR TARGET FAILURE, the application client shall consider this parameter to be undefined.

Sense Data: A buffer to contain sense data returned by means of the autosense mechanism (see 5.9.4.3). The buffer length is indicated by the Sense Data Length field. If the command ends with a service response of SERVICE DELIVERY OR TARGET FAILURE, the application client shall consider this parameter to be undefined.

Sense Data Length: The length in bytes of the Sense Data.

Status: A one-byte field containing command completion status (see 5.3). If the command ends with a service response of SERVICE DELIVERY OR TARGET FAILURE, the application client shall consider this parameter to be undefined.

Service Response assumes one of the following values:

TASK COMPLETE: A logical unit response indicating that the task has ended. The status parameter shall have one of the values specified in 5.3 other than INTERMEDIATE or INTERMEDIATE-CONDITION MET.

LINKED COMMAND COMPLETE: Logical unit responses indicating that the task has not ended and that a linked command has completed successfully. As specified in 5.3, the status parameter shall have a value of INTERMEDIATE or INTERMEDIATE-CONDITION MET.

SERVICE DELIVERY OR TARGET FAILURE: The command has been ended due to a service delivery failure (see 3.1.115) or SCSI target device malfunction. All output parameters are invalid.

The actual SCSI transport protocol events corresponding to a response of TASK COMPLETE, LINKED COMMAND COMPLETE or SERVICE DELIVERY OR TARGET FAILURE shall be specified in each SCSI transport protocol standard.

An application client requests processing of a linked command by setting the LINK bit to one in the CDB CONTROL byte as specified in 5.2.3. The task attribute is determined by the Task Attribute argument specified for the first command in the sequence. Upon receiving a response of LINKED COMMAND COMPLETE, an application client may issue the next command in the series through an Execute Command remote procedure call having the same I_T_L_x nexus and omitting the Task Attribute argument. If the logical unit receives the next command in a series of

linked commands before completing the current command in that linked command series, the overlapped command condition described in 5.9.2 shall result.

5.4.1 Overview

The SCSI transport protocol services that support the **Execute Command** remote procedure call are described in 5.4. Two groups of SCSI transport protocol services are described. The SCSI transport protocol services that support the request and confirmation for the **Execute Command** remote procedure call are described in 5.4.2. The SCSI transport protocol services that support the data transfers associated with processing a SCSI command are described in 5.4.3.

5.4.2 Execute Command request/confirmation SCSI transport protocol services

All SCSI transport protocol standards shall define the SCSI transport protocol specific requirements for implementing the **Send SCSI Command** SCSI transport protocol service request and the **Command Complete Received** confirmation. Support for the **SCSI Command Received** indication and **Send Command Complete** response by a SCSI transport protocol standard is optional. All SCSI I/O systems shall implement these SCSI transport protocols as defined in the applicable SCSI transport protocol specification.

SCSI Transport Protocol Service Request:

Send SCSI Command (IN (I_T_L_x Nexus, CDB, [Task Attribute], [Data-In Buffer Size], [Data-Out Buffer], [Data-Out Buffer Size], [Autosense Request], [Command Reference Number]))

Input Arguments:

I_T_L_x Nexus: Either an I_T_L nexus or an I_T_L_Q nexus (see 4.11).

CDB: Command descriptor block (see 5.2).

Task Attribute: A value specifying one of the task attributes defined in 8.5. For specific requirements on the Task Attribute argument see 5.1.

Data-In Buffer Size: The number of bytes available for data transfers to the Data-In Buffer (see 5.4.3).

Data-Out Buffer: A buffer containing command specific information to be sent to the logical unit, such as data or parameter lists needed to service the command (see 5.1). The content of the Data-Out Buffer shall not change during the lifetime of the command (see 5.5) as viewed by the application client.

Data-Out Buffer Size: The number of bytes available for data transfers from the Data-Out Buffer (see 5.4.3).

Autosense Request: An argument (see 5.1) requesting the automatic return of sense data by means of the autosense mechanism specified in 5.9.4.3.

Command Reference Number (CRN): When this argument is used, all sequential commands of an I_T_L nexus shall include a CRN argument that is incremented by one (see 5.1).

SCSI Transport Protocol Service Indication:

SCSI Command Received (IN (I_T_L_x Nexus, CDB, [Task Attribute], [Autosense Request], [Command Reference Number]))

Input Arguments:

I_T_L_x Nexus: Either an I_T_L nexus or an I_T_L_Q nexus (see 4.11).

CDB: Command descriptor block (see 5.2).

Task Attribute: A value specifying one of the task attributes defined in 8.5. For specific requirements on the Task Attribute argument see 5.1.

Autosense Request: This parameter is only present if the **Autosense Request** parameter was specified in the **Send SCSI Command** call and autosense delivery is supported by the SCSI transport protocol and logical unit.

Command Reference Number (CRN): When this argument is used, all sequential commands of an I_T_L nexus shall include a CRN argument that is incremented by one (see 5.1).

SCSI Transport Protocol Service Response (from device server):

Send Command Complete (IN (I_T_L_x Nexus, [Sense Data], Sense Data Length, Status, Service Response))

[Editor's note: another SAM-3 proposal requiring autosense changes "[Sense Data]" to "Sense Data" (optional to mandatory). After that proposal is incorporated, [Sense Data Length] should also be made mandatory.]

Input Arguments:

I_T_L_x Nexus: Either an I_T_L nexus or an I_T_L_Q nexus (see 4.11).

Sense Data: Autosense data. If present, this argument instructs the SCSI target port to return the autosense data information to the SCSI initiator port automatically (see 5.9.4.3).

Sense Data Length: The length in bytes of the Sense Data to be returned to the application client.

Status: Command completion status (see 5.1).

Service Response: Possible service response information for the command (see 5.1).

SCSI Transport Protocol Service Confirmation:

Command Complete Received (IN (I_T_L_x Nexus, [Data-In Buffer], [Sense Data], Sense Data Length, Status, Service Response))

Input Arguments:

I_T_L_x Nexus: Either an I_T_L nexus or an I_T_L_Q nexus (see 4.11).

Data-In Buffer: A buffer containing command specific information returned by the logical unit on command completion (see 5.1).

Sense Data: Autosense data (see 5.9.4.3).

Sense Data Length: The length in bytes of the received Sense Data.

Status: Command completion status (see 5.1).

Service Response: Service response for the command (see 5.1).