

To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 17 July 2006
Subject: 06-264r2 SPC-4 REQUEST SENSE parameter data clarifications

Revision history

Revision 0 (2 June 2006) First revision.

Revision 1 (6 June 2006) Incorporated two more mentions of returning GOOD status after mentioning returning the parameter data.

Revision 2 (17 July 2006) Incorporated comments from July 2006 CAP WG.

Related documents

spc4r04 - SCSI Primary Commands - 4 (SPC-4) revision 4

Overview

1. The REQUEST SENSE command deals with two kinds of sense data:

- a) sense data returned as parameter data, if the command is terminated with GOOD status; and
- b) sense data returned as autosense data (i.e., sense data returned in the same I_T_L_Q nexus transaction), if the command is terminated with CHECK CONDITION status.

Some of the descriptions should be improved so a reader doesn't think, for example, that if there is no sense data to return, REQUEST SENSE is terminated with CHECK CONDITION status and returns sense data with a sense key of NO SENSE. It is supposed to return GOOD status and return parameter data containing sense data containing a sense key of NO SENSE.

2. In the CDB, it is unclear what happens when the DESC bit is set to one if the descriptor format is not supported. There are two plausible results:

- a) Return fixed format sense data. This is what a logical unit compliant with SPC-2 that does not check reserved fields would do. Since the sense data header indicates the format of the data, applications understand it.
- b) Return CHECK CONDITION/ILLEGAL REQUEST/INVALID FIELD IN CDB. This is what a logical unit compliant with SPC-2 that checks reserved fields would do.

Since the general SCSI convention seems to be that unsupported values in defined fields result in CHECK CONDITION status rather than be silently ignored, that behavior is proposed for SPC-4 compliant logical units.

3. For a logical unit that reports a peripheral qualifier of 000b in its standard INQUIRY data because the device server is unable to determine whether or not a peripheral device is connected, a sense key of NO SENSE is specified but no additional sense code is mentioned. This proposal adds specification of the additional sense code NO ADDITIONAL SENSE DATA (i.e., 00h/00h).

4. The access control description is not clear about whether a REQUEST SENSE from an I_T nexus without access that would have returned GOOD status with parameter data containing NO SENSE is supposed to be terminated with CHECK CONDITION status with the specified replacement sense key, or still return GOOD status with the specified replacement sense key. CHECK CONDITION seems like a better fit.

Suggested changes

3.1.103 sense data: Data describing an error or exceptional condition that a device server delivers to an application client in the same I_T_L_Q nexus transaction (see 3.1.45) as a CHECK CONDITION status or [as parameter data](#) in response to a REQUEST SENSE command (see 6.27). The format of sense data is defined in 4.5.

4.5 Sense data

4.5.1 Sense data introduction

Sense data shall be returned in the same I_T_L_Q nexus transaction (see 3.1.45) as a CHECK CONDITION status and as parameter data in response to the REQUEST SENSE command (see 6.27). Sense data returned in the same I_T_L_Q nexus transaction as a CHECK CONDITION status shall be either fixed or

descriptor format sense data format based on the value of the D_SENSE bit in the Control mode page (see 7.4.6). The REQUEST SENSE command may be used to request either the fixed format sense data or the descriptor format sense data.

6.27 REQUEST SENSE command

The REQUEST SENSE command (see table 171) requests that the device server transfer [parameter data containing](#) sense data to the application client.

Table 171 — REQUEST SENSE command

Byte\Bit	7	6	5	4	3	2	1	0
0	OPERATION CODE (03h)							
1	Reserved							DESC
2	Reserved							
3	Reserved							
4	ALLOCATION LENGTH							
5	CONTROL							

The descriptor format (DESC) bit ([see table 172](#)) specifies which sense data format [the device server](#) shall be returned [in the parameter data](#). ~~If DESC is set to zero, fixed format sense data (see 4.5.3) shall be returned. If DESC is set to one and descriptor format sense data (see 4.5.2) is supported, descriptor format sense data shall be returned.~~

Table 172 — DESC bit

<u>Code</u>	<u>Descriptor format sense data supported?</u>	<u>Description</u>
<u>0</u>	<u>yes or no</u>	<u>The device server shall return fixed format sense data (see 4.5.3) in the parameter data</u>
<u>1</u>	<u>yes</u>	<u>The device server shall return descriptor format sense data (see 4.5.2) in the parameter data</u>
	<u>no</u>	<u>The device server shall return no parameter data and terminate the REQUEST SENSE command with CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and the additional sense code set to INVALID FIELD IN CDB</u>

The ALLOCATION LENGTH field is defined in 4.3.4.6. Application clients should request 252 bytes of sense data to ensure they retrieve all the sense data. If fewer than 252 bytes are requested, sense data may be lost since the REQUEST SENSE command with any allocation length clears the sense data.

Sense data shall be available and cleared under the conditions defined in SAM-3. If the device server has no ~~other~~ sense data available to return, it shall return:

- 1) [parameter data containing sense data with](#) the sense key set to NO SENSE and the additional sense code set to NO ADDITIONAL SENSE INFORMATION; [and](#)
- 2) [GOOD status for the REQUEST SENSE command](#).

If the logical unit is in a power condition ([see 5.9](#)), other than the active power condition when a REQUEST SENSE command is received and there is no ACA condition, it shall return:

- 1) [parameter data containing sense data with](#) the sense key set to NO SENSE and the additional sense code set to one of the following:
 - A) LOW POWER CONDITION ON if the reason for entry into the power condition is unknown;

- B) IDLE CONDITION ACTIVATED BY TIMER if the logical unit entered the idle power condition due to the idle condition timer (see 7.4.12);
- C) STANDBY CONDITION ACTIVATED BY TIMER if the logical unit entered the standby power condition due to the standby condition timer (see 7.4.12);
- D) IDLE CONDITION ACTIVATED BY COMMAND if the logical unit entered the idle power condition due to receipt of a command requiring the idle power condition while it was in the standby power condition; or
- E) Another additional sense code based on requirements specified in a command standard (see 3.1.17);

and

2) GOOD status for the REQUEST SENSE command.

On completion of the REQUEST SENSE command, the logical unit shall return to the same power condition that was active before the REQUEST SENSE command was received. A REQUEST SENSE command shall not reset any power condition timers.

The device server shall return CHECK CONDITION status for a REQUEST SENSE command only to report exception conditions specific to the REQUEST SENSE command itself. [join paragraphs] Examples of conditions that cause a REQUEST SENSE command to return a CHECK CONDITION status are:

- a) An invalid field value is detected in the CDB;
- b) The device server does not support the REQUEST SENSE command (see 4.3.1);
- c) An unrecovered error is detected by the service delivery subsystem; or
- d) A malfunction prevents return of the sense data.

If a device server returns CHECK CONDITION status for a REQUEST SENSE command, any parameter data containing sense data that was transferred is invalid.

If a REQUEST SENSE command is received on an I_T nexus with a pending unit attention condition (i.e., before the device server reports CHECK CONDITION status) and there is an exception condition specific to the REQUEST SENSE command itself, then the device server shall not clear the pending unit attention condition (see SAM-3).

If a recovered error occurs during the processing of the REQUEST SENSE command, the device server shall return: ~~the sense data with GOOD status. If a device server returns CHECK CONDITION status for a REQUEST SENSE command, all sense data may be invalid.~~

- 1) parameter data containing sense data with the sense key set to RECOVERED ERROR; and
- 2) GOOD status for the REQUEST SENSE command.

In response to a REQUEST SENSE command issued to a logical unit that reports a peripheral qualifier of 011b in its standard INQUIRY data (see 6.4.2), the device server shall return: ~~GOOD status and parameter data that contains sense data. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to LOGICAL UNIT NOT SUPPORTED.~~

- 1) parameter data containing sense data with the sense key set to ILLEGAL REQUEST and the additional sense code set to LOGICAL UNIT NOT SUPPORTED; and
- 2) GOOD status for the REQUEST SENSE command.

In response to a REQUEST SENSE command issued to a logical unit that reports a peripheral qualifier of 001b in its standard INQUIRY data, the device server shall return: ~~GOOD status and parameter data that contains sense data. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to LOGICAL UNIT NOT SUPPORTED.~~

- 1) parameter data containing sense data with the sense key set to ILLEGAL REQUEST and the additional sense code set to LOGICAL UNIT NOT SUPPORTED; and
- 2) GOOD status for the REQUEST SENSE command.

In response to a REQUEST SENSE command issued to a logical unit that reports a peripheral qualifier of 000b in its standard INQUIRY data because it has a peripheral device connected but is not ready for access,

the device server shall return: ~~GOOD status and parameter data that contains sense data appropriate to the condition that is making the logical unit not operational;~~

- 1) [parameter data containing sense data appropriate to the condition that is making the logical unit not operational;](#) and
- 2) [GOOD status for the REQUEST SENSE command.](#)

In response to a REQUEST SENSE command issued to a logical unit that reports a peripheral qualifier of 000b in its standard INQUIRY data because the device server is unable to determine whether or not a peripheral device is connected, the device server shall return: ~~GOOD status and parameter data that contains sense data with the sense key set to NO SENSE.~~

- 1) [parameter data containing sense data with the sense key set to NO SENSE and the additional sense code set to NO ADDITIONAL SENSE INFORMATION;](#) and
- 2) [GOOD status for the REQUEST SENSE command.](#)

Device servers shall return at least 18 bytes of parameter data in response to a REQUEST SENSE command if the allocation length is 18 or greater and the DESC bit is set to zero. Application clients may determine how much sense data has been returned by examining the ALLOCATION LENGTH field in the CDB and the ADDITIONAL SENSE LENGTH field in the sense data. Device servers shall not adjust the additional sense length to reflect truncation if the allocation length is less than the sense data available.

7.4.11 Informational Exceptions Control mode page

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Table 173 — Method of reporting informational exceptions (MRIE) field

Code	Description
6h	Only report informational exception condition on request: The device server shall preserve the informational exception(s) information. To find out about information exception conditions the application client polls the device server by issuing a REQUEST SENSE command. In the parameter data containing sense data, the The sense key shall be set to NO SENSE and the additional sense code shall indicate the cause of the informational exception condition.

8.3.1.7 Verifying access rights

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If the initiator port is in the pending-enrolled state (see 8.3.1.5.1.4) under an AccessID, the ACL contains an ACE containing that AccessID as an access identifier, and that ACE includes a LUACD with LUN value matching the addressed LUN, then commands shall be processed as follows:

- a) INQUIRY, REPORT LUNS, ACCESS CONTROL OUT and ACCESS CONTROL IN commands shall be processed as if access controls were not present;
- b) A REQUEST SENSE command [\(see 6.27\)](#) shall be processed as if access controls were not present ~~as described in 6.27~~, except in ~~the case cases~~ where [parameter data containing sense data with](#) a sense key set to NO SENSE would be returned [\(see 6.27 and table 173 in 7.4.11\)](#). In ~~this case~~ [these cases](#), the ~~REQUEST SENSE command shall return~~ [device server shall terminate the REQUEST SENSE command with CHECK CONDITION status, with](#) the sense key set to ILLEGAL REQUEST and the additional sense code set to ACCESS DENIED - INITIATOR PENDING-ENROLLED; and
- c) Any other command shall be terminated with CHECK CONDITION status, with the sense key set to ILLEGAL REQUEST, and the additional sense code set to ACCESS DENIED - INITIATOR ENDING-ENROLLED.