

To: T10 Technical Committee
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Subject: MSC Management commands proposal

Revision History

Revision 0 (January 16, 2002) first revision

Related Documents

01-095r1 – SCSI Management Server Commands (MSC) Project Proposal
Others as needed

Overview

The MSC project (1528-D) proposal (Rob Elliot of Compaq) proposes a new set of commands to be used in conjunction with SCSI protocol bridge devices; benefiting management, discovery and other functions associated with these devices. The main advantage of MSC lies in the ability for host applications to make use of connection topology in protocol bridges, allowing those applications to build internal maps of devices, understand how protocols are routed, and reliably execute Extended Copy commands.

The initial thinking of those who have provided input into the MSC project centers around building the commands that could be used to transport management data to and from devices that include management server entities. It is expected that these commands will support SNMP structures and data, but would not be limited to that method of management data presentation.

This proposal does not intend to define the layout or nature of the flow of the MSC document. No attempt has been made to verify operation codes, ASC / ASCQ codes, assignment of section numbering, or cross-referencing the document with other previous attempts to create such a mechanism. This proposal will probably need to be supported under the MAINTENANCE opcodes to support these service actions.

Proposed Additions to SPC-3

To support the inclusion of the MSC command specification, a new `VERSION DESCRIPTOR` value is needed in Table 51, subclause 7.3.2. Assignment of this number is out of the scope of this proposal.

Proposed Additions to MSC

A Definitions

A.1 management server: The entity in a SCSI protocol bridge or router that processes management commands.

A.2 MIB server: The entity (management server) in a SCSI protocol bridge or router that processes SNMP commands.

A.2 CIM server: The entity (management server) in a SCSI protocol bridge or router that processes CIM commands.

B Symbols and Abbreviations

SNMP Simple Network Management Protocol (IETF RFCs XXX, YYY, ZZZ)

MIB Management Information Base (IETF RFC XXX)

CIM Common Information Model (DMTF XXX)

C MSC Management models

MSC Management models describe the method by which a protocol bridge defines structures used to represent management data. Management structures, in relation to the model supported, are retrieved through the management server resident in the protocol bridge, for use in application clients. The structures define, usually in ASCII format, the layout or use model for that protocol bridge, allowing application clients the ability to retrieve and modify data associated with portions of the structure. Management models are varied in definition to the point that a generalized concept of any structure is not possible for the purpose of this specification.

bC.1 Management Model Descriptions

Management models support the application client and protocol bridge management server to identify the management scheme being used and how to operate on the data. The identification codes permit the correct routing of the data to the appropriate management process. Table 1 defines these model descriptors, which are used in service actions in MANAGEMENT commands and during data-in buffer transfers of those commands.

Table 1 – Management model descriptors

Model Code	Description	Reference
000b	SNMP	C.1.1
001b	CIM	C.1.2

C.1.1 SNMP Management Model

The SNMP management model allows the transporting of data based on SNMP packets and MIB structures while also allowing the MIB server to send the MIB structure for use by the application client. The model provides the ability to encapsulate SNMP commands into the MANAGEMENT command, using appropriate SNMP service actions, see D.1.1.X

for definitions of SNMP commands. The structures for each service action are defined in subclause D.1.1.

C.1.1.1 Default MIB

The default MIB is defined by the protocol bridge, and is the SNMP structure that the management server uses by default during execution of MANAGEMENT service actions.

C.1.1.1 SCSI MIB

Definition TBD

C.1.1.2 FCIA MIB

Definition TBD

C.1.1.3 SNIA FC MIB

Definition TBD

C.1.1.3 Private MIB

Definition TBD

C.1.2 CIM Management Model

The CIM management model allows the transporting of data based on CIM XML schemas while also allowing the CIM server to send the schema structure for use by the application client. The model provides the ability to encapsulate CIM commands into the MANAGEMENT command, using appropriate CIM service actions. The structures for each service action are defined in subclause D.1.1.

D MANAGEMENT command

D.1 MANAGEMENT command overview

The MANAGEMENT command supports the transfer of management data from SCSI protocol bridges that implement either defined or private management structures. The MANAGEMENT command allows for the application client to interrogate the protocol bridges' supported models, retrieve the model structures, and view or modify data for that structure. Identification of the management model is based on the settings of the MANAGEMENT command sent, allowing only one type of management data command to be issued; it is not possible to modify or read structures from two separate models in the same MANAGEMENT command.

The MANAGEMENT command defines service actions that initiate the transfer of data between a management server and an application client. Each MANAGEMENT command is identified to be either a non-specific management model command, or specific to the management model supported by the management server. The use of non-specific

management model commands is intended for the transfer of management structures, forcing management interpretation models at the management server, or issuing vendor-unique MANAGEMENT commands.

The transfer of management structures from a READ MANAGEMENT STRUCTURE command delivers to the application client the construction of the management information the protocol bridge uses to present the organization of this data. The READ MANAGEMENT MODELS command presents the models that the protocol bridge supports allowing the application client request a default type management structure through the MODEL flag. If the model is supported the protocol bridge delivers the structure in the response data form.

D.1.1 MANAGEMENT command service actions

The service actions for the MANAGEMENT command are listed in Table 2.

Table 2 – Service actions for MANAGEMENT command

Service name	Service action	Type	Subclause
READ MANAGEMENT MODELS	00h	M ⁽¹⁾	D.1.1.1
SET MANAGEMENT MODEL	01h	O ⁽¹⁾	D.1.1.2
READ MANAGEMENT STRUCTURE	02h	M ⁽¹⁾	D.1.1.3
MANAGEMENT REQUEST	03h	M	D.1.1.4
MANAGEMENT RESPONSE	04h	O	D.1.1.5
Reserved	05h – 17h		
Vendor Specific	18h – 1Fh		
<p>Key: M = Service action implementation is mandatory. O = Service action is optional</p> <p>Notes: (1) Commands are not subject to model interpretation, see subclause D.1.1.2.</p>			

D.1.1.1 READ MANAGEMENT MODELS command

The READ MANAGEMENT MODELS command (see Table 3) service action requests that information regarding defined management models supported be sent to the application client. See C.1 for a definition of management models.

Table 3 – READ MANAGEMENT MODELS command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (XXh)							
1	Reserved			SERVICE ACTION (00h)				
2	Reserved		DEFAULT	LUNMODEL	SENDSTRC	MODEL		
3	Reserved							
4	(MSB)	LOGICAL UNIT NUMBER						(LSB)
5	Reserved							
6	Reserved							
7	(MSB)	ALLOCATION LENGTH						(LSB)
8	Reserved							
9	Reserved							
10	Reserved							
11	CONTROL							

A **DEFAULT** bit of one indicates that the management server shall return only the default management model and structure used to describe management data and settings, as indicated by the **LUNMODEL**, **SENDSTRC** and **MODEL** fields. A **DEFAULT** bit of zero indicates that the management server shall return data as indicated by the **LUNMODEL**, **SENDSTRC** and **MODEL** fields only.

A send model (**SENDSTRC**) bit of zero indicates the management server shall ignore the **MODEL** field and deliver data as defined in Table 4 during the data-in buffer transfer of the command. A send model (**SENDSTRC**) bit of one indicates the management server shall return management structure(s) as defined in Table 9 (subclause D.1.X.X), based on the settings in the **MODEL** field during the data-in transfer of the command. The **ALLOCATION LENGTH** is only valid when the **SENDSTRC** bit is one.

A LUN model (**LUNMODEL**) bit of zero indicates the management server shall deliver data associated with only its supported model(s), as indicated by the **SENDSTRC** and **MODEL** fields during the data-in transfer of the command. A LUN model (**LUNMODEL**) bit of one indicates the management server shall deliver data associated with a logical unit attached to the protocol router that also support this specification, as indicated by the **SENDSTRC**, **LOGICAL UNIT NUMBER** and **MODEL** fields during the data-in transfer of the command.

If the **SENDSTRC** bit is one and the requested model is not supported, the management server shall terminate the command with **CHECK CONDITION** status and the sense key shall be set to **TBD** with the appropriate additional sense code for the condition. If the **LUNMODEL** bit is one and the requested **LOGICAL UNIT NUMBER** is not present, the management server shall terminate the command with **CHECK CONDITION** status and the sense key shall be set to **TBD** with the appropriate additional sense code for the condition.

Table 4 – Read management model data

Bit Byte	7	6	5	4	3	2	1	0
0	Reserved							
1	SNMP	CIM	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
2	SNMP MIB MAP							
3	CIM SCHEMA MAP							
4	Reserved							
5	Reserved							
6	Reserved				SETMDL	MODEL		
7	Reserved							

A `SNMP` bit of one indicates that the management server contains a defined or private SNMP MIB structures as defined in Table 5. A `CIM` bit of one indicates that the management server contains a defined or private CIM schema structures as defined in Table 6. Management servers that return this data shall set at least one bit of Byte 1 to one, indicating what format the management structure supports. Multiple MIB structures may be reported.

The management server shall return only the one descriptor and model if the default bit is set in the `READ MANAGEMENT MODEL` command.

A set model (`SETMDL`) bit of one indicates that the management server is set to interpret all `MANAGEMENT` service actions indicated in the `MODEL` field, as defined in Table 1. See subclause C.1 for a definition of management models.

Table 5 – SNMP MIB MAP definitions

MIB Code	Description	Reference
00h	Default MIB	
01h	SCSI MIB	C.1.1.1
02h	FCIA MIB	C.1.1.2
04h	SNIA FC MIB	C.1.1.3
08h	Private MIB	C1.1.4

Table 6 – CIM descriptors

Schema Code	Description	Reference
00h	Default schema	

D.1.1.2 SET MANAGEMENT MODEL command

The `SET MANAGEMENT MODEL` command (see Table 7) service action requests that the management server to interpret all `MANAGEMENT` service actions in the model indicated in Table 1. See subclause C.1 for a definition of management models.

Table 7 – SET MANAGEMENT MODEL command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (XXh)							
1	Reserved			SERVICE ACTION (01h)				
2	Reserved			LUNMODEL	Reserved	MODEL		
3	Reserved							
4	(MSB)	LOGICAL UNIT NUMBER						(LSB)
5								
6	Reserved							
7	Reserved							
8	Reserved							
9	Reserved							
10	Reserved							
11	CONTROL							

A LUN model (LUNMODEL) bit of one indicates the management server shall interpret all MANAGEMENT service actions in the MODEL indicated for that LOGICAL UNIT NUMBER. The delivery of the MANAGEMENT commands to cascaded protocol bridges is beyond the scope of this specification.

If the requested model is not supported, the management server shall terminate the command with CHECK CONDITION status and the sense key shall be set to TBD with the appropriate additional sense code for the condition. If the LUNMODEL bit is one and the requested LOGICAL UNIT NUMBER is not present, the management server shall terminate the command with CHECK CONDITION status and the sense key shall be set to TBD with the appropriate additional sense code for the condition.

D.1.1.3 READ MANAGEMENT STRUCTURE command

The READ MANAGEMENT STRUCTURE command (see Table 8) service action requests that the management server transfer management structure(s) supported to the application client. See C.1 for a definition of management models. The definition of management structures is outside of the scope of this specification.

Table 8 – READ MANAGEMENT STRUCTURE command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (XXh)							
1	Reserved			SERVICE ACTION (02h)				
2	Reserved		DEFAULT	LUNMODEL	Reserved	MODEL		
3	STRUCTURE MAP							
4	(MSB)	LOGICAL UNIT NUMBER						(LSB)
5								
6	Reserved							
7	(MSB)	ALLOCATION LENGTH						(LSB)
8								
9								
10								
11	CONTROL							

The `STRUCTURE MAP` field indicates that the management server shall return the specified structure(s), as indicated by the model field during the data-in transfer of the command. The `STRUCTURE MAP` is any subset of the supported management structures returned by the management server from the `READ MANAGEMENT MODEL` command data (see Table 4). Refer to Table 5 for SNMP descriptors and Table 6 for CIM descriptors.

A LUN model (`LUNMODEL`) bit of zero indicates the management server shall deliver data associated with only its supported structure(s). A LUN model (`UNMODEL`) bit of one indicates the management server shall deliver data associated with a logical unit attached to the protocol router that also supports this specification, as indicated by the `LOGICAL UNIT NUMBER` and `MODEL` fields during the data-in transfer of the command.

If the requested model is not supported, the management server shall terminate the command with `CHECK CONDITION` status and the sense key shall be set to TBD with the appropriate additional sense code for the condition. If the `LUNMODEL` bit is one and the requested `LOGICAL UNIT NUMBER` is not present, the management server shall terminate the command with `CHECK CONDITION` status and the sense key shall be set to TBD with the appropriate additional sense code for the condition.

The `READ MANAGEMENT STRUCTURE` data list contains a four-byte header that contains the length in bytes of the structure list and a list of supported structures. Each `OPERATION CODE DESCRIPTOR` contains information on a single supported management structure.

Table 9 – Read management structure data list

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1	STRUCTURES LIST LENGTH (n-3)							
2								
3								
	MANAGEMENT STRUCTURES (IF ANY)							
4	Management structure descriptor							
n								

The `STRUCTURES LIST LENGTH` field specifies the length in bytes of the following `MANAGEMENT STRUCTURES(S)`.

The `MANAGEMENT STRUCTURE DESCRIPTOR` is defined in Table 10.

