

This is a preview - click here to buy the full publication



ISO/IEC 11989

Edition 1.0 2010-03

INTERNATIONAL STANDARD



Information technology – iSCSI management API

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **XC**

ICS 35.200

ISBN 978-2-88910-820-6

CONTENTS

FOREWORD.....	10
1 Scope.....	12
2 Normative references	12
3 Document conventions	12
4 Background technical information	14
4.1 Terms, definitions and abbreviations	14
4.2 Concepts.....	17
4.2.1 Library and plugins	17
4.2.2 Object ID	18
4.2.3 Object ID list.....	19
4.2.4 The Shared Node versus Non-shared Nodes	19
4.2.5 Logical HBA	20
4.2.6 Target OIDs and Logical Unit OIDs.....	20
4.2.7 Software Initiators versus Hardware Initiators	21
4.2.8 iSCSI session and connection parameters	22
4.2.9 Class relationship diagram	23
5 Constants and types.....	24
5.1 IMA_WCHAR.....	24
5.2 IMA_BYTE	24
5.3 IMA_BOOL.....	24
5.4 IMA_XBOOL.....	24
5.5 IMA_UINT	24
5.6 IMA_UINT16.....	24
5.7 IMA_UINT32.....	24
5.8 IMA_UINT64.....	24
5.9 IMA_DATETIME	24
5.10 IMA_OBJECT_VISIBILITY_FN	24
5.11 IMA_OBJECT_PROPERTY_FN.....	25
5.12 IMA_OBJECT_TYPE	25
5.12.1 Format.....	25
5.12.2 Fields	26
5.13 IMA_STATUS.....	27
5.13.1 Macros	27
5.13.2 Non-error statuses.....	27
5.13.3 Error statuses.....	28
5.14 IMA_OID	31
5.14.1 Format.....	31
5.14.2 Fields	31
5.14.3 Remarks.....	31
5.15 IMA_OID_LIST	32
5.15.1 Format.....	32
5.15.2 Fields	32
5.15.3 Remarks.....	32
5.16 IMA_NODE_NAME.....	32
5.16.1 Format.....	32
5.16.2 Remarks.....	32

5.17	IMA_NODE_ALIAS	32
	5.17.1 Format.....	32
	5.17.2 Remarks.....	32
5.18	IMA_IP_ADDRESS.....	33
	5.18.1 Format.....	33
	5.18.2 Fields	33
5.19	IMA_HOST_NAME	33
	5.19.1 Format.....	33
	5.19.2 Remarks.....	33
5.20	IMA_HOST_ID.....	33
	5.20.1 Format.....	33
	5.20.2 Fields	34
	5.20.3 Remarks.....	34
5.21	IMA_TARGET_ADDRESS	34
	5.21.1 Format.....	34
	5.21.2 Fields	34
	5.21.3 Remarks.....	34
5.22	IMA_ADDRESS_KEY	34
	5.22.1 Format.....	34
	5.22.2 Fields	35
	5.22.3 Remarks.....	35
5.23	IMA_ADDRESS_KEYS	35
	5.23.1 Format.....	35
	5.23.2 Fields	35
	5.23.3 Remarks.....	35
5.24	IMA_STATIC_DISCOVERY_TARGET.....	36
	5.24.1 Format.....	36
	5.24.2 Fields	36
	5.24.3 Remarks.....	36
5.25	IMA_DISCOVERY_ADDRESS_PROPERTIES	36
	5.25.1 Format.....	36
	5.25.2 Fields	36
	5.25.3 Remarks.....	37
5.26	IMA_STATIC_DISCOVERY_TARGET_PROPERTIES.....	37
	5.26.1 Format.....	37
	5.26.2 Fields	37
	5.26.3 Remarks.....	37
5.27	IMA_IP_PROPERTIES	37
	5.27.1 Format.....	37
	5.27.2 Fields	38
	5.27.3 Remarks.....	39
5.28	IMA_LIBRARY_PROPERTIES.....	39
	5.28.1 Format.....	39
	5.28.2 Fields	39
	5.28.3 Remarks.....	40
5.29	IMA_PLUGIN_PROPERTIES.....	40
	5.29.1 Format.....	40
	5.29.2 Fields	40
	5.29.3 Remarks.....	41

5.30	IMA_NODE_PROPERTIES.....	41
	5.30.1 Format.....	41
	5.30.2 Fields	41
	5.30.3 Remarks.....	42
5.31	IMA_LHBA_PROPERTIES.....	42
	5.31.1 Format.....	42
	5.31.2 Fields	43
	5.31.3 Remarks.....	43
5.32	Upper Level Protocol (ULP) flags	43
5.33	IMA_PHBA_PROPERTIES	44
	5.33.1 Format.....	44
	5.33.2 Fields	44
	5.33.3 Remarks.....	46
5.34	IMA_DISCOVERY_PROPERTIES	47
	5.34.1 Format.....	47
	5.34.2 Fields	47
	5.34.3 Remarks.....	48
5.35	IMA_PHBA_DOWNLOAD_IMAGE_TYPE.....	48
	5.35.1 Format.....	48
	5.35.2 Fields	48
	5.35.3 Remarks.....	49
5.36	IMA_PHBA_DOWNLOAD_IMAGE_PROPERTIES.....	49
	5.36.1 Format.....	49
	5.36.2 Fields	49
	5.36.3 Remarks.....	49
5.37	IMA_ISNS_DISCOVERY_METHOD	49
	5.37.1 Format.....	49
	5.37.2 Fields	50
	5.37.3 Remarks.....	50
5.38	IMA_PHBA_DOWNLOAD_PROPERTIES	50
	5.38.1 Format.....	50
	5.38.2 Fields	50
	5.38.3 Remarks.....	51
5.39	IMA_IPSEC_PROPERTIES	51
	5.39.1 Format.....	51
	5.39.2 Fields	51
	5.39.3 Remarks.....	51
5.40	IMA_MIN_MAX_VALUE.....	51
	5.40.1 Format.....	51
	5.40.2 Fields	52
	5.40.3 Remarks.....	52
5.41	IMA_BOOL_VALUE.....	53
	5.41.1 Format.....	53
	5.41.2 Fields	53
5.42	IMA_MAC_ADDRESS.....	53
	5.42.1 Format.....	53
	5.42.2 Remarks.....	53
5.43	IMA_LNP_PROPERTIES.....	53
	5.43.1 Format.....	53

5.43.2	Fields	54
5.43.3	Remarks	54
5.44	IMA_PNP_PROPERTIES	54
5.44.1	Format	54
5.44.2	Fields	54
5.44.3	Remarks	55
5.45	IMA_PNP_STATISTICS	55
5.45.1	Format	55
5.45.2	Fields	55
5.45.3	Remarks	56
5.46	IMA_NETWORK_PORTAL_PROPERTIES	56
5.46.1	Format	56
5.46.2	Fields	56
5.46.3	Remarks	56
5.47	IMA_PHBA_STATUS	56
5.47.1	Format	56
5.47.2	Values	56
5.47.3	Remarks	56
5.48	IMA_NETWORK_PORT_STATUS	57
5.48.1	Format	57
5.48.2	Fields	57
5.48.3	Remarks	58
5.49	IMA_TARGET_DISCOVERY_METHOD	58
5.49.1	Format	58
5.49.2	Fields	58
5.50	IMA_TARGET_PROPERTIES	58
5.50.1	Format	58
5.50.2	Fields	59
5.50.3	Remarks	59
5.51	IMA_TARGET_ERROR_STATISTICS	60
5.51.1	Format	60
5.51.2	Fields	60
5.51.3	Remarks	61
5.52	IMA_LU_PROPERTIES	62
5.52.1	Format	62
5.52.2	Fields	62
5.52.3	Remarks	63
5.53	IMA_DEVICE_STATISTICS	63
5.53.1	Format	63
5.53.2	Fields	64
5.53.3	Remarks	64
5.54	IMA_STATISTICS_PROPERTIES	64
5.54.1	Format	64
5.54.2	Fields	64
5.54.3	Remarks	65
5.55	IMA_AUTHMETHOD	65
5.55.1	Format	65
5.55.2	Fields	65
5.56	IMA_CHAP_INITIATOR_AUTHPARMS	66

5.56.1	Format.....	66
5.56.2	Fields	66
5.56.3	Remarks.....	67
5.57	IMA_SRP_INITIATOR_AUTHPARMS	67
5.57.1	Format.....	67
5.57.2	Fields	67
5.57.3	Remarks.....	68
5.58	IMA_KRB5_INITIATOR_AUTHPARMS	68
5.58.1	Format.....	68
5.58.2	Fields	68
5.58.3	Remarks.....	68
5.59	IMA_SPKM_INITIATOR_AUTHPARMS.....	68
5.59.1	Format.....	68
5.59.2	Fields	69
5.59.3	Remarks.....	69
5.60	IMA_INITIATOR_AUTHPARMS	69
5.60.1	Format.....	69
5.60.2	Fields	70
5.60.3	Remarks.....	70
6	APIs	70
6.1	APIs by Category	70
6.1.1	Library and Plugin APIs	70
6.1.2	Node APIs	71
6.1.3	Logical HBA APIs	71
6.1.4	Physical HBA APIs	72
6.1.5	Network Portal APIs	73
6.1.6	Logical Network Port (LNP) APIs	73
6.1.7	Physical Network Port (PNP) APIs.....	73
6.1.8	Target APIs	73
6.1.9	Logical Unit (LU) APIs	74
6.1.10	Miscellaneous APIs	75
6.2	APIs by Name	76
6.2.1	IMA_AddDiscoveryAddress.....	78
6.2.2	IMA_AddStaticDiscoveryTarget	79
6.2.3	IMA_DeregisterForObjectPropertyChanges	81
6.2.4	IMA_DeregisterForObjectVisibilityChanges.....	81
6.2.5	IMA_ExposeLu	82
6.2.6	IMA_FreeMemory	83
6.2.7	IMA_GenerateNodeName	84
6.2.8	IMA_GetAddressKeys.....	85
6.2.9	IMA_GetAssociatedPluginOid	86
6.2.10	IMA_GetDataPduInOrderProperties	87
6.2.11	IMA_GetDataSequenceInOrderProperties.....	88
6.2.12	IMA_GetDefaultTime2RetainProperties	89
6.2.13	IMA_GetDefaultTime2WaitProperties.....	90
6.2.14	IMA_GetDeviceStatistics	91
6.2.15	IMA_GetDiscoveryAddressOidList	92
6.2.16	IMA_GetDiscoveryAddressProperties	93
6.2.17	IMA_GetDiscoveryProperties	94

6.2.18	IMA_GetErrorRecoveryLevelProperties	95
6.2.19	IMA_GetFirstBurstLengthProperties.....	96
6.2.20	IMA_GetImmediateDataProperties.....	97
6.2.21	IMA_GetInitialR2TProperties	98
6.2.22	IMA_GetInitiatorAuthParms	99
6.2.23	IMA_GetInUseInitiatorAuthMethods	100
6.2.24	IMA_GetIpProperties	101
6.2.25	IMA_GetIpsecProperties.....	102
6.2.26	IMA_GetLhbaOidList	103
6.2.27	IMA_GetLhbaProperties	104
6.2.28	IMA_GetLibraryProperties	105
6.2.29	IMA_GetLnpOidList	105
6.2.30	IMA_GetLnpProperties	106
6.2.31	IMA_GetLuOid.....	107
6.2.32	IMA_GetLuOidList	108
6.2.33	IMA_GetLuProperties	109
6.2.34	IMA_GetMaxBurstLengthProperties	110
6.2.35	IMA_GetMaxConnectionsProperties	111
6.2.36	IMA_GetMaxOutstandingR2TProperties	112
6.2.37	IMA_GetMaxRecvDataSegmentLengthProperties	113
6.2.38	IMA_GetNetworkPortalOidList	114
6.2.39	IMA_GetNetworkPortalProperties	115
6.2.40	IMA_GetNetworkPortStatus	115
6.2.41	IMA_GetNodeProperties	116
6.2.42	IMA_GetNonSharedNodeOidList.....	117
6.2.43	IMA_GetObjectType	118
6.2.44	IMA_GetPhbaDownloadProperties.....	119
6.2.45	IMA_GetPhbaOidList	120
6.2.46	IMA_GetPhbaProperties	121
6.2.47	IMA_GetPhbaStatus	122
6.2.48	IMA_GetPluginOidList	122
6.2.49	IMA_GetPluginProperties	123
6.2.50	IMA_GetPnpOidList.....	124
6.2.51	IMA_GetPnpProperties	125
6.2.52	IMA_GetPnpStatistics.....	126
6.2.53	IMA_GetSharedNodeOid	127
6.2.54	IMA_GetStaticDiscoveryTargetOidList.....	128
6.2.55	IMA_GetStaticDiscoveryTargetProperties	129
6.2.56	IMA_GetStatisticsProperties	130
6.2.57	IMA_GetSupportedAuthMethods.....	131
6.2.58	IMA_GetTargetErrorStatistics	132
6.2.59	IMA_GetTargetOidList	133
6.2.60	IMA_GetTargetProperties	135
6.2.61	IMA_IsPhbaDownloadFile.....	136
6.2.62	IMA_LuInquiry	137
6.2.63	IMA_LuReadCapacity	139
6.2.64	IMA_LuReportLuns	141
6.2.65	IMA_PhbaDownload	143
6.2.66	IMA_PluginIOctl.....	144

6.2.67	IMA_RegisterForObjectPropertyChanges	146
6.2.68	IMA_RegisterForObjectVisibilityChanges	147
6.2.69	IMA_RemoveDiscoveryAddress	148
6.2.70	IMA_RemoveStaleData	149
6.2.71	IMA_RemoveStaticDiscoveryTarget	150
6.2.72	IMA_SetDataPduInOrder	151
6.2.73	IMA_SetDataSequenceInOrder	152
6.2.74	IMA_SetDefaultGateway	153
6.2.75	IMA_SetDefaultTime2Retain	154
6.2.76	IMA_SetDefaultTime2Wait	155
6.2.77	IMA_SetDnsServerAddress	156
6.2.78	IMA_SetErrorRecoveryLevel	157
6.2.79	IMA_SetFirstBurstLength	159
6.2.80	IMA_SetImmediateData	160
6.2.81	IMA_SetInitialR2T	161
6.2.82	IMA_SetInitiatorAuthMethods	162
6.2.83	IMA_SetInitiatorAuthParms	163
6.2.84	IMA_SetIpConfigMethod	164
6.2.85	IMA_SetIsnsDiscovery	166
6.2.86	IMA_SetMaxBurstLength	167
6.2.87	IMA_SetMaxConnections	169
6.2.88	IMA_SetMaxRecvDataSegmentLength	170
6.2.89	IMA_SetMaxOutstandingR2T	171
6.2.90	IMA_SetNetworkPortallpAddress	172
6.2.91	IMA_SetNodeAlias	173
6.2.92	IMA_SetNodeName	174
6.2.93	IMA_SetSendTargetsDiscovery	176
6.2.94	IMA_SetSlpDiscovery	177
6.2.95	IMA_SetStaticDiscovery	178
6.2.96	IMA_SetStatisticsCollection	179
6.2.97	IMA_SetSubnetMask	181
6.2.98	IMA_UnexposeLu	182
7	Implementation compliance	183
8	Notes	183
8.1	Client Usage Notes	183
8.1.1	Persisted Object IDs	183
8.1.2	Reserved Fields	183
8.1.3	Event Notification Within a Single Client	183
8.1.4	Event Notification and Multi-Threading	184
8.1.5	IPsec Security	184
8.1.6	Transmission of Authorization Parameters	184
8.1.7	Target OIDs and iSCSI Targets	184
8.1.8	Configuration Changes and the IMA_STATUS_REBOOT_NECESSARY status	184
8.2	Library Implementation Notes	184
8.2.1	Object IDs	184
8.2.2	Multi-threading Support	184
8.2.3	Event Notification and Multi-Threading	184
8.2.4	Structure Packing	185

8.2.5	Calling Conventions.....	185
8.3	Plugin Implementation Notes	185
8.3.1	Object IDs	185
8.3.2	Reserved Fields	185
8.3.3	Multi-threading Support	185
8.3.4	Event Notification to Different Clients	185
8.3.5	Event Notification and Multi-Threading	185
8.3.6	IPsec Security	185
8.3.7	Persistence of Authorization Parameters	186
8.3.8	Executing SCSI Commands and Operating System Compatibility	186
8.3.9	Executing SCSI Commands and Session Management.....	186
8.3.10	Plugin IOctls	186
8.3.11	Target OIDs and Logical Unit OIDs.....	186
Annex A (informative)	Device Names.....	187
Annex B (informative)	Coding Examples	188
Bibliography.....		198

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INFORMATION TECHNOLOGY –

iSCSI management API

FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.
- 2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.
- 3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.
- 4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC publication.
- 7) All users should ensure that they have the latest edition of this publication.
- 8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 11989 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

International Standard ISO/IEC 11989 was prepared by ANSI, was adopted, under the fast track procedure, by joint technical committee 1: Information technology and has been assigned to subcommittee 25: Interconnection of information technology equipment.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INFORMATION TECHNOLOGY –

iSCSI management API

1 Scope

This International Standard specifies an Application Programming Interface (API) that provides interfaces to discover and manage iSCSI resources on a system. This International Standard is applicable to vendors who deliver drivers that provide iSCSI resources to a system.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including any amendments, applies.

The provisions of the referenced specifications other than ISO/IEC, IEC, ISO and ITU documents, as identified in this clause, are valid within the context of this International Standard. The reference to such a specification within this International Standard does not give it any further status within ISO/IEC. In particular, it does not give the referenced specification the status of an International Standard.

ISO/IEC 14776-453, *Information technology – Small Computer System Interface – Part 453: SCSI Primary Commands-3 (SPC-3)*

ISO/IEC 19501, *Unified Modeling Language (UML)*

ISO/IEC 8802-3:2000, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*¹

IETF RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*

IETF RFC 2945, *The SRP Authentication and Key Exchange System*

IETF RFC 3720, *Internet Small Computer Systems Interface (iSCSI)*

ANSI INCITS 386-2004, *Fibre Channel HBA API (FC-HBA)*

¹ IEEE 802.1AX, IEEE Standard for Information technology