

KMIP Tape Library Profile Version 1.0

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Related work:

This specification is related to:

- *Key Management Interoperability Protocol Profiles Version 1.0*. Edited by [Robert Griffin and Subhash Sankuratripati](#). 01 October 2010. OASIS Standard. <http://docs.oasis-open.org/kmip/profiles/v1.0/os/kmip-profiles-1.0-os.html>.
- *Key Management Interoperability Protocol Specification Version 1.1*. Edited by [Robert Haas and Indra Fitzgerald](#). 24 January 2013. OASIS Standard. <http://docs.oasis-open.org/kmip/spec/v1.1/os/kmip-spec-v1.1-os.html>.

- *Key Management Interoperability Protocol Specification Version 1.2*. Edited by [Kiran Thota](#) and [Kelley Burgin](#). Latest version: <http://docs.oasis-open.org/kmip/spec/v1.2/kmip-spec-v1.2.html>.

Abstract:

Describes a profile for Tape Libraries as KMIP clients interacting with KMIP servers.

Status:

This document was last revised or approved by the OASIS Key Management Interoperability Protocol (KMIP) TC on the above date. The level of approval is also listed above. Check the "Latest version" location noted above for possible later revisions of this document.

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1 Introduction

For normative definition of the elements of KMIP see the [KMIP Specification](#) [KMIP-SPEC] and the [KMIP Profiles](#) [KMIP-PROF].

~~Illustrative guidance for the implementation of KMIP clients and servers is provided in the [KMIP Usage Guide](#) [KMIP-UG].~~

This profile defines the necessary KMIP functionality that a Tape Library operating as a KMIP client SHALL use and a KMIP server conforming to this profile SHALL support in order to interoperate in conformance with this profile.

1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

Key Associated Data (KAD)	Part of the tape format. May be segmented into authenticated and unauthenticated fields. KAD usage is detailed in the SCSI SSC-3 standard from the T10 organization available as ANSI INCITS 335-2000.
Hexadecimal Numeric Characters	Case-sensitive, printable, single byte ASCII characters representing the numbers 0 through 9 and uppercase alpha A through F. (US-ASCII characters 30h-39h and 41h-46h). Each byte (single 8-bit numeric value) is represented as two hexadecimal numeric characters with the high-nibble represented by the first (left-most) hexadecimal numeric character and the low-nibble represented by the second (right-most) hexadecimal numeric character.
N(a)	The maximum number of bytes in the tape authenticated KAD field. For LTO4, N(a) is 12 bytes. For LTO5, N(a) is 60 bytes. For LTO6, N(a) is 60 bytes.
N(u)	The maximum number of bytes in the tape unauthenticated KAD field. For LTO4, N(u) is 32 bytes. For LTO5, N(u) is 32 bytes. For LTO6, N(u) is 32 bytes.
N(k)	The maximum number of bytes in the tape format KAD fields – i.e. N(a) + N(u). For LTO4, N(k) is 44 bytes. For LTO5, N(k) is 92 bytes. For LTO6, N(k) is 92 bytes.

1.2 Normative References

- [RFC2119] Bradner, S., “Key words for use in RFCs to Indicate Requirement Levels”, BCP 14, RFC 2119, March 1997. <http://www.ietf.org/rfc/rfc2119.txt>.

- 18 **[KMIP-ENCODE]** *KMIP Additional Message Encodings Version 1.0.*
 19 [URL](#) **[RFC2246]** T. Dierks and C. Allen, *The TLS Protocol, Version 1.0*, IETF RFC
 20 2246, Jan 1999,
 21 *Candidate OASIS Standard 01.* **DD MMM YYYY**
- 22 **[KMIP-SPEC]** One or more of [KMIP-SPEC-1_0], [KMIP-SPEC-1_1], [KMIP-SPEC-1_2]
 23 **[KMIP-SPEC-1_0]** Key Management Interoperability Protocol Specification Version 1.0
 24 <http://docs.oasis-open.org/kmip/spec/v1.0/os/kmip-spec-1.0-os.doc>
 25 OASIS Standard, October 2010.
- 26 **[KMIP-SPEC-1_1]** *Key Management Interoperability Protocol Specification Version 1.1.*
 27 <http://docs.oasis-open.org/kmip/spec/v1.1/os/kmip-spec-v1.1-os.doc>
 28 OASIS Standard. 24 January 2013.
- 29 **[KMIP-SPEC-1_2]** *Key Management Interoperability Protocol Specification Version 1.2.*
 30 [URL](#)
 31 Candidate OASIS Standard 01. **DD MMM YYYY**.
- 32 **[KMIP-PROF]** One or more of [KMIP-PROF-1_0], [KMIP-PROF-1_1], [KMIP-PROF-1_2]
 33 **[KMIP-PROF-1_0]** *Key Management Interoperability Protocol Usage Guide Profiles Version 1.0.*
 34 <http://docs.oasis-open.org/kmip/profiles/v1.0/os/kmip-profiles-1.0-os.doc>
 35 OASIS Standard. 1 October 2010.
- 36 **[KMIP-PROF-1_1]** *Key Management Interoperability Protocol Usage Guide Profiles Version ~~1.1~~.*
 37 <http://docs.oasis-open.org/kmip/profiles/v1.1/os/kmip-profiles-v1.1-os.doc>
 38 OASIS Standard 01. 24 January 2013.
- 39 **[KMIP-PROF-1_2]** *Key Management Interoperability Protocol Usage Guide Profiles Version 1.2.*
 40 [URL](#)
 41 Candidate OASIS Standard 01. **DD MMM YYYY**.

42 **1.3 Non-Normative References**

- 43 ~~**[KMIP-UG]** One or more of [KMIP-UG-1_0], [KMIP-UG-1_1], [KMIP-UG-1_2]~~
 44 ~~**[KMIP-UG-1_0]** *Key Management Interoperability Protocol Usage Guide Version 1.0.*~~
 45 ~~Committee Note Draft, 1 December 2011-~~
- 46 ~~**[KMIP-UG-1_1]** *Key Management Interoperability Protocol Usage Guide Version 1.1.*~~
 47 ~~Committee Note 01, 27 July 2012-~~
- 48 ~~**[KMIP-UG-1_2]** *Key Management Interoperability Protocol Usage Guide Version 1.2.*~~
 49 ~~Committee Note Draft, **DD MMM YYYY**-~~
- 51 ~~**[KMIP-TC-1_1]** *Key Management Interoperability Protocol Test Cases Version 1.1.*, Committee~~
 52 ~~Note 01, 27 July 2012-~~
- 53 ~~**[KMIP-TC-1_2]** *Key Management Interoperability Protocol Test Cases Version 1.2.*~~
 54 ~~, Committee Note Draft, **DD MMM YYYY**-~~
- 55 ~~**[KMIP-UC]** *Key Management Interoperability Protocol Use Cases Version 1.0.*, Committee~~
 56 ~~Specification, 15 June 2010-~~

2 Tape Library Profile

57

58 The Tape Library Profile specifies the behavior of a tape library operating as a KMIP client interacting with
59 a KMIP server.

2.1 Authentication Suite

60

61 Implementations conformant to this profile SHALL support at least one of the Authentication Suites
62 defined within [KMIP-PROF]. ~~The establishment of the trust relationship between the KMIP client and the~~
63 ~~KMIP server is the same as the defined base profiles for the version of the profile supported.~~

2.2 Baseline Tape Library - Client

64

65 KMIP clients conformant to this profile under [KMIP-SPEC-1_0]:

66 1. SHALL conform to the [KMIP-SPEC-1_0]

67 ~~KMIP clients conformant to this profile under [KMIP-SPEC-1_1]:~~

68 ~~4.2. SHALL conform to the Baseline Client profile in Clause (section 5.12) of [KMIP-PROF] and [KMIP-~~
69 ~~SPEC-1_1]~~

70 ~~KMIP clients conformant to this profile under [KMIP-SPEC-1_2]:~~

71 ~~3.~~ SHALL conform to the *Baseline Client* (section 5.2) of [KMIP-PROF-1_2]

72 ~~KMIP clients conformant to this profile~~

73 ~~2.4.~~ SHOULD support *Application Specific Information* [KMIP-SPEC] with Application Data provided
74 by the client in accordance with section 2.4

75 ~~3.5.~~ SHOULD NOT use a *Custom Attribute* [KMIP-SPEC] that duplicates information that is already in
76 standard *Attributes* [KMIP-SPEC]

77 ~~4.6.~~ MAY use x-Barcode as a *Custom Attribute* [KMIP-SPEC] of type Text String to store the barcode

78 ~~5.7.~~ MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other clause
79 within this section 2.2

80 ~~6.8.~~ MAY support extensions outside the scope of this standard (e.g., vendor extensions,
81 conformance clauses) that do not conflict with any KMIP requirements

82 KMIP clients conformant to this profile under [KMIP-SPEC-1_2]:

83 ~~7.9.~~ SHALL support the following *Attributes* [KMIP-SPEC]

84 a. *Alternative Name* [KMIP-SPEC-1_2]

85 ~~8.10.~~ SHALL support the following *Message Encoding* [KMIP-SPEC-1_2]#1:

86 a. *Alternative Name Type Enumeration* [KMIP-SPEC-1_2] value:

87 i. Uninterpreted Text String

88 ~~9.11.~~ SHALL store the media barcode information in an *Alternative Name* [KMIP-SPEC-1_2]
89 *Attribute* [KMIP-SPEC-1_2] in accordance with section 0

2.3 Baseline Tape Library - Server

90

91 KMIP servers conformant to this profile under [KMIP-SPEC-1_0]:

92 1. SHALL conform to the [KMIP-Baseline-Server-SPEC-1_0]

93 ~~KMIP servers conformant to this profile under [KMIP-SPEC-1_1]:~~

94 ~~4.2. SHALL conform to the Baseline Server of [KMIP-PROF] and [KMIP-SPEC-1_1]~~

95 ~~KMIP servers conformant to this profile under [KMIP-SPEC-1_2]:~~

96 | 3. SHALL conform to the *Baseline Server* of [KMIP-PROF-1_2]
97 | KMIP servers conformant to this profile:
98 | 2.4. SHALL support the following *Objects* [KMIP-SPEC]
99 | a. *Symmetric Key* [KMIP-SPEC]
100 | 3.5. SHALL support the following *Attributes* [KMIP-SPEC]:
101 | a. *Name* [KMIP-SPEC]
102 | b. *Cryptographic Algorithm* [KMIP-SPEC]
103 | c. *Custom Attribute* [KMIP SPEC]
104 | d. *Application Specific Information* [KMIP SPEC]
105 | 4.6. SHALL support the following *Client-to-Server Operations* [KMIP-SPEC]:
106 | a. *Create* [KMIP-SPEC]
107 | 5.7. SHALL support the following *Message Contents* [KMIP-SPEC]:
108 | a. *Batch Order Option* [KMIP-SPEC] value:
109 | i. True
110 | b. *Batch Count* [KMIP-SPEC] value:
111 | i. 1 to 32
112 | 6.8. SHALL support the following *Message Encoding* [KMIP-SPEC]:
113 | a. *Cryptographic Algorithm Enumeration* [KMIP-SPEC] value:
114 | i. AES
115 | b. *Object Type Enumeration* [KMIP-SPEC] value:
116 | i. Symmetric Key
117 | c. *Key Format Type Enumeration* [KMIP-SPEC] value:
118 | i. Raw
119 | d. *Cryptographic Length* [KMIP-SPEC] value :
120 | i. 256-bit
121 | e. *Name Type Enumeration* [KMIP-SPEC] value:
122 | i. Uninterpreted Text String
123 | 7.9. SHALL support *Custom Attribute* [KMIP-SPEC] with the following data types and properties:
124 | a. Text String
125 | b. Integer
126 | c. Date Time
127 | 8.10. SHALL support a minimum length of 256 characters for *Custom Attribute* [KMIP-SPEC]
128 | and *Name* [KMIP-SPEC] values where the attribute type is of variable length
129 | 9.11. SHALL support a minimum of 30 *Custom Attribute* [KMIP-SPEC] per managed object
130 | 10.12. SHALL support a minimum of 64 characters in *Custom Attribute* [KMIP-SPEC] names
131 | ~~2.~~ ~~SHALL support the , returning results in accordance with the test cases~~
132 | 11.13. MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other
133 | clause within this section 2.2
134 | 12.14. MAY support extensions outside the scope of this standard (e.g., vendor extensions,
135 | conformance clauses) that do not conflict with any KMIP requirements
136 |
137 | KMIP servers conformant to this profile under [KMIP-SPEC-1_2]:
138 | 13.15. SHALL support the following *Attributes* [KMIP-SPEC]

- 139 a. *Alternative Name* [KMIP-SPEC-1_2]
140 | ~~44.16.~~ SHALL support the following *Message Encoding* [KMIP-SPEC-1_2]:
141 a. *Alternative Name Type Enumeration* [KMIP-SPEC-1_2] value:
142 i. Uninterpreted Text String

143 | **2.32.4 Using Application Specific Information for Key Identifiers**

144 This information applies to Tape Libraries that use the *Application Specific Information* [KMIP-SPEC]
145 | attribute to store key identifiers. KMIP clients are **NOT** required to use *Application Specific Information*
146 [KMIP-SPEC] however KMIP servers are required to support KMIP clients that use *Application Specific*
147 *Information* [KMIP-SPEC] and KMIP clients that do not use *Application Specific Information* [KMIP-
148 SPEC].

149 The *Application Specific Information* [KMIP-SPEC] MAY be used to store data that is specific to the
150 application (Tape Library) using the object.

151 The following Application Namespaces SHOULD be used in the Application Namespace field of the
152 *Application Specific Information* [KMIP-SPEC]:

- 153 • LIBRARY-LTO, LIBRARY-LTO4, LIBRARY-LTO5, and LIBRARY-LTO6

154 For backwards compatibility with deployed Tape Library implementations, servers MAY support
155 VENDOR-LIBRARY-LTO as an Application Namespace, where VENDOR is an ASCII string that SHALL
156 NOT be further interpreted and SHALL be handled by the server as if the Application Namespace was set
157 to LIBRARY-LTO.

158 *Application Specific Information* [KMIP-SPEC] supports key identifiers being created either on the server
159 or on the client (Tape Library), but not both. This profile specifies key identifiers created by the client.

160 The *Application Specific Information* [KMIP-SPEC] method of key identification relies on the ability to
161 uniquely identify a key based only on its Application Data (preferably), or (alternatively) on some
162 combination of Application Data and *Custom Attributes* [KMIP-SPEC], which the key creator guarantees
163 to be unique within the Application Namespace.

164 Key identifiers stored in the KMIP server's *Application Specific Information* [KMIP-SPEC] are in ASCII
165 format. Key identifiers stored in the KMIP client's tape format KAD fields are numeric format. The
166 specific algorithm for converting between text and numeric formats is specified below.

167 All information contained in the tape format's KAD fields is converted to an ASCII string consisting of
168 hexadecimal numeric character pairs as follows:

- 169 1. The unauthenticated KAD is converted to text;
- 170 2. The authenticated KAD is converted to text and;
- 171 3. The converted authenticated KAD text is concatenated to the end of the converted
172 unauthenticated KAD text.

173 If the implementation uses client-created key identifiers, then the client generates a new identifier in
174 ASCII format that SHALL be unique within the chosen namespace. The source material for generating the
175 string is dependent on client policy. The numeric representation of this identifier SHALL be no larger than
176 the N(k) bytes of the KAD for the tape media being used.

177 For KMIP clients and servers conforming to this profile, *Application Specific Information* [KMIP-SPEC]
178 SHALL be created by the Tape Library KMIP client based on the tape format's KAD fields as follows:

- 179 1. Define an empty output buffer sufficient to contain a string with a maximum length of 2*N(k)
180 bytes.
- 181 2. Copy the tape format's unauthenticated KAD (if present) to the output buffer, converting each
182 byte value to exactly two Hexadecimal Numeric Characters. The first byte (i.e., byte 0) of the
183 output buffer is the first byte of unauthenticated KAD.
- 184 3. Concatenate the tape format's authenticated KAD to the output buffer, converting each byte value
185 to exactly two Hexadecimal Numeric Characters.

186
187 Note: the contents of the unauthenticated KAD and authenticated KAD fields may be less than the
188 maximum permitted lengths; the implementation provides the correct length values to use in the algorithm
189 rather than using fixed maximum length fields.
190 If *Application Specific Information* [KMIP-SPEC] is supported, then it SHALL be used by the client for
191 locating the object for the purpose of encrypting and decrypting data on tape. The *Application Specific*
192 *Information* [KMIP-SPEC] value SHALL solely be used for this purpose.

193
194 ~~Refer to [KMIP-UG] for further non-normative details of conversion to and from KAD values.~~

195 **2.42.5 Using Alternative Name for tape media barcode**

196 The Tape Library client SHALL assign a text (i.e., human-readable) representation of the media barcode
197 to the *Alternative Name* [KMIP-SPEC-1_2] of the object. This SHALL occur on first use of the object for
198 encryption, which normally is when the library requests the server to create the object.

199
200 The relationship between key identifiers in *Application Specific Information* [KMIP-SPEC] and *Alternative*
201 *Name* [KMIP-SPEC-1_2] is as follows:

- 202 a) The values for both are provided by the client
- 203 b) The identifier in *Alternative Name* [KMIP-SPEC-1_2] (i.e., the barcode) SHALL be used by the
204 server administrator for finding keys associated with specific tape media (e.g., a server
205 administrator may want to find the key(s) associated with a missing tape cartridge, where the
206 barcode of that tape cartridge is known).
- 207 c) The *Alternative Name* [KMIP-SPEC-1_2] SHALL NOT be used by a client for locating the object
208 to encrypt or decrypt data, since the value (barcode) is ~~NOT~~not required to be unique and
209 therefore does not ensure retrieval of the correct key.

210 ~~Refer to [KMIP-UG-1_2] for further non-normative details of *Alternative Name* [KMIP-SPEC-1_2] usage.~~

211 3 Tape Library Profile Test Cases

212 ~~This section documents the test cases that a client or server conformant to the Tape Library Profile~~
213 ~~SHALL support.~~

214 ~~The test cases define a number of request-response pairs for KMIP operations. Each test case is~~
215 ~~provided in the XML format specified in [KMIP-ENCODE] intended to be both human-readable and usable~~
216 ~~by automated tools. The time sequence (starting from 0) for each request-response pair is noted and line~~
217 ~~numbers are provided for ease of cross-reference for a given test sequence.~~

218 ~~Each test case has a unique label (the section name) which includes indication of mandatory (-M-) or~~
219 ~~optional (-O-) status and the protocol version major and minor numbers as part of the identifier.~~

220 ~~The test cases may depend on a specific configuration of a KMIP client and server being configured in a~~
221 ~~manner consistent with the test case assumptions.~~

222 ~~Where possible the flow of unique identifiers between tests, the date-time values, and other dynamic~~
223 ~~items are indicated using symbolic identifiers – in actual request and response messages these dynamic~~
224 ~~values will be filled in with valid values.~~

225 ~~Note: the values for the returned items and the *Custom Attributes* custom attributes are illustrative. Actual~~
226 ~~values from a real client system will vary as specified in section 4.7. ~~These test cases demonstrate~~~~
227 ~~usage of all of the mandatory types that are required to be supported in a server implementation.~~

228 3.1 Mandatory Test Cases **KMIP v1.0**

229 ~~This section documents the test cases that a client or server conformant to the ~~SHALL~~ support for each~~
230 ~~version of the KMIP protocol (major and minor).~~

231 3.1.1 TL-M-1-10 - Configuration

232 Determine server configuration details including operations supported (only the mandatory operations are
233 listed in the response example), objects supported (only the mandatory objects types are listed in the
234 response example), optional server information, and optional list of application name spaces.

```
0001 # TIME 0
0002 <RequestMessage>
0003   <RequestHeader>
0004     <ProtocolVersion>
0005       <ProtocolVersionMajor type="Integer" value="1"/>
0006       <ProtocolVersionMinor type="Integer" value="0"/>
0007     </ProtocolVersion>
0008     <BatchCount type="Integer" value="1"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Query"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <QueryFunction type="Enumeration" value="QueryOperations"/>
0015       <QueryFunction type="Enumeration" value="QueryObjects"/>
0016       <QueryFunction type="Enumeration" value="QueryServerInformation"/>
0017       <QueryFunction type="Enumeration" value="QueryApplicationNamespaces"/>
0018     </RequestPayload>
0019   </BatchItem>
0020 </RequestMessage>
0021 <ResponseMessage>
0022   <ResponseHeader>
```

```

0022     <ProtocolVersion>
0023         <ProtocolVersionMajor type="Integer" value="1"/>
0024         <ProtocolVersionMinor type="Integer" value="0"/>
0025     </ProtocolVersion>
0026     <TimeStamp type="DateTime" value="2012-10-05T21:35:17+00:00"/>
0027     <BatchCount type="Integer" value="1"/>
0028 </ResponseHeader>
0029 <BatchItem>
0030     <Operation type="Enumeration" value="Query"/>
0031     <UniqueBatchItemID type="ByteString" value="01"/>
0032     <ResultStatus type="Enumeration" value="Success"/>
0033     <ResponsePayload>
0034         <Operation type="Enumeration" value="Query"/>
0035         <Operation type="Enumeration" value="Locate"/>
0036         <Operation type="Enumeration" value="Destroy"/>
0037         <Operation type="Enumeration" value="Get"/>
0038         <Operation type="Enumeration" value="Create"/>
0039         <Operation type="Enumeration" value="Register"/>
0040         <Operation type="Enumeration" value="GetAttributes"/>
0041         <Operation type="Enumeration" value="GetAttributeList"/>
0042         <Operation type="Enumeration" value="AddAttribute"/>
0043         <Operation type="Enumeration" value="ModifyAttribute"/>
0044         <Operation type="Enumeration" value="DeleteAttribute"/>
0045         <Operation type="Enumeration" value="Activate"/>
0046         <Operation type="Enumeration" value="Revoke"/>
0047         <Operation type="Enumeration" value="Check"/>
0048         <ObjectType type="Enumeration" value="SymmetricKey"/>
0049         <ObjectType type="Enumeration" value="Template"/>
0050         <VendorIdentification type="TextString" value="server-
0051         vendor.com"/>
0051     <ServerInformation>
0052     </ServerInformation>
0053     </ResponsePayload>
0054 </BatchItem>
0055 </ResponseMessage>

```

235

236 3.1.2 TL-M-2-10 - Write with new (created) key

237 This case may occur when the Write operation starts with the first block on a tape. The implementation
238 may choose which Write operations qualify for creation of a new key. Regardless of the initiating
239 circumstances, the Tape Library requests the server to create a new AES-256 symmetric key with
240 appropriate identifying information which is unique within the Application Namespace.

241 Additional custom attributes MAY be specified in order to:

- 242 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 243 - provide human-readable information (such as the tape Barcode value)
- 244 - provide information to support client-specific purposes

```

0001 # TIME 0
0001 <RequestMessage>
0002     <RequestHeader>
0003         <ProtocolVersion>
0004             <ProtocolVersionMajor type="Integer" value="1"/>
0005             <ProtocolVersionMinor type="Integer" value="0"/>
0006         </ProtocolVersion>
0007         <BatchOrderOption type="Boolean" value="true"/>
0008         <BatchCount type="Integer" value="2"/>

```

```

0009 </RequestHeader>
0010 <BatchItem>
0011   <Operation type="Enumeration" value="Create"/>
0012   <UniqueBatchItemID type="ByteString" value="01"/>
0013   <RequestPayload>
0014     <ObjectType type="Enumeration" value="SymmetricKey"/>
0015     <TemplateAttribute>
0016       <Attribute>
0017         <AttributeName type="TextString" value="x-ID"/>
0018         <AttributeValue type="TextString" value="TL-M-2-10"/>
0019       </Attribute>
0020       <Attribute>
0021         <AttributeName type="TextString" value="Name"/>
0022         <AttributeValue>
0023           <NameValue type="TextString"
0024 value="AAAAAAAA1A1AA12345678901234567"/>
0025           <NameType type="Enumeration"
0026 value="UninterpretedTextString"/>
0027         </AttributeValue>
0028       </Attribute>
0029         <AttributeName type="TextString" value="Cryptographic
0030 Algorithm"/>
0031         <AttributeValue type="Enumeration" value="AES"/>
0032       </Attribute>
0033         <AttributeName type="TextString" value="Cryptographic
0034 Length"/>
0035         <AttributeValue type="Integer" value="256"/>
0036       </Attribute>
0037         <AttributeName type="TextString" value="Cryptographic
0038 Usage Mask"/>
0039         <AttributeValue type="Integer" value="Decrypt Encrypt"/>
0040       </Attribute>
0041         <AttributeName type="TextString" value="Application
0042 Specific Information"/>
0043         <AttributeValue>
0044           <ApplicationNamespace type="TextString" value="LIBRARY-
0045 LTO"/>
0046           <ApplicationData type="TextString"
0047 value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
0048 000"/>
0049         </AttributeValue>
0050       </Attribute>
0051         <AttributeName type="TextString" value="x-Barcode"/>
0052         <AttributeValue type="TextString" value="XXA012A1"/>
0053       </Attribute>
0054         <AttributeName type="TextString" value="x-
0055 VendorAttribute1"/>
0056         <AttributeValue type="TextString" value="XXA012A1"/>
0057       </Attribute>
0058         <AttributeName type="TextString" value="x-
0059 VendorAttribute2"/>

```


0108	</BatchItem>
0109	</ResponseMessage>

245

246 3.1.3 TL-M-3-10 - Read an encrypted tape

247 The Tape Library constructs an identifier string based on the method in 2.3, then requests the server to
 248 Locate that string via ASI. A Get is then requested based on the key's unique identifier. The Tape Library
 249 MAY update attributes associated with the Symmetric Key Managed Object. The following test case
 250 shows extensive use of custom attributes. Custom attributes are not required if the Application Name is
 251 unique within the Application Namespace. An implementation may also use custom attributes for vendor-
 252 unique purposes, or to improve usability.

253 The test case destroys the key created in the previous test case to clean up after the test. Tape Library
 254 implementations **MAY** may elect to not perform this step.

255

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="0"/>
0006     </ProtocolVersion>
0007     <BatchOrderOption type="Boolean" value="true"/>
0008     <BatchCount type="Integer" value="2"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Locate"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <Attribute>
0015         <AttributeName type="TextString" value="Object Type"/>
0016         <AttributeValue type="Enumeration" value="SymmetricKey"/>
0017       </Attribute>
0018       <Attribute>
0019         <AttributeName type="TextString" value="Application Specific
Information"/>
0020         <AttributeValue>
0021           <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0022           <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0023         </AttributeValue>
0024       </Attribute>
0025     </RequestPayload>
0026   </BatchItem>
0027   <BatchItem>
0028     <Operation type="Enumeration" value="Get"/>
0029     <UniqueBatchItemID type="ByteString" value="02"/>
0030     <RequestPayload>
0031     </RequestPayload>
0032   </BatchItem>
0033 </RequestMessage>
0034 <ResponseMessage>
0035   <ResponseHeader>
0036     <ProtocolVersion>

```



```

Information"/>
0090     <AttributeValue>
0091     <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0092     <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0093     </AttributeValue>
0094     </Attribute>
0095     </RequestPayload>
0096 </BatchItem>
0097 <BatchItem>
0098   <Operation type="Enumeration" value="GetAttributeList"/>
0099   <UniqueBatchItemID type="ByteString" value="02"/>
0100   <RequestPayload>
0101   </RequestPayload>
0102 </BatchItem>
0103 </RequestMessage>
0104 <ResponseMessage>
0105   <ResponseHeader>
0106     <ProtocolVersion>
0107       <ProtocolVersionMajor type="Integer" value="1"/>
0108       <ProtocolVersionMinor type="Integer" value="0"/>
0109     </ProtocolVersion>
0110     <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0111     <BatchCount type="Integer" value="2"/>
0112   </ResponseHeader>
0113   <BatchItem>
0114     <Operation type="Enumeration" value="Locate"/>
0115     <UniqueBatchItemID type="ByteString" value="01"/>
0116     <ResultStatus type="Enumeration" value="Success"/>
0117     <ResponsePayload>
0118       <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER 0"/>
0119     </ResponsePayload>
0120   </BatchItem>
0121   <BatchItem>
0122     <Operation type="Enumeration" value="GetAttributeList"/>
0123     <UniqueBatchItemID type="ByteString" value="02"/>
0124     <ResultStatus type="Enumeration" value="Success"/>
0125     <ResponsePayload>
0126       <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0127       <AttributeName type="TextString" value="x-ID"/>
0128       <AttributeName type="TextString" value="x-Barcode"/>
0129       <AttributeName type="TextString" value="x-VendorAttribute1"/>
0130       <AttributeName type="TextString" value="x-VendorAttribute2"/>
0131       <AttributeName type="TextString" value="x-VendorAttribute3"/>
0132       <AttributeName type="TextString" value="Unique Identifier"/>
0133       <AttributeName type="TextString" value="Object Type"/>
0134       <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0135       <AttributeName type="TextString" value="Cryptographic
Length"/>
0136       <AttributeName type="TextString" value="Application Specific
Information"/>
0137       <AttributeName type="TextString" value="Cryptographic Usage
Mask"/>

```

0138	<AttributeName type="TextString" value="Digest"/>
0139	<AttributeName type="TextString" value="Initial Date"/>
0140	<AttributeName type="TextString" value="Last Change Date"/>
0141	<AttributeName type="TextString" value="Lease Time"/>
0142	<AttributeName type="TextString" value="Name"/>
0143	<AttributeName type="TextString" value="State"/>
0144	</ResponsePayload>
0145	</BatchItem>
0146	</ResponseMessage>
	# TIME 2
0147	<RequestMessage>
0148	<RequestHeader>
0149	<ProtocolVersion>
0150	<ProtocolVersionMajor type="Integer" value="1"/>
0151	<ProtocolVersionMinor type="Integer" value="0"/>
0152	</ProtocolVersion>
0153	<BatchOrderOption type="Boolean" value="true"/>
0154	<BatchCount type="Integer" value="2"/>
0155	</RequestHeader>
0156	<BatchItem>
0157	<Operation type="Enumeration" value="Locate"/>
0158	<UniqueBatchItemID type="ByteString" value="01"/>
0159	<RequestPayload>
0160	<Attribute>
0161	<AttributeName type="TextString" value="Object Type"/>
0162	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0163	</Attribute>
0164	<Attribute>
0165	<AttributeName type="TextString" value="Application Specific Information"/>
0166	<AttributeValue>
0167	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0168	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000"/>
0169	</AttributeValue>
0170	</Attribute>
0171	</RequestPayload>
0172	</BatchItem>
0173	<BatchItem>
0174	<Operation type="Enumeration" value="GetAttributes"/>
0175	<UniqueBatchItemID type="ByteString" value="02"/>
0176	<RequestPayload>
0177	</RequestPayload>
0178	</BatchItem>
0179	</RequestMessage>
0180	<ResponseMessage>
0181	<ResponseHeader>
0182	<ProtocolVersion>
0183	<ProtocolVersionMajor type="Integer" value="1"/>
0184	<ProtocolVersionMinor type="Integer" value="0"/>
0185	</ProtocolVersion>
0186	<TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0187	<BatchCount type="Integer" value="2"/>
0188	</ResponseHeader>
0189	<BatchItem>
0190	<Operation type="Enumeration" value="Locate"/>

```

0191     <UniqueBatchItemID type="ByteString" value="01"/>
0192     <ResultStatus type="Enumeration" value="Success"/>
0193     <ResponsePayload>
0194         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0195     </ResponsePayload>
0196 </BatchItem>
0197 </BatchItem>
0198     <Operation type="Enumeration" value="GetAttributes"/>
0199     <UniqueBatchItemID type="ByteString" value="02"/>
0200     <ResultStatus type="Enumeration" value="Success"/>
0201     <ResponsePayload>
0202         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0203         <Attribute>
0204             <AttributeName type="TextString" value="x-ID"/>
0205             <AttributeValue type="TextString" value="TL-M-2-10"/>
0206         </Attribute>
0207         <Attribute>
0208             <AttributeName type="TextString" value="x-Barcode"/>
0209             <AttributeValue type="TextString" value="XXA012A1"/>
0210         </Attribute>
0211         <Attribute>
0212             <AttributeName type="TextString" value="x-
VendorAttribute1"/>
0213             <AttributeValue type="TextString" value="XXA012A1"/>
0214         </Attribute>
0215         <Attribute>
0216             <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0217             <AttributeValue type="Integer" value="0"/>
0218         </Attribute>
0219         <Attribute>
0220             <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0221             <AttributeValue type="DateTime" value="2012-10-
05T22:08:19+00:00"/>
0222         </Attribute>
0223         <Attribute>
0224             <AttributeName type="TextString" value="Unique Identifier"/>
0225             <AttributeValue type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0226         </Attribute>
0227         <Attribute>
0228             <AttributeName type="TextString" value="Object Type"/>
0229             <AttributeValue type="Enumeration" value="SymmetricKey"/>
0230         </Attribute>
0231         <Attribute>
0232             <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0233             <AttributeValue type="Enumeration" value="AES"/>
0234         </Attribute>
0235         <Attribute>
0236             <AttributeName type="TextString" value="Cryptographic
Length"/>
0237             <AttributeValue type="Integer" value="256"/>
0238         </Attribute>
0239     </Attribute>

```

0240	<AttributeName type="TextString" value="Application Specific Information"/>
0241	<AttributeValue>
0242	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0243	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000"/>
0244	</AttributeValue>
0245	</Attribute>
0246	<Attribute>
0247	<AttributeName type="TextString" value="Cryptographic Usage Mask"/>
0248	<AttributeValue type="Integer" value="Decrypt Encrypt"/>
0249	</Attribute>
0250	<Attribute>
0251	<AttributeName type="TextString" value="Digest"/>
0252	<AttributeValue>
0253	<HashingAlgorithm type="Enumeration" value="SHA_256"/>
0254	<DigestValue type="ByteString" value="0bd3d7ada745e4eb34cc9d26cc84d4852a15906b2f77f80d01fc31c28108c49b"/>
0255	</AttributeValue>
0256	</Attribute>
0257	<Attribute>
0258	<AttributeName type="TextString" value="Initial Date"/>
0259	<AttributeValue type="DateTime" value="2012-10-05T21:41:46+00:00"/>
0260	</Attribute>
0261	<Attribute>
0262	<AttributeName type="TextString" value="Last Change Date"/>
0263	<AttributeValue type="DateTime" value="2012-10-05T21:41:46+00:00"/>
0264	</Attribute>
0265	<Attribute>
0266	<AttributeName type="TextString" value="Lease Time"/>
0267	<AttributeValue type="Interval" value="3600"/>
0268	</Attribute>
0269	<Attribute>
0270	<AttributeName type="TextString" value="Name"/>
0271	<AttributeValue>
0272	<NameValue type="TextString" value="AAAAAAA1A1AA12345678901234567"/>
0273	<NameType type="Enumeration" value="UninterpretedTextString"/>
0274	</AttributeValue>
0275	</Attribute>
0276	<Attribute>
0277	<AttributeName type="TextString" value="State"/>
0278	<AttributeValue type="Enumeration" value="PreActive"/>
0279	</Attribute>
0280	</ResponsePayload>
0281	</BatchItem>
0282	</ResponseMessage>
	# TIME 3
0283	<RequestMessage>
0284	<RequestHeader>
0285	<ProtocolVersion>

0286	<ProtocolVersionMajor type="Integer" value="1"/>
0287	<ProtocolVersionMinor type="Integer" value="0"/>
0288	</ProtocolVersion>
0289	<BatchOrderOption type="Boolean" value="true"/>
0290	<BatchCount type="Integer" value="3"/>
0291	</RequestHeader>
0292	<BatchItem>
0293	<Operation type="Enumeration" value="Locate"/>
0294	<UniqueBatchItemID type="ByteString" value="01"/>
0295	<RequestPayload>
0296	<Attribute>
0297	<AttributeName type="TextString" value="Object Type"/>
0298	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0299	</Attribute>
0300	<Attribute>
0301	<AttributeName type="TextString" value="Application Specific Information"/>
0302	<AttributeValue>
0303	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0304	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000"/>
0305	</AttributeValue>
0306	</Attribute>
0307	</RequestPayload>
0308	</BatchItem>
0309	<BatchItem>
0310	<Operation type="Enumeration" value="ModifyAttribute"/>
0311	<UniqueBatchItemID type="ByteString" value="02"/>
0312	<RequestPayload>
0313	<Attribute>
0314	<AttributeName type="TextString" value="x-VendorAttribute2"/>
0315	<AttributeValue type="DateTime" value="2012-10-05T22:27:06+00:00"/>
0316	</Attribute>
0317	</RequestPayload>
0318	</BatchItem>
0319	<BatchItem>
0320	<Operation type="Enumeration" value="ModifyAttribute"/>
0321	<UniqueBatchItemID type="ByteString" value="03"/>
0322	<RequestPayload>
0323	<Attribute>
0324	<AttributeName type="TextString" value="x-VendorAttribute3"/>
0325	<AttributeValue type="Integer" value="1"/>
0326	</Attribute>
0327	</RequestPayload>
0328	</BatchItem>
0329	</RequestMessage>
0330	<ResponseMessage>
0331	<ResponseHeader>
0332	<ProtocolVersion>
0333	<ProtocolVersionMajor type="Integer" value="1"/>
0334	<ProtocolVersionMinor type="Integer" value="0"/>
0335	</ProtocolVersion>
0336	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>

```

0337     <BatchCount type="Integer" value="3"/>
0338 </ResponseHeader>
0339 <BatchItem>
0340     <Operation type="Enumeration" value="Locate"/>
0341     <UniqueBatchItemID type="ByteString" value="01"/>
0342     <ResultStatus type="Enumeration" value="Success"/>
0343     <ResponsePayload>
0344         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0345     </ResponsePayload>
0346 </BatchItem>
0347 <BatchItem>
0348     <Operation type="Enumeration" value="ModifyAttribute"/>
0349     <UniqueBatchItemID type="ByteString" value="02"/>
0350     <ResultStatus type="Enumeration" value="Success"/>
0351     <ResponsePayload>
0352         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0353         <Attribute>
0354             <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0355             <AttributeValue type="DateTime" value="2012-10-
05T22:27:06+00:00"/>
0356         </Attribute>
0357     </ResponsePayload>
0358 </BatchItem>
0359 <BatchItem>
0360     <Operation type="Enumeration" value="ModifyAttribute"/>
0361     <UniqueBatchItemID type="ByteString" value="03"/>
0362     <ResultStatus type="Enumeration" value="Success"/>
0363     <ResponsePayload>
0364         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0365         <Attribute>
0366             <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0367             <AttributeValue type="Integer" value="1"/>
0368         </Attribute>
0369     </ResponsePayload>
0370 </BatchItem>
0371 </ResponseMessage>
# TIME 4
0372 <RequestMessage>
0373 <RequestHeader>
0374     <ProtocolVersion>
0375         <ProtocolVersionMajor type="Integer" value="1"/>
0376         <ProtocolVersionMinor type="Integer" value="0"/>
0377     </ProtocolVersion>
0378     <BatchCount type="Integer" value="1"/>
0379 </RequestHeader>
0380 <BatchItem>
0381     <Operation type="Enumeration" value="Destroy"/>
0382     <RequestPayload>
0383         <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0384     </RequestPayload>
0385 </BatchItem>
0386 </RequestMessage>

```

```

0387 <ResponseMessage>
0388   <ResponseHeader>
0389     <ProtocolVersion>
0390       <ProtocolVersionMajor type="Integer" value="1"/>
0391       <ProtocolVersionMinor type="Integer" value="0"/>
0392     </ProtocolVersion>
0393     <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0394     <BatchCount type="Integer" value="1"/>
0395   </ResponseHeader>
0396   <BatchItem>
0397     <Operation type="Enumeration" value="Destroy"/>
0398     <ResultStatus type="Enumeration" value="Success"/>
0399     <ResponsePayload>
0400       <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0401     </ResponsePayload>
0402   </BatchItem>
0403 </ResponseMessage>

```

256

257 **3.2 Mandatory Test Cases KMIP v1.1**

258 **3.1.43.2.1 TL-M-1-11 - Configuration**

259 Determine server configuration details including operations supported (only the mandatory operations are
260 listed in the response example), objects supported (only the mandatory objects types are listed in the
261 response example), optional server information, and optional list of application name spaces.

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="1"/>
0006     </ProtocolVersion>
0007     <BatchCount type="Integer" value="1"/>
0008   </RequestHeader>
0009   <BatchItem>
0010     <Operation type="Enumeration" value="Query"/>
0011     <UniqueBatchItemID type="ByteString" value="01"/>
0012     <RequestPayload>
0013       <QueryFunction type="Enumeration" value="QueryOperations"/>
0014       <QueryFunction type="Enumeration" value="QueryObjects"/>
0015       <QueryFunction type="Enumeration"
value="QueryServerInformation"/>
0016       <QueryFunction type="Enumeration"
value="QueryApplicationNamespaces"/>
0017     </RequestPayload>
0018   </BatchItem>
0019 </RequestMessage>
0020 <ResponseMessage>
0021   <ResponseHeader>
0022     <ProtocolVersion>
0023       <ProtocolVersionMajor type="Integer" value="1"/>
0024       <ProtocolVersionMinor type="Integer" value="1"/>
0025     </ProtocolVersion>
0026     <TimeStamp type="DateTime" value="2012-10-05T21:35:17+00:00"/>
0027     <BatchCount type="Integer" value="1"/>

```

```

0028 </ResponseHeader>
0029 <BatchItem>
0030   <Operation type="Enumeration" value="Query"/>
0031   <UniqueBatchItemID type="ByteString" value="01"/>
0032   <ResultStatus type="Enumeration" value="Success"/>
0033   <ResponsePayload>
0034     <Operation type="Enumeration" value="Query"/>
0035     <Operation type="Enumeration" value="Locate"/>
0036     <Operation type="Enumeration" value="Destroy"/>
0037     <Operation type="Enumeration" value="Get"/>
0038     <Operation type="Enumeration" value="Create"/>
0039     <Operation type="Enumeration" value="Register"/>
0040     <Operation type="Enumeration" value="GetAttributes"/>
0041     <Operation type="Enumeration" value="GetAttributeList"/>
0042     <Operation type="Enumeration" value="AddAttribute"/>
0043     <Operation type="Enumeration" value="ModifyAttribute"/>
0044     <Operation type="Enumeration" value="DeleteAttribute"/>
0045     <Operation type="Enumeration" value="Activate"/>
0046     <Operation type="Enumeration" value="Revoke"/>
0047     <Operation type="Enumeration" value="Check"/>
0048     <ObjectType type="Enumeration" value="SymmetricKey"/>
0049     <ObjectType type="Enumeration" value="Template"/>
0050     <VendorIdentification type="TextString" value="server-
vendor.com"/>
0051     <ServerInformation>
0052     </ServerInformation>
0053   </ResponsePayload>
0054 </BatchItem>
0055 </ResponseMessage>

```

262

263 **3.1.53.2.2 TL-M-2-11 - Write with new (created) key**

264 This case may occur when the Write operation starts with the first block on a tape. The implementation
265 may choose which Write operations qualify for creation of a new key. Regardless of the initiating
266 circumstances, the Tape Library requests the server to create a new AES-256 symmetric key with
267 appropriate identifying information which is unique within the Application Namespace.

268 Additional custom attributes MAY be specified in order to:

- 269 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 270 - provide human-readable information (such as the tape Barcode value)
- 271 - provide information to support client-specific purposes

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="1"/>
0006     </ProtocolVersion>
0007     <BatchOrderOption type="Boolean" value="true"/>
0008     <BatchCount type="Integer" value="2"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Create"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <ObjectType type="Enumeration" value="SymmetricKey"/>

```



```

0015     <TemplateAttribute>
0016     <Attribute>
0017         <AttributeName type="TextString" value="x-ID"/>
0018         <AttributeValue type="TextString" value="TL-M-2-11"/>
0019     </Attribute>
0020     <Attribute>
0021         <AttributeName type="TextString" value="Name"/>
0022         <AttributeValue>
0023             <NameValue type="TextString"
value="AAAAAAA1A1AA12345678901234567"/>
0024             <NameType type="Enumeration"
value="UninterpretedTextString"/>
0025         </AttributeValue>
0026     </Attribute>
0027     <Attribute>
0028         <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0029         <AttributeValue type="Enumeration" value="AES"/>
0030     </Attribute>
0031     <Attribute>
0032         <AttributeName type="TextString" value="Cryptographic
Length"/>
0033         <AttributeValue type="Integer" value="256"/>
0034     </Attribute>
0035     <Attribute>
0036         <AttributeName type="TextString" value="Cryptographic
Usage Mask"/>
0037         <AttributeValue type="Integer" value="Decrypt Encrypt"/>
0038     </Attribute>
0039     <Attribute>
0040         <AttributeName type="TextString" value="Application
Specific Information"/>
0041         <AttributeValue>
0042             <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0043             <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0044         </AttributeValue>
0045     </Attribute>
0046     <Attribute>
0047         <AttributeName type="TextString" value="x-Barcode"/>
0048         <AttributeValue type="TextString" value="XXA012A1"/>
0049     </Attribute>
0050     <Attribute>
0051         <AttributeName type="TextString" value="x-
VendorAttribute1"/>
0052         <AttributeValue type="TextString" value="XXA012A1"/>
0053     </Attribute>
0054     <Attribute>
0055         <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0056         <AttributeValue type="Integer" value="0"/>
0057     </Attribute>
0058     <Attribute>
0059         <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0060         <AttributeValue type="DateTime" value="2012-10-

```


273 **3.1.63.2.3 TL-M-3-11 - Read an encrypted tape**

274 The Tape Library constructs an identifier string based on the method in 2.3, then requests the server to
 275 Locate that string via ASI. A Get is then requested based on the key's unique identifier. The Tape Library
 276 MAY update attributes associated with the Symmetric Key Managed Object. The following test case
 277 shows extensive use of custom attributes. Custom attributes are not required if the Application Name is
 278 unique within the Application Namespace. An implementation may also use custom attributes for vendor-
 279 unique purposes, or to improve usability.

280 The test case destroys the key created in the previous test case to clean up after the test. Tape Library
 281 implementations MAY may elect to not perform this step.

282

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="1"/>
0006     </ProtocolVersion>
0007     <BatchOrderOption type="Boolean" value="true"/>
0008     <BatchCount type="Integer" value="2"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Locate"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <Attribute>
0015         <AttributeName type="TextString" value="Object Type"/>
0016         <AttributeValue type="Enumeration" value="SymmetricKey"/>
0017       </Attribute>
0018       <Attribute>
0019         <AttributeName type="TextString" value="Application Specific
Information"/>
0020         <AttributeValue>
0021           <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0022           <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF123400
000"/>
0023         </AttributeValue>
0024       </Attribute>
0025     </RequestPayload>
0026   </BatchItem>
0027   <BatchItem>
0028     <Operation type="Enumeration" value="Get"/>
0029     <UniqueBatchItemID type="ByteString" value="02"/>
0030     <RequestPayload>
0031     </RequestPayload>
0032   </BatchItem>
0033 </RequestMessage>
0034 <ResponseMessage>
0035   <ResponseHeader>
0036     <ProtocolVersion>
0037       <ProtocolVersionMajor type="Integer" value="1"/>
0038       <ProtocolVersionMinor type="Integer" value="1"/>
0039     </ProtocolVersion>
0040     <TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0041     <BatchCount type="Integer" value="2"/>
  
```



```

0093     value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
0094     000"/>
0095         </AttributeValue>
0096     </Attribute>
0097 </RequestPayload>
0098 </BatchItem>
0099 <BatchItem>
0100     <Operation type="Enumeration" value="GetAttributeList"/>
0101     <UniqueBatchItemID type="ByteString" value="02"/>
0102     <RequestPayload>
0103     </RequestPayload>
0104 </BatchItem>
0105 </RequestMessage>
0106 <ResponseMessage>
0107     <ResponseHeader>
0108         <ProtocolVersion>
0109             <ProtocolVersionMajor type="Integer" value="1"/>
0110             <ProtocolVersionMinor type="Integer" value="1"/>
0111         </ProtocolVersion>
0112         <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0113         <BatchCount type="Integer" value="2"/>
0114     </ResponseHeader>
0115     <BatchItem>
0116         <Operation type="Enumeration" value="Locate"/>
0117         <UniqueBatchItemID type="ByteString" value="01"/>
0118         <ResponseStatus type="Enumeration" value="Success"/>
0119         <ResponsePayload>
0120             <UniqueIdentifier type="TextString"
0121             value="$UNIQUE_IDENTIFIER 0"/>
0122         </ResponsePayload>
0123     </BatchItem>
0124     <BatchItem>
0125         <Operation type="Enumeration" value="GetAttributeList"/>
0126         <UniqueBatchItemID type="ByteString" value="02"/>
0127         <ResponseStatus type="Enumeration" value="Success"/>
0128         <ResponsePayload>
0129             <UniqueIdentifier type="TextString"
0130             value="$UNIQUE_IDENTIFIER_0"/>
0131             <AttributeName type="TextString" value="x-ID"/>
0132             <AttributeName type="TextString" value="x-Barcode"/>
0133             <AttributeName type="TextString" value="x-VendorAttribute1"/>
0134             <AttributeName type="TextString" value="x-VendorAttribute2"/>
0135             <AttributeName type="TextString" value="x-VendorAttribute3"/>
0136             <AttributeName type="TextString" value="Unique Identifier"/>
0137             <AttributeName type="TextString" value="Object Type"/>
0138             <AttributeName type="TextString" value="Cryptographic
0139             Algorithm"/>
0140             <AttributeName type="TextString" value="Cryptographic
0141             Length"/>
0142             <AttributeName type="TextString" value="Application Specific
0143             Information"/>
0144             <AttributeName type="TextString" value="Cryptographic Usage
0145             Mask"/>
0146             <AttributeName type="TextString" value="Digest"/>
0147             <AttributeName type="TextString" value="Initial Date"/>
0148             <AttributeName type="TextString" value="Last Change Date"/>
0149             <AttributeName type="TextString" value="Lease Time"/>
0150             <AttributeName type="TextString" value="Name"/>

```

0143	<AttributeName type="TextString" value="State"/>
0144	</ResponsePayload>
0145	</BatchItem>
0146	</ResponseMessage>
	# TIME 2
0147	<RequestMessage>
0148	<RequestHeader>
0149	<ProtocolVersion>
0150	<ProtocolVersionMajor type="Integer" value="1"/>
0151	<ProtocolVersionMinor type="Integer" value="1"/>
0152	</ProtocolVersion>
0153	<BatchOrderOption type="Boolean" value="true"/>
0154	<BatchCount type="Integer" value="2"/>
0155	</RequestHeader>
0156	<BatchItem>
0157	<Operation type="Enumeration" value="Locate"/>
0158	<UniqueBatchItemID type="ByteString" value="01"/>
0159	<RequestPayload>
0160	<Attribute>
0161	<AttributeName type="TextString" value="Object Type"/>
0162	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0163	</Attribute>
0164	<Attribute>
0165	<AttributeName type="TextString" value="Application Specific Information"/>
0166	<AttributeValue>
0167	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0168	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000"/>
0169	</AttributeValue>
0170	</Attribute>
0171	</RequestPayload>
0172	</BatchItem>
0173	<BatchItem>
0174	<Operation type="Enumeration" value="GetAttributes"/>
0175	<UniqueBatchItemID type="ByteString" value="02"/>
0176	<RequestPayload>
0177	</RequestPayload>
0178	</BatchItem>
0179	</RequestMessage>
0180	<ResponseMessage>
0181	<ResponseHeader>
0182	<ProtocolVersion>
0183	<ProtocolVersionMajor type="Integer" value="1"/>
0184	<ProtocolVersionMinor type="Integer" value="1"/>
0185	</ProtocolVersion>
0186	<TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0187	<BatchCount type="Integer" value="2"/>
0188	</ResponseHeader>
0189	<BatchItem>
0190	<Operation type="Enumeration" value="Locate"/>
0191	<UniqueBatchItemID type="ByteString" value="01"/>
0192	<ResultStatus type="Enumeration" value="Success"/>
0193	<ResponsePayload>
0194	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER 0"/>

```

0195     </ResponsePayload>
0196 </BatchItem>
0197 <BatchItem>
0198   <Operation type="Enumeration" value="GetAttributes"/>
0199   <UniqueBatchItemID type="ByteString" value="02"/>
0200   <ResultStatus type="Enumeration" value="Success"/>
0201   <ResponsePayload>
0202     <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0203     <Attribute>
0204       <AttributeName type="TextString" value="x-ID"/>
0205       <AttributeValue type="TextString" value="TL-M-2-11"/>
0206     </Attribute>
0207     <Attribute>
0208       <AttributeName type="TextString" value="x-
VendorAttribute1"/>
0209       <AttributeValue type="TextString" value="XXA012A1"/>
0210     </Attribute>
0211     <Attribute>
0212       <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0213       <AttributeValue type="Integer" value="0"/>
0214     </Attribute>
0215     <Attribute>
0216       <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0217       <AttributeValue type="DateTime" value="2012-10-
05T22:08:19+00:00"/>
0218     </Attribute>
0219     <Attribute>
0220       <AttributeName type="TextString" value="Unique Identifier"/>
0221       <AttributeValue type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0222     </Attribute>
0223     <Attribute>
0224       <AttributeName type="TextString" value="Object Type"/>
0225       <AttributeValue type="Enumeration" value="SymmetricKey"/>
0226     </Attribute>
0227     <Attribute>
0228       <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0229       <AttributeValue type="Enumeration" value="AES"/>
0230     </Attribute>
0231     <Attribute>
0232       <AttributeName type="TextString" value="Cryptographic
Length"/>
0233       <AttributeValue type="Integer" value="256"/>
0234     </Attribute>
0235     <Attribute>
0236       <AttributeName type="TextString" value="Application Specific
Information"/>
0237       <AttributeValue>
0238         <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0239         <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0240       </AttributeValue>

```

0241	</Attribute>
0242	<Attribute>
0243	<AttributeName type="TextString" value="Cryptographic Usage Mask"/>
0244	<AttributeValue type="Integer" value="Decrypt Encrypt"/>
0245	</Attribute>
0246	<Attribute>
0247	<AttributeName type="TextString" value="Digest"/>
0248	<AttributeValue>
0249	<HashingAlgorithm type="Enumeration" value="SHA_256"/>
0250	<DigestValue type="ByteString" value="0bd3d7ada745e4eb34cc9d26cc84d4852a15906b2f77f80d01fc31c28108c49b"/>
0251	<KeyFormatType type="Enumeration" value="Raw"/>
0252	</AttributeValue>
0253	</Attribute>
0254	<Attribute>
0255	<AttributeName type="TextString" value="Fresh"/>
0256	<AttributeValue type="Boolean" value="false"/>
0257	</Attribute>
0258	<Attribute>
0259	<AttributeName type="TextString" value="Initial Date"/>
0260	<AttributeValue type="DateTime" value="2012-10-05T21:41:46+00:00"/>
0261	</Attribute>
0262	<Attribute>
0263	<AttributeName type="TextString" value="Last Change Date"/>
0264	<AttributeValue type="DateTime" value="2012-10-05T21:41:46+00:00"/>
0265	</Attribute>
0266	<Attribute>
0267	<AttributeName type="TextString" value="Lease Time"/>
0268	<AttributeValue type="Interval" value="3600"/>
0269	</Attribute>
0270	<Attribute>
0271	<AttributeName type="TextString" value="Name"/>
0272	<AttributeValue>
0273	<NameValue type="TextString" value="AAAAAAA1A1AA12345678901234567"/>
0274	<NameType type="Enumeration" value="UninterpretedTextString"/>
0275	</AttributeValue>
0276	</Attribute>
0277	<Attribute>
0278	<AttributeName type="TextString" value="State"/>
0279	<AttributeValue type="Enumeration" value="PreActive"/>
0280	</Attribute>
0281	</ResponsePayload>
0282	</BatchItem>
0283	</ResponseMessage>
0284	# TIME 3 <RequestMessage>
0285	<RequestHeader>
0286	<ProtocolVersion>
0287	<ProtocolVersionMajor type="Integer" value="1"/>
0288	<ProtocolVersionMinor type="Integer" value="1"/>
0289	</ProtocolVersion>
0290	<BatchOrderOption type="Boolean" value="true"/>


```

0291     <BatchCount type="Integer" value="3"/>
0292 </RequestHeader>
0293 <BatchItem>
0294     <Operation type="Enumeration" value="Locate"/>
0295     <UniqueBatchItemID type="ByteString" value="01"/>
0296     <RequestPayload>
0297         <Attribute>
0298             <AttributeName type="TextString" value="Object Type"/>
0299             <AttributeValue type="Enumeration" value="SymmetricKey"/>
0300         </Attribute>
0301         <Attribute>
0302             <AttributeName type="TextString" value="Application Specific
Information"/>
0303             <AttributeValue>
0304                 <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0305                 <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0306             </AttributeValue>
0307         </Attribute>
0308     </RequestPayload>
0309 </BatchItem>
0310 <BatchItem>
0311     <Operation type="Enumeration" value="ModifyAttribute"/>
0312     <UniqueBatchItemID type="ByteString" value="02"/>
0313     <RequestPayload>
0314         <Attribute>
0315             <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0316             <AttributeValue type="DateTime" value="2012-10-
05T22:27:06+00:00"/>
0317         </Attribute>
0318     </RequestPayload>
0319 </BatchItem>
0320 <BatchItem>
0321     <Operation type="Enumeration" value="ModifyAttribute"/>
0322     <UniqueBatchItemID type="ByteString" value="03"/>
0323     <RequestPayload>
0324         <Attribute>
0325             <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0326             <AttributeValue type="Integer" value="1"/>
0327         </Attribute>
0328     </RequestPayload>
0329 </BatchItem>
0330 </RequestMessage>
0331 <ResponseMessage>
0332     <ResponseHeader>
0333         <ProtocolVersion>
0334             <ProtocolVersionMajor type="Integer" value="1"/>
0335             <ProtocolVersionMinor type="Integer" value="1"/>
0336         </ProtocolVersion>
0337         <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0338         <BatchCount type="Integer" value="3"/>
0339     </ResponseHeader>
0340     <BatchItem>
0341         <Operation type="Enumeration" value="Locate"/>

```

0342	<UniqueBatchItemID type="ByteString" value="01"/>
0343	<ResultStatus type="Enumeration" value="Success"/>
0344	<ResponsePayload>
0345	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0346	</ResponsePayload>
0347	</BatchItem>
0348	<BatchItem>
0349	<Operation type="Enumeration" value="ModifyAttribute"/>
0350	<UniqueBatchItemID type="ByteString" value="02"/>
0351	<ResultStatus type="Enumeration" value="Success"/>
0352	<ResponsePayload>
0353	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0354	<Attribute>
0355	<AttributeName type="TextString" value="x-
	VendorAttribute2"/>
0356	<AttributeValue type="DateTime" value="2012-10-
	05T22:27:06+00:00"/>
0357	</Attribute>
0358	</ResponsePayload>
0359	</BatchItem>
0360	<BatchItem>
0361	<Operation type="Enumeration" value="ModifyAttribute"/>
0362	<UniqueBatchItemID type="ByteString" value="03"/>
0363	<ResultStatus type="Enumeration" value="Success"/>
0364	<ResponsePayload>
0365	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0366	<Attribute>
0367	<AttributeName type="TextString" value="x-
	VendorAttribute3"/>
0368	<AttributeValue type="Integer" value="1"/>
0369	</Attribute>
0370	</ResponsePayload>
0371	</BatchItem>
0372	</ResponseMessage>
	<i># TIME 4</i>
0373	<RequestMessage>
0374	<RequestHeader>
0375	<ProtocolVersion>
0376	<ProtocolVersionMajor type="Integer" value="1"/>
0377	<ProtocolVersionMinor type="Integer" value="1"/>
0378	</ProtocolVersion>
0379	<BatchCount type="Integer" value="1"/>
0380	</RequestHeader>
0381	<BatchItem>
0382	<Operation type="Enumeration" value="Destroy"/>
0383	<RequestPayload>
0384	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0385	</RequestPayload>
0386	</BatchItem>
0387	</RequestMessage>
0388	<ResponseMessage>
0389	<ResponseHeader>
0390	<ProtocolVersion>
0391	<ProtocolVersionMajor type="Integer" value="1"/>

```

0392     <ProtocolVersionMinor type="Integer" value="1"/>
0393     </ProtocolVersion>
0394     <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0395     <BatchCount type="Integer" value="1"/>
0396     </ResponseHeader>
0397     <BatchItem>
0398         <Operation type="Enumeration" value="Destroy"/>
0399         <ResultStatus type="Enumeration" value="Success"/>
0400         <ResponsePayload>
0401             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0402         </ResponsePayload>
0403     </BatchItem>
0404 </ResponseMessage>

```

283

284 **3.3 Mandatory Test Cases KMIP v1.2**

285 **3.1.73.3.1 TL-M-1-12 - Configuration**

286 Determine server configuration details including operations supported (only the mandatory operations are
287 listed in the response example), objects supported (only the mandatory objects types are listed in the
288 response example), optional server information, and optional list of application name spaces.

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="2"/>
0006     </ProtocolVersion>
0007     <BatchCount type="Integer" value="1"/>
0008   </RequestHeader>
0009   <BatchItem>
0010     <Operation type="Enumeration" value="Query"/>
0011     <UniqueBatchItemID type="ByteString" value="01"/>
0012     <RequestPayload>
0013       <QueryFunction type="Enumeration" value="QueryOperations"/>
0014       <QueryFunction type="Enumeration" value="QueryObjects"/>
0015       <QueryFunction type="Enumeration"
value="QueryServerInformation"/>
0016       <QueryFunction type="Enumeration"
value="QueryApplicationNamespaces"/>
0017     </RequestPayload>
0018   </BatchItem>
0019 </RequestMessage>
0020 <ResponseMessage>
0021   <ResponseHeader>
0022     <ProtocolVersion>
0023       <ProtocolVersionMajor type="Integer" value="1"/>
0024       <ProtocolVersionMinor type="Integer" value="2"/>
0025     </ProtocolVersion>
0026     <TimeStamp type="DateTime" value="2012-10-05T21:35:17+00:00"/>
0027     <BatchCount type="Integer" value="1"/>
0028   </ResponseHeader>
0029   <BatchItem>
0030     <Operation type="Enumeration" value="Query"/>
0031     <UniqueBatchItemID type="ByteString" value="01"/>

```

```

0032 <ResponseStatus type="Enumeration" value="Success"/>
0033 <ResponsePayload>
0034   <Operation type="Enumeration" value="Query"/>
0035   <Operation type="Enumeration" value="Locate"/>
0036   <Operation type="Enumeration" value="Destroy"/>
0037   <Operation type="Enumeration" value="Get"/>
0038   <Operation type="Enumeration" value="Create"/>
0039   <Operation type="Enumeration" value="Register"/>
0040   <Operation type="Enumeration" value="GetAttributes"/>
0041   <Operation type="Enumeration" value="GetAttributeList"/>
0042   <Operation type="Enumeration" value="AddAttribute"/>
0043   <Operation type="Enumeration" value="ModifyAttribute"/>
0044   <Operation type="Enumeration" value="DeleteAttribute"/>
0045   <Operation type="Enumeration" value="Activate"/>
0046   <Operation type="Enumeration" value="Revoke"/>
0047   <Operation type="Enumeration" value="Check"/>
0048   <ObjectType type="Enumeration" value="SymmetricKey"/>
0049   <ObjectType type="Enumeration" value="Template"/>
0050   <VendorIdentification type="TextString" value="server-
vendor.com"/>
0051   <ServerInformation>
0052   </ServerInformation>
0053 </ResponsePayload>
0054 </BatchItem>
0055 </ResponseMessage>

```

289

290 **3.1.83.3.2 TL-M-2-12 - Write with new (created) key**

291 This case may occur when the Write operation starts with the first block on a tape. The implementation
292 may choose which Write operations qualify for creation of a new key. Regardless of the initiating
293 circumstances, the Tape Library requests the server to create a new AES-256 symmetric key with
294 appropriate identifying information which is unique within the Application Namespace.

295 Additional custom attributes MAY be specified in order to:

- 296 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 297 - provide human-readable information (such as the tape Barcode value)
- 298 - provide information to support client-specific purposes

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="2"/>
0006     </ProtocolVersion>
0007     <BatchOrderOption type="Boolean" value="true"/>
0008     <BatchCount type="Integer" value="2"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Create"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <ObjectType type="Enumeration" value="SymmetricKey"/>
0015       <TemplateAttribute>
0016         <Attribute>
0017           <AttributeName type="TextString" value="x-ID"/>
0018           <AttributeValue type="TextString" value="TL-M-2-12"/>

```

```

0019     </Attribute>
0020     <Attribute>
0021         <AttributeName type="TextString" value="Alternative
Name" />
0022         <AttributeValue>
0023             <AlternativeNameValue type="TextString"
value="XXA012A1" />
0024             <AlternativeNameType type="Enumeration"
value="UninterpretedTextString" />
0025         </AttributeValue>
0026     </Attribute>
0027     <Attribute>
0028         <AttributeName type="TextString" value="Name" />
0029         <AttributeValue>
0030             <NameValue type="TextString"
value="AAAAAAAAA1A1AA12345678901234567" />
0031             <NameType type="Enumeration"
value="UninterpretedTextString" />
0032         </AttributeValue>
0033     </Attribute>
0034     <Attribute>
0035         <AttributeName type="TextString" value="Cryptographic
Algorithm" />
0036         <AttributeValue type="Enumeration" value="AES" />
0037     </Attribute>
0038     <Attribute>
0039         <AttributeName type="TextString" value="Cryptographic
Length" />
0040         <AttributeValue type="Integer" value="256" />
0041     </Attribute>
0042     <Attribute>
0043         <AttributeName type="TextString" value="Cryptographic
Usage Mask" />
0044         <AttributeValue type="Integer" value="Decrypt Encrypt" />
0045     </Attribute>
0046     <Attribute>
0047         <AttributeName type="TextString" value="Application
Specific Information" />
0048         <AttributeValue>
0049             <ApplicationNamespace type="TextString" value="LIBRARY-
LTO" />
0050             <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000" />
0051         </AttributeValue>
0052     </Attribute>
0053     <Attribute>
0054         <AttributeName type="TextString" value="x-Barcode" />
0055         <AttributeValue type="TextString" value="XXA012A1" />
0056     </Attribute>
0057     <Attribute>
0058         <AttributeName type="TextString" value="x-
VendorAttribute1" />
0059         <AttributeValue type="TextString" value="XXA012A1" />
0060     </Attribute>
0061     <Attribute>
0062         <AttributeName type="TextString" value="x-
VendorAttribute2" />

```


0115	</BatchItem>
0116	</ResponseMessage>

299

300 **3.1.93.3.3 TL-M-3-12 - Read an encrypted tape**

301 The Tape Library constructs an identifier string based on the method in 2.3, then requests the server to
 302 Locate that string via ASI. A Get is then requested based on the key's unique identifier. The Tape Library
 303 MAY update attributes associated with the Symmetric Key Managed Object. The following test case
 304 shows extensive use of custom attributes. Custom attributes are not required if the Application Name is
 305 unique within the Application Namespace. An implementation may also use custom attributes for vendor-
 306 unique purposes, or to improve usability.

307 The test case destroys the key created in the previous test case to clean up after the test. Tape Library
 308 implementations **MAY** may elect to not perform this step.

309

```

# TIME 0
0001 <RequestMessage>
0002   <RequestHeader>
0003     <ProtocolVersion>
0004       <ProtocolVersionMajor type="Integer" value="1"/>
0005       <ProtocolVersionMinor type="Integer" value="2"/>
0006     </ProtocolVersion>
0007     <BatchOrderOption type="Boolean" value="true"/>
0008     <BatchCount type="Integer" value="2"/>
0009   </RequestHeader>
0010   <BatchItem>
0011     <Operation type="Enumeration" value="Locate"/>
0012     <UniqueBatchItemID type="ByteString" value="01"/>
0013     <RequestPayload>
0014       <Attribute>
0015         <AttributeName type="TextString" value="Object Type"/>
0016         <AttributeValue type="Enumeration" value="SymmetricKey"/>
0017       </Attribute>
0018       <Attribute>
0019         <AttributeName type="TextString" value="Application Specific
Information"/>
0020         <AttributeValue>
0021           <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0022           <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0023         </AttributeValue>
0024       </Attribute>
0025     </RequestPayload>
0026   </BatchItem>
0027   <BatchItem>
0028     <Operation type="Enumeration" value="Get"/>
0029     <UniqueBatchItemID type="ByteString" value="02"/>
0030     <RequestPayload>
0031     </RequestPayload>
0032   </BatchItem>
0033 </RequestMessage>
0034 <ResponseMessage>
0035   <ResponseHeader>
0036     <ProtocolVersion>

```



```

Information"/>
0090     <AttributeValue>
0091     <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0092     <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0093     </AttributeValue>
0094     </Attribute>
0095     </RequestPayload>
0096 </BatchItem>
0097 <BatchItem>
0098   <Operation type="Enumeration" value="GetAttributeList"/>
0099   <UniqueBatchItemID type="ByteString" value="02"/>
0100   <RequestPayload>
0101   </RequestPayload>
0102 </BatchItem>
0103 </RequestMessage>
0104 <ResponseMessage>
0105   <ResponseHeader>
0106     <ProtocolVersion>
0107       <ProtocolVersionMajor type="Integer" value="1"/>
0108       <ProtocolVersionMinor type="Integer" value="2"/>
0109     </ProtocolVersion>
0110     <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0111     <BatchCount type="Integer" value="2"/>
0112   </ResponseHeader>
0113   <BatchItem>
0114     <Operation type="Enumeration" value="Locate"/>
0115     <UniqueBatchItemID type="ByteString" value="01"/>
0116     <ResultStatus type="Enumeration" value="Success"/>
0117     <ResponsePayload>
0118       <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER 0"/>
0119     </ResponsePayload>
0120   </BatchItem>
0121   <BatchItem>
0122     <Operation type="Enumeration" value="GetAttributeList"/>
0123     <UniqueBatchItemID type="ByteString" value="02"/>
0124     <ResultStatus type="Enumeration" value="Success"/>
0125     <ResponsePayload>
0126       <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0127       <AttributeName type="TextString" value="x-ID"/>
0128       <AttributeName type="TextString" value="x-Barcode"/>
0129       <AttributeName type="TextString" value="x-VendorAttribute1"/>
0130       <AttributeName type="TextString" value="x-VendorAttribute2"/>
0131       <AttributeName type="TextString" value="x-VendorAttribute3"/>
0132       <AttributeName type="TextString" value="Unique Identifier"/>
0133       <AttributeName type="TextString" value="Object Type"/>
0134       <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0135       <AttributeName type="TextString" value="Cryptographic
Length"/>
0136       <AttributeName type="TextString" value="Application Specific
Information"/>
0137       <AttributeName type="TextString" value="Cryptographic Usage
Mask"/>

```

0138	<AttributeName type="TextString" value="Digest"/>
0139	<AttributeName type="TextString" value="Initial Date"/>
0140	<AttributeName type="TextString" value="Last Change Date"/>
0141	<AttributeName type="TextString" value="Lease Time"/>
0142	<AttributeName type="TextString" value="Name"/>
0143	<AttributeName type="TextString" value="Original Creation Date"/>
0144	<AttributeName type="TextString" value="State"/>
0145	</ResponsePayload>
0146	</BatchItem>
0147	</ResponseMessage>
0148	# TIME 2 <RequestMessage>
0149	<RequestHeader>
0150	<ProtocolVersion>
0151	<ProtocolVersionMajor type="Integer" value="1"/>
0152	<ProtocolVersionMinor type="Integer" value="2"/>
0153	</ProtocolVersion>
0154	<BatchOrderOption type="Boolean" value="true"/>
0155	<BatchCount type="Integer" value="2"/>
0156	</RequestHeader>
0157	<BatchItem>
0158	<Operation type="Enumeration" value="Locate"/>
0159	<UniqueBatchItemID type="ByteString" value="01"/>
0160	<RequestPayload>
0161	<Attribute>
0162	<AttributeName type="TextString" value="Object Type"/>
0163	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0164	</Attribute>
0165	<Attribute>
0166	<AttributeName type="TextString" value="Application Specific Information"/>
0167	<AttributeValue>
0168	<ApplicationNamespace type="TextString" value="LIBRARY- LTO"/>
0169	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000 000"/>
0170	</AttributeValue>
0171	</Attribute>
0172	</RequestPayload>
0173	</BatchItem>
0174	<BatchItem>
0175	<Operation type="Enumeration" value="GetAttributes"/>
0176	<UniqueBatchItemID type="ByteString" value="02"/>
0177	<RequestPayload>
0178	</RequestPayload>
0179	</BatchItem>
0180	</RequestMessage>
0181	<ResponseMessage>
0182	<ResponseHeader>
0183	<ProtocolVersion>
0184	<ProtocolVersionMajor type="Integer" value="1"/>
0185	<ProtocolVersionMinor type="Integer" value="2"/>
0186	</ProtocolVersion>
0187	<TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0188	<BatchCount type="Integer" value="2"/>
0189	</ResponseHeader>

```

0190     <BatchItem>
0191         <Operation type="Enumeration" value="Locate"/>
0192         <UniqueBatchItemID type="ByteString" value="01"/>
0193         <ResultStatus type="Enumeration" value="Success"/>
0194         <ResponsePayload>
0195             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0196         </ResponsePayload>
0197     </BatchItem>
0198     <BatchItem>
0199         <Operation type="Enumeration" value="GetAttributes"/>
0200         <UniqueBatchItemID type="ByteString" value="02"/>
0201         <ResultStatus type="Enumeration" value="Success"/>
0202         <ResponsePayload>
0203             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0204             <Attribute>
0205                 <AttributeName type="TextString" value="x-ID"/>
0206                 <AttributeValue type="TextString" value="TL-M-2-12"/>
0207             </Attribute>
0208             <Attribute>
0209                 <AttributeName type="TextString" value="x-Barcode"/>
0210                 <AttributeValue type="TextString" value="XXA012A1"/>
0211             </Attribute>
0212             <Attribute>
0213                 <AttributeName type="TextString" value="x-
VendorAttribute1"/>
0214                 <AttributeValue type="TextString" value="XXA012A1"/>
0215             </Attribute>
0216             <Attribute>
0217                 <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0218                 <AttributeValue type="Integer" value="0"/>
0219             </Attribute>
0220             <Attribute>
0221                 <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0222                 <AttributeValue type="DateTime" value="2012-10-
05T22:08:19+00:00"/>
0223             </Attribute>
0224             <Attribute>
0225                 <AttributeName type="TextString" value="Unique Identifier"/>
0226                 <AttributeValue type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0227             </Attribute>
0228             <Attribute>
0229                 <AttributeName type="TextString" value="Object Type"/>
0230                 <AttributeValue type="Enumeration" value="SymmetricKey"/>
0231             </Attribute>
0232             <Attribute>
0233                 <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0234                 <AttributeValue type="Enumeration" value="AES"/>
0235             </Attribute>
0236             <Attribute>
0237                 <AttributeName type="TextString" value="Cryptographic
Length"/>
0238                 <AttributeValue type="Integer" value="256"/>

```

```

0239     </Attribute>
0240     <Attribute>
0241         <AttributeName type="TextString" value="Alternative Name"/>
0242         <AttributeValue>
0243             <AlternativeNameValue type="TextString" value="XXA012A1"/>
0244             <AlternativeNameType type="Enumeration"
value="UninterpretedTextString"/>
0245         </AttributeValue>
0246     </Attribute>
0247     <Attribute>
0248         <AttributeName type="TextString" value="Application Specific
Information"/>
0249         <AttributeValue>
0250             <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0251             <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0252         </AttributeValue>
0253     </Attribute>
0254     <Attribute>
0255         <AttributeName type="TextString" value="Cryptographic Usage
Mask"/>
0256         <AttributeValue type="Integer" value="Decrypt Encrypt"/>
0257     </Attribute>
0258     <Attribute>
0259         <AttributeName type="TextString" value="Digest"/>
0260         <AttributeValue>
0261             <HashingAlgorithm type="Enumeration" value="SHA_256"/>
0262             <DigestValue type="ByteString"
value="0bd3d7ada745e4eb34cc9d26cc84d4852a15906b2f77f80d01fc31c28108c
49b"/>
0263         <KeyFormatType type="Enumeration" value="Raw"/>
0264     </AttributeValue>
0265 </Attribute>
0266 <Attribute>
0267     <AttributeName type="TextString" value="Fresh"/>
0268     <AttributeValue type="Boolean" value="false"/>
0269 </Attribute>
0270 <Attribute>
0271     <AttributeName type="TextString" value="Initial Date"/>
0272     <AttributeValue type="DateTime" value="2012-10-
05T21:41:46+00:00"/>
0273 </Attribute>
0274 <Attribute>
0275     <AttributeName type="TextString" value="Last Change Date"/>
0276     <AttributeValue type="DateTime" value="2012-10-
05T21:41:46+00:00"/>
0277 </Attribute>
0278 <Attribute>
0279     <AttributeName type="TextString" value="Lease Time"/>
0280     <AttributeValue type="Interval" value="3600"/>
0281 </Attribute>
0282 <Attribute>
0283     <AttributeName type="TextString" value="Name"/>
0284     <AttributeValue>
0285         <NameValue type="TextString"
value="AAAAAAA1A1AA12345678901234567"/>

```

```

0286         <NameType type="Enumeration"
value="UninterpretedTextString"/>
0287         </AttributeValue>
0288         </Attribute>
0289         <Attribute>
0290         <AttributeName type="TextString" value="Original Creation
Date"/>
0291         <AttributeValue type="DateTime" value="2012-10-
05T21:41:46+00:00"/>
0292         </Attribute>
0293         <Attribute>
0294         <AttributeName type="TextString" value="State"/>
0295         <AttributeValue type="Enumeration" value="PreActive"/>
0296         </Attribute>
0297         </ResponsePayload>
0298         </BatchItem>
0299     </ResponseMessage>

# TIME 3
0300 <RequestMessage>
0301 <RequestHeader>
0302     <ProtocolVersion>
0303         <ProtocolVersionMajor type="Integer" value="1"/>
0304         <ProtocolVersionMinor type="Integer" value="2"/>
0305     </ProtocolVersion>
0306     <BatchOrderOption type="Boolean" value="true"/>
0307     <BatchCount type="Integer" value="3"/>
0308 </RequestHeader>
0309 <BatchItem>
0310     <Operation type="Enumeration" value="Locate"/>
0311     <UniqueBatchItemID type="ByteString" value="01"/>
0312     <RequestPayload>
0313         <Attribute>
0314             <AttributeName type="TextString" value="Object Type"/>
0315             <AttributeValue type="Enumeration" value="SymmetricKey"/>
0316         </Attribute>
0317         <Attribute>
0318             <AttributeName type="TextString" value="Application Specific
Information"/>
0319             <AttributeValue>
0320                 <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0321                 <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0322             </AttributeValue>
0323         </Attribute>
0324     </RequestPayload>
0325 </BatchItem>
0326 <BatchItem>
0327     <Operation type="Enumeration" value="ModifyAttribute"/>
0328     <UniqueBatchItemID type="ByteString" value="02"/>
0329     <RequestPayload>
0330         <Attribute>
0331             <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0332             <AttributeValue type="DateTime" value="2012-10-
05T22:27:06+00:00"/>
0333         </Attribute>

```

```

0334     </RequestPayload>
0335 </BatchItem>
0336 <BatchItem>
0337     <Operation type="Enumeration" value="ModifyAttribute"/>
0338     <UniqueBatchItemID type="ByteString" value="03"/>
0339     <RequestPayload>
0340         <Attribute>
0341             <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0342             <AttributeValue type="Integer" value="1"/>
0343         </Attribute>
0344     </RequestPayload>
0345 </BatchItem>
0346 </RequestMessage>
0347 <ResponseMessage>
0348     <ResponseHeader>
0349         <ProtocolVersion>
0350             <ProtocolVersionMajor type="Integer" value="1"/>
0351             <ProtocolVersionMinor type="Integer" value="2"/>
0352         </ProtocolVersion>
0353         <TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0354         <BatchCount type="Integer" value="3"/>
0355     </ResponseHeader>
0356     <BatchItem>
0357         <Operation type="Enumeration" value="Locate"/>
0358         <UniqueBatchItemID type="ByteString" value="01"/>
0359         <ResultStatus type="Enumeration" value="Success"/>
0360         <ResponsePayload>
0361             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0362         </ResponsePayload>
0363     </BatchItem>
0364     <BatchItem>
0365         <Operation type="Enumeration" value="ModifyAttribute"/>
0366         <UniqueBatchItemID type="ByteString" value="02"/>
0367         <ResultStatus type="Enumeration" value="Success"/>
0368         <ResponsePayload>
0369             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0370             <Attribute>
0371                 <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0372                 <AttributeValue type="DateTime" value="2012-10-
05T22:27:06+00:00"/>
0373             </Attribute>
0374         </ResponsePayload>
0375     </BatchItem>
0376     <BatchItem>
0377         <Operation type="Enumeration" value="ModifyAttribute"/>
0378         <UniqueBatchItemID type="ByteString" value="03"/>
0379         <ResultStatus type="Enumeration" value="Success"/>
0380         <ResponsePayload>
0381             <UniqueIdentifier type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0382             <Attribute>
0383                 <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0384                 <AttributeValue type="Integer" value="1"/>

```

0385	</Attribute>
0386	</ResponsePayload>
0387	</BatchItem>
0388	</ResponseMessage>
0389	# TIME 4 <RequestMessage>
0390	<RequestHeader>
0391	<ProtocolVersion>
0392	<ProtocolVersionMajor type="Integer" value="1"/>
0393	<ProtocolVersionMinor type="Integer" value="2"/>
0394	</ProtocolVersion>
0395	<BatchCount type="Integer" value="1"/>
0396	</RequestHeader>
0397	<BatchItem>
0398	<Operation type="Enumeration" value="Destroy"/>
0399	<RequestPayload>
0400	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0401	</RequestPayload>
0402	</BatchItem>
0403	</RequestMessage>
0404	<ResponseMessage>
0405	<ResponseHeader>
0406	<ProtocolVersion>
0407	<ProtocolVersionMajor type="Integer" value="1"/>
0408	<ProtocolVersionMinor type="Integer" value="2"/>
0409	</ProtocolVersion>
0410	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0411	<BatchCount type="Integer" value="1"/>
0412	</ResponseHeader>
0413	<BatchItem>
0414	<Operation type="Enumeration" value="Destroy"/>
0415	<ResultStatus type="Enumeration" value="Success"/>
0416	<ResponsePayload>
0417	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0418	</ResponsePayload>
0419	</BatchItem>
0420	</ResponseMessage>

311 4 Conformance

312 4.1 Tape Library Client KMIP v1.0 Conformance ~~Statement~~

313 KMIP client ~~and server~~ implementations conformant to this profile:

- 314 1. SHALL support the Authentication Suite conditions (2.1);
- 315 2. SHALL support the Baseline Tape Library ~~- Client~~ conditions (2.2);
- 316 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 317 4. ~~SHALL support the~~ Using Alternative Name for tape media barcode ~~conditions (0); and~~
- 318 5. ~~SHALL support all the~~ Mandatory Test Cases ~~KMIP v1.0~~ (3.1).

319 4.2 Tape Library Client KMIP v1.1 Conformance

320 ~~KMIP client implementations conformant to this profile:~~

- 321 1. ~~SHALL support the~~ Authentication Suite ~~conditions~~ (2.1);
- 322 2. ~~SHALL support the~~ Baseline Tape Library ~~- Client~~ ~~conditions~~ (2.2);
- 323 3. ~~SHALL support the~~ Using Application Specific Information for Key Identifiers ~~conditions~~ (2.4);
- 324 4.4. ~~SHALL support the~~ Using Alternative Name for tape media barcode conditions (0); and
- 325 5. ~~SHALL support all the~~ ~~Mandatory Test Cases KMIP v1.1~~ (3.2).

326 4.3 Tape Library Client KMIP v1.2 Conformance

327 ~~KMIP client implementations conformant to this profile:~~

- 328 1. ~~SHALL support the~~ Authentication Suite ~~conditions~~ (2.1);
- 329 2. ~~SHALL support the~~ Baseline Tape Library ~~- Client~~ ~~conditions~~ (2.2);
- 330 3. ~~SHALL support the~~ Using Application Specific Information for Key Identifiers ~~conditions~~ (2.4);
- 331 4.4. ~~SHALL support the~~ Using Alternative Name for tape media barcode ~~conditions (0) for each~~
- 332 ~~supported protocol version (major); and minor).~~
- 333 5. ~~SHALL support all the~~ ~~Mandatory Test Cases KMIP v1.2~~ (3.3).

334 4.4 Tape Library Server KMIP v1.0 Conformance

335 ~~KMIP server implementations conformant to this profile:~~

- 336 1. ~~SHALL support the~~ Authentication Suite ~~conditions~~ (2.1);
- 337 2. ~~SHALL support the~~ Baseline Tape Library ~~- Server~~ ~~conditions~~ (2.3);
- 338 3. ~~SHALL support the~~ Using Application Specific Information for Key Identifiers ~~conditions~~ (2.4);
- 339 4. ~~SHALL support the~~ Using Alternative Name for tape media barcode ~~conditions (0); and~~
- 340 5. ~~SHALL support all the~~ ~~Mandatory Test Cases KMIP v1.0~~ (3.1).

341 4.5 Tape Library Server KMIP v1.1 Conformance

342 ~~KMIP server implementations conformant to this profile:~~

- 343 1. ~~SHALL support the~~ Authentication Suite ~~conditions~~ (2.1);
- 344 2. ~~SHALL support the~~ Baseline Tape Library ~~- Server~~ ~~conditions~~ (2.3);
- 345 3. ~~SHALL support the~~ Using Application Specific Information for Key Identifiers ~~conditions~~ (2.4);
- 346 4. ~~SHALL support the~~ Using Alternative Name for tape media barcode ~~conditions (0); and~~

347 5. SHALL support all the Mandatory Test Cases KMIP v1.1 (3.2).

348 **4.6 Tape Library Server KMIP v1.2 Conformance**

349 KMIP server implementations conformant to this profile:

- 350 1. SHALL support the Authentication Suite conditions (2.1);
- 351 2. SHALL support the Baseline Tape Library - Server conditions (2.3);
- 352 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 353 4. SHALL support the Using Alternative Name for tape media barcode conditions (0); and
- 354 5. SHALL support all the Mandatory Test Cases KMIP v1.2 (3.3).

355 **4.24.7 Permitted Test Case Variations**

356 Whilst the test cases provided in this Profile define the allowed request and response content, some
357 inherent variations MAY occur and are permitted within a successfully completed test case.

358 Each test case MAY include allowed variations in the description of the test case in addition to the
359 variations noted in this section.

360 Other variations not explicitly noted in this Profile SHALL be deemed non-conformant.

361 **4.2.14.7.1 Variable Items**

362 An implementation conformant to this Profile MAY vary the following values:

- 363 1. UniqueIdentifier
- 364 2. PrivateKeyUniqueIdentifier
- 365 3. PublicKeyUniqueIdentifier
- 366 4. UniqueBatchItemIdentifier
- 367 5. AsynchronousCorrelationValue
- 368 6. TimeStamp
- 369 7. KeyValue / KeyMaterial including:
 - 370 a. key material content returned for managed cryptographic objects which are generated by
371 the server
 - 372 b. wrapped versions of keys where the wrapping key is dynamic or the wrapping contains
373 variable output for each wrap operation
- 374 8. For response containing the output of cryptographic operation in Data / SignatureData/ MACData
375 / IVCounterNonce where:
 - 376 a. the managed object is generated by the server; or
 - 377 b. the operation inherently contains variable output
- 378 9. For the following DateTime attributes where the value is not specified in the request as a fixed
379 DateTime value:
 - 380 a. ActivationDate
 - 381 b. ArchiveDate
 - 382 c. CompromiseDate
 - 383 d. CompromiseOccurrenceDate
 - 384 e. DeactivationDate
 - 385 f. DestroyDate
 - 386 g. InitialDate
 - 387 h. LastChangeDate

- 388 i. ProtectStartDate
- 389 j. ProcessStopDate
- 390 k. ValidityDate
- 391 l. OriginalCreationDate
- 392 10. LinkedObjectIdentifier
- 393 11. DigestValue
 - 394 a. For those managed cryptographic objects which are dynamically generated
- 395 12. KeyFormatType
 - 396 a. The key format type selected by the server when it creates managed objects
- 397 13. Digest
 - 398 a. The HashingAlgorithm selected by the server when it calculates the digest for a managed
 - 399 object for which it has access to the key material
 - 400 b. The Digest Value
- 401 14. Extensions reported in Query for ExtensionList and ExtensionMap
- 402 15. Application Namespaces reported in Query
- 403 16. Object Types reported in Query other than those noted as required in this profile
- 404 17. Operation Types reported in Query other than those noted as required in this profile (or any
- 405 referenced profile documents)
- 406 18. For TextString attribute values containing test identifiers:
 - 407 a. Additional vendor or application prefixes
- 408 19. Additional attributes beyond those noted in the response

409
410 An implementation conformant to this Profile MAY allow the following response variations:

- 411 20. Object Group values – May or may not return one or more Object Group values not included in
- 412 the requests
- 413 21. y-CustomAttributes – May or may not include additional server-specific associated attributes not
- 414 included in requests
- 415 22. Message Extensions – May or may not include additional (non-critical) vendor extensions
- 416 23. TemplateAttribute – May or may not be included in responses where the Template Attribute
- 417 response is noted as optional in [KMIP-SPEC]
- 418 24. AttributeIndex – May or may not include Attribute Index value where the Attribute Index value is 0
- 419 for Protocol Versions 1.1 and above.
- 420 25. ResultMessage – May or may not be included in responses and the value (if included) may vary
- 421 from the text contained within the test case.
- 422 26. The list of Protocol Versions returned in a DiscoverVersion response may include additional
- 423 protocol versions if the request has not specified a list of client supported Protocol Versions.
- 424 27. VendorIdentification - The value (if included) may vary from the text contained within the test
- 425 case.

426 **4.2.24.7.2 Variable behavior**

427 An implementation conformant to this Profile SHALL allow variation of the following behavior:

- 428 1. A test may omit the clean-up requests and responses (containing Revoke and/or Destroy) at the
- 429 end of the test provided there is a separate mechanism to remove the created objects during
- 430 testing.
- 431 2. A test may omit the test identifiers if the client is unable to include them in requests. This includes
- 432 the following attributes:

433 a. Name; and

434 b. x-ID

435 3. A test MAY perform requests with multiple batch items or as multiple requests with a single batch
436 item provided the sequence of operations are equivalent

437 4. A request MAY contain an optional *Authentication* [KMIP_SPEC] structure within each request
438

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439 The following individuals have participated in the creation of this specification and are gratefully
440 acknowledged:

441 **Participants:**

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449 Peter Bartok, Venafi, Inc.
450 Tom Benjamin, IBM
451 Anthony Berglas, Cryptsoft
452 Mathias Björkqvist, IBM
453 Kevin Bocket, Venafi
454 Anne Bolgert, IBM
455 Alan Brown, Thales e-Security
456 Tim Bruce, CA Technologies
457 Chris Burchett, Credant Technologies, Inc.
458 Kelley Burgin, National Security Agency
459 Robert Burns, Thales e-Security
460 Chuck Castleton, Venafi
461 Kenli Chong, QuintessenceLabs
462 John Clark, Hewlett-Packard
463 Tom Clifford, Symantec Corp.
464 Doron Cohen, SafeNet, Inc
465 Tony Cox, Cryptsoft
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476 Indra Fitzgerald, Hewlett-Packard
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497 Mark Knight, Thales e-Security
498 Kathy Kriese, Symantec Corporation
499 Mark Lambiase, SecureAuth
500 John Leiseboer, Quintessence Labs
501 Hal Lockhart, Oracle Corporation
502 Robert Lockhart, Thales e-Security
503 Anne Luk, Cryptsoft
504 Sairam Manidi, Freescale
505 Luther Martin, Voltage Security
506 Neil McEvoy, iFOSSF
507 Marina Milshtein, Individual
508 Dale Moberg, Axway Software
509 Jishnu Mukeri, Hewlett-Packard
510 Bryan Olson, Hewlett-Packard
511 John Peck, IBM
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513 Denis Pochuev, SafeNet, Inc.
514 Reid Poole, Venafi, Inc.
515 Ajai Puri, SafeNet, Inc.
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520 Warren Robbins, Dell
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524 Anil Saldhana, Red Hat
525 Subhash Sankuratripati, NetApp
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548 Michael Yoder, Vormetric. Inc.
549 Magda Zdunkiewicz, Cryptsoft
550 Peter Zelechowski, Election Systems & Software

Appendix B. KMIP Specification Cross Reference

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
1 Introduction			
<i>Non-Normative References</i>	1.3.	1.3.	1.3.
<i>Normative References</i>	1.2.	1.2.	1.2.
<i>Terminology</i>	1.1.	1.1.	1.1.
2 Objects			
<i>Attribute</i>	2.1.1.	2.1.1.	2.1.1.
<i>Base Objects</i>	2.1.	2.1.	2.1.
<i>Certificate</i>	2.2.1.	2.2.1.	2.2.1.
<i>Credential</i>	2.1.2.	2.1.2.	2.1.2.
<i>Data</i>	-	-	2.1.10.
<i>Data Length</i>	-	-	2.1.11.
<i>Extension Information</i>	-	2.1.9.	2.1.9.
<i>Key Block</i>	2.1.3.	2.1.3.	2.1.3.
<i>Key Value</i>	2.1.4.	2.1.4.	2.1.4.
<i>Key Wrapping Data</i>	2.1.5.	2.1.5.	2.1.5.
<i>Key Wrapping Specification</i>	2.1.6.	2.1.6.	2.1.6.
<i>MAC Data</i>	-	-	2.1.13.
<i>Managed Objects</i>	2.2.	2.2.	2.2.
<i>Nonce</i>	-	-	2.1.14.
<i>Opaque Object</i>	2.2.8.	2.2.8.	2.2.8.
<i>PGP Key</i>	-	-	2.2.9.
<i>Private Key</i>	2.2.4.	2.2.4.	2.2.4.
<i>Public Key</i>	2.2.3.	2.2.3.	2.2.3.
<i>Secret Data</i>	2.2.7.	2.2.7.	2.2.7.
<i>Signature Data</i>	-	-	2.1.12.
<i>Split Key</i>	2.2.5.	2.2.5.	2.2.5.
<i>Symmetric Key</i>	2.2.2.	2.2.2.	2.2.2.
<i>Template</i>	2.2.6.	2.2.6.	2.2.6.
<i>Template-Attribute Structures</i>	2.1.8.	2.1.8.	2.1.8.
<i>Transparent DH Private Key</i>	2.1.7.6.	2.1.7.6.	2.1.7.6.
<i>Transparent DH Public Key</i>	2.1.7.7.	2.1.7.7.	2.1.7.7.
<i>Transparent DSA Private Key</i>	2.1.7.2.	2.1.7.2.	2.1.7.2.
<i>Transparent DSA Public Key</i>	2.1.7.3.	2.1.7.3.	2.1.7.3.
<i>Transparent ECDH Private Key</i>	2.1.7.10.	2.1.7.10.	2.1.7.10.
<i>Transparent ECDH Public Key</i>	2.1.7.11.	2.1.7.11.	2.1.7.11.
<i>Transparent ECDSA Private Key</i>	2.1.7.8.	2.1.7.8.	2.1.7.8.
<i>Transparent ECDSA Public Key</i>	2.1.7.9.	2.1.7.9.	2.1.7.9.
<i>Transparent ECMQV Private Key</i>	2.1.7.12.	2.1.7.12.	2.1.7.12.
<i>Transparent ECMQV Public Key</i>	2.1.7.13.	2.1.7.13.	2.1.7.13.
<i>Transparent Key Structures</i>	2.1.7.	2.1.7.	2.1.7.
<i>Transparent RSA Private Key</i>	2.1.7.4.	2.1.7.4.	2.1.7.4.
<i>Transparent RSA Public Key</i>	2.1.7.5.	2.1.7.5.	2.1.7.5.
<i>Transparent Symmetric Key</i>	2.1.7.1.	2.1.7.1.	2.1.7.1.
3 Attributes			
<i>Activation Date</i>	3.19.	3.24.	3.24.
<i>Alternative Name</i>	-	-	3.40.
<i>Application Specific Information</i>	3.30.	3.36.	3.36.
<i>Archive Date</i>	3.27.	3.32.	3.32.

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
<i>Attributes</i>	3	3	3
<i>Certificate Identifier</i>	3.9.	3.13.	3.13.
<i>Certificate Issuer</i>	3.11.	3.15.	3.15.
<i>Certificate Length</i>	-	3.9.	3.9.
<i>Certificate Subject</i>	3.10.	3.14.	3.14.
<i>Certificate Type</i>	3.8.	3.8.	3.8.
<i>Compromise Date</i>	3.25.	3.30.	3.30.
<i>Compromise Occurrence Date</i>	3.24.	3.29.	3.29.
<i>Contact Information</i>	3.31.	3.37.	3.37.
<i>Cryptographic Algorithm</i>	3.4.	3.4.	3.4.
<i>Cryptographic Domain Parameters</i>	3.7.	3.7.	3.7.
<i>Cryptographic Length</i>	3.5.	3.5.	3.5.
<i>Cryptographic Parameters</i>	3.6.	3.6.	3.6.
<i>Custom Attribute</i>	3.33.	3.39.	3.39.
<i>Deactivation Date</i>	3.22.	3.27.	3.27.
<i>Default Operation Policy</i>	3.13.2.	3.18.2.	3.18.2.
<i>Default Operation Policy for Certificates and Public Key Objects</i>	3.13.2.2.	3.18.2.2.	3.18.2.2.
<i>Default Operation Policy for Secret Objects</i>	3.13.2.1.	3.18.2.1.	3.18.2.1.
<i>Default Operation Policy for Template Objects</i>	3.13.2.3.	3.18.2.3.	3.18.2.3.
<i>Destroy Date</i>	3.23.	3.28.	3.28.
<i>Digest</i>	3.12.	3.17.	3.17.
<i>Digital Signature Algorithm</i>	-	3.16.	3.16.
<i>Fresh</i>	-	3.34.	3.34.
<i>Initial Date</i>	3.18.	3.23.	3.23.
<i>Key Value Location</i>	-	-	3.42.
<i>Key Value Present</i>	-	-	3.41.
<i>Last Change Date</i>	3.32.	3.38.	3.38.
<i>Lease Time</i>	3.15.	3.20.	3.20.
<i>Link</i>	3.29.	3.35.	3.35.
<i>Name</i>	3.2.	3.2.	3.2.
<i>Object Group</i>	3.28.	3.33.	3.33.
<i>Object Type</i>	3.3.	3.3.	3.3.
<i>Operation Policy Name</i>	3.13.	3.18.	3.18.
<i>Operations outside of operation policy control</i>	3.13.1.	3.18.1.	3.18.1.
<i>Original Creation Date</i>	-	-	3.43.
<i>Process Start Date</i>	3.20.	3.25.	3.25.
<i>Protect Stop Date</i>	3.21.	3.26.	3.26.
<i>Revocation Reason</i>	3.26.	3.31.	3.31.
<i>State</i>	3.17.	3.22.	3.22.
<i>Unique Identifier</i>	3.1.	3.1.	3.1.
<i>Usage Limits</i>	3.16.	3.21.	3.21.
<i>X.509 Certificate Identifier</i>	-	3.10.	3.10.
<i>X.509 Certificate Issuer</i>	-	3.12.	3.12.
<i>X.509 Certificate Subject</i>	-	3.11.	3.11.
4 Client-to-Server Operations			
<i>Activate</i>	4.18.	4.19.	4.19.
<i>Add Attribute</i>	4.13.	4.14.	4.14.
<i>Archive</i>	4.21.	4.22.	4.22.
<i>Cancel</i>	4.25.	4.27.	4.27.
<i>Certify</i>	4.6.	4.7.	4.7.
<i>Check</i>	4.9.	4.10.	4.10.
<i>Create</i>	4.1.	4.1.	4.1.
<i>Create Key Pair</i>	4.2.	4.2.	4.2.

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
<i>Create Split Key</i>	-	-	4.38.
<i>Decrypt</i>	-	-	4.30.
<i>Delete Attribute</i>	4.15.	4.16.	4.16.
<i>Derive Key</i>	4.5.	4.6.	4.6.
<i>Destroy</i>	4.20.	4.21.	4.21.
<i>Discover Versions</i>	-	4.26.	4.26.
<i>Encrypt</i>	-	-	4.29.
<i>Get</i>	4.10.	4.11.	4.11.
<i>Get Attribute List</i>	4.12.	4.13.	4.13.
<i>Get Attributes</i>	4.11.	4.12.	4.12.
<i>Get Usage Allocation</i>	4.17.	4.18.	4.18.
<i>Hash</i>	-	-	4.37.
<i>Join Split Key</i>	-	-	4.39.
<i>Locate</i>	4.8.	4.9.	4.9.
<i>MAC</i>	-	-	4.33.
<i>MAC Verify</i>	-	-	4.34.
<i>Modify Attribute</i>	4.14.	4.15.	4.15.
<i>Obtain Lease</i>	4.16.	4.17.	4.17.
<i>Poll</i>	4.26.	4.28.	4.28.
<i>Query</i>	4.24.	4.25.	4.25.
<i>Re-certify</i>	4.7.	4.8.	4.8.
<i>Recover</i>	4.22.	4.23.	4.23.
<i>Register</i>	4.3.	4.3.	4.3.
<i>Re-key</i>	4.4.	4.4.	4.4.
<i>Re-key Key Pair</i>	-	4.5.	4.5.
<i>Revoke</i>	4.19.	4.20.	4.20.
<i>RNG Retrieve</i>	-	-	4.35.
<i>RNG Seed</i>	-	-	4.36.
<i>Sign</i>	-	-	4.31.
<i>Signature Verify</i>	-	-	4.32.
<i>Validate</i>	4.23.	4.24.	4.24.
5 Server-to-Client Operations			
<i>Notify</i>	5.1.	5.1.	5.1.
<i>Put</i>	5.2.	5.2.	5.2.
6 Message Contents			
<i>Asynchronous Correlation Value</i>	6.8.	6.8.	6.8.
<i>Asynchronous Indicator</i>	6.7.	6.7.	6.7.
<i>Attestation Capable Indicator</i>	-	-	6.17.
<i>Batch Count</i>	6.14.	6.14.	6.14.
<i>Batch Error Continuation Option</i>	6.13.	6.13.	6.13.
<i>Batch Item</i>	6.15.	6.15.	6.15.
<i>Batch Order Option</i>	6.12.	6.12.	6.12.
<i>Maximum Response Size</i>	6.3.	6.3.	6.3.
<i>Message Extension</i>	6.16.	6.16.	6.16.
<i>Operation</i>	6.2.	6.2.	6.2.
<i>Protocol Version</i>	6.1.	6.1.	6.1.
<i>Result Message</i>	6.11.	6.11.	6.11.
<i>Result Reason</i>	6.10.	6.10.	6.10.
<i>Result Status</i>	6.9.	6.9.	6.9.
<i>Time Stamp</i>	6.5.	6.5.	6.5.
<i>Unique Batch Item ID</i>	6.4.	6.4.	6.4.
7 Message Format			

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
<i>Message Structure</i>	7.1.	7.1.	7.1.
<i>Operations</i>	7.2.	7.2.	7.2.
8 Authentication			
<i>Authentication</i>	8	8	8
9 Message Encoding			
<i>Alternative Name Type Enumeration</i>	-	-	9.1.3.2.34.
<i>Attestation Type Enumeration</i>	-	-	9.1.3.2.36.
<i>Batch Error Continuation Option Enumeration</i>	9.1.3.2.29.	9.1.3.2.30.	9.1.3.2.30.
<i>Bit Masks</i>	9.1.3.3.	9.1.3.3.	9.1.3.3.
<i>Block Cipher Mode Enumeration</i>	9.1.3.2.13.	9.1.3.2.14.	9.1.3.2.14.
<i>Cancellation Result Enumeration</i>	9.1.3.2.24.	9.1.3.2.25.	9.1.3.2.25.
<i>Certificate Request Type Enumeration</i>	9.1.3.2.21.	9.1.3.2.22.	9.1.3.2.22.
<i>Certificate Type Enumeration</i>	9.1.3.2.6.	9.1.3.2.6.	9.1.3.2.6.
<i>Credential Type Enumeration</i>	9.1.3.2.1.	9.1.3.2.1.	9.1.3.2.1.
<i>Cryptographic Algorithm Enumeration</i>	9.1.3.2.12.	9.1.3.2.13.	9.1.3.2.13.
<i>Cryptographic Usage Mask</i>	9.1.3.3.1.	9.1.3.3.1.	9.1.3.3.1.
<i>Defined Values</i>	9.1.3.	9.1.3.	9.1.3.
<i>Derivation Method Enumeration</i>	9.1.3.2.20.	9.1.3.2.21.	9.1.3.2.21.
<i>Digital Signature Algorithm Enumeration</i>	-	9.1.3.2.7.	9.1.3.2.7.
<i>Encoding Option Enumeration</i>	-	9.1.3.2.32.	9.1.3.2.32.
<i>Enumerations</i>	9.1.3.2.	9.1.3.2.	9.1.3.2.
<i>Examples</i>	9.1.2.	9.1.2.	9.1.2.
<i>Hashing Algorithm Enumeration</i>	9.1.3.2.15.	9.1.3.2.16.	9.1.3.2.16.
<i>Item Length</i>	9.1.1.3.	9.1.1.3.	9.1.1.3.
<i>Item Tag</i>	9.1.1.1.	9.1.1.1.	9.1.1.1.
<i>Item Type</i>	9.1.1.2.	9.1.1.2.	9.1.1.2.
<i>Item Value</i>	9.1.1.4.	9.1.1.4.	9.1.1.4.
<i>Key Compression Type Enumeration</i>	9.1.3.2.2.	9.1.3.2.2.	9.1.3.2.2.
<i>Key Format Type Enumeration</i>	9.1.3.2.3.	9.1.3.2.3.	9.1.3.2.3.
<i>Key Role Type Enumeration</i>	9.1.3.2.16.	9.1.3.2.17.	9.1.3.2.17.
<i>Key Value Location Type Enumeration</i>	-	-	9.1.3.2.35.
<i>Link Type Enumeration</i>	9.1.3.2.19.	9.1.3.2.20.	9.1.3.2.20.
<i>Name Type Enumeration</i>	9.1.3.2.10.	9.1.3.2.11.	9.1.3.2.11.
<i>Object Group Member Enumeration</i>	-	9.1.3.2.33.	9.1.3.2.33.
<i>Object Type Enumeration</i>	9.1.3.2.11.	9.1.3.2.12.	9.1.3.2.12.
<i>Opaque Data Type Enumeration</i>	9.1.3.2.9.	9.1.3.2.10.	9.1.3.2.10.
<i>Operation Enumeration</i>	9.1.3.2.26.	9.1.3.2.27.	9.1.3.2.27.
<i>Padding Method Enumeration</i>	9.1.3.2.14.	9.1.3.2.15.	9.1.3.2.15.
<i>Put Function Enumeration</i>	9.1.3.2.25.	9.1.3.2.26.	9.1.3.2.26.
<i>Query Function Enumeration</i>	9.1.3.2.23.	9.1.3.2.24.	9.1.3.2.24.
<i>Recommended Curve Enumeration for ECDSA, ECDH, and ECMQV</i>	9.1.3.2.5.	9.1.3.2.5.	9.1.3.2.5.
<i>Result Reason Enumeration</i>	9.1.3.2.28.	9.1.3.2.29.	9.1.3.2.29.
<i>Result Status Enumeration</i>	9.1.3.2.27.	9.1.3.2.28.	9.1.3.2.28.
<i>Revocation Reason Code Enumeration</i>	9.1.3.2.18.	9.1.3.2.19.	9.1.3.2.19.
<i>Secret Data Type Enumeration</i>	9.1.3.2.8.	9.1.3.2.9.	9.1.3.2.9.
<i>Split Key Method Enumeration</i>	9.1.3.2.7.	9.1.3.2.8.	9.1.3.2.8.
<i>State Enumeration</i>	9.1.3.2.17.	9.1.3.2.18.	9.1.3.2.18.
<i>Storage Status Mask</i>	9.1.3.3.2.	9.1.3.3.2.	9.1.3.3.2.
<i>Tags</i>	9.1.3.1.	9.1.3.1.	9.1.3.1.
<i>TTLV Encoding</i>	9.1.	9.1.	9.1.
<i>TTLV Encoding Fields</i>	9.1.1.	9.1.1.	9.1.1.
<i>Usage Limits Unit Enumeration</i>	9.1.3.2.30.	9.1.3.2.31.	9.1.3.2.31.

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
<i>Validity Indicator Enumeration</i>	9.1.3.2.22.	9.1.3.2.23.	9.1.3.2.23.
<i>Wrapping Method Enumeration</i>	9.1.3.2.4.	9.1.3.2.4.	9.1.3.2.4.
<i>XML Encoding</i>	9.2.	-	-
10 Transport			
<i>Transport</i>	10	10	10
12 KMIP Server and Client Implementation Conformance			
<i>Conformance clauses for a KMIP Server</i>	12.1.	-	-
<i>KMIP Client Implementation Conformance</i>	-	12.2.	12.2.
<i>KMIP Server Implementation Conformance</i>	-	12.1.	12.1.

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Appendix C. Revision History

Revision	Date	Editor	Changes Made
wd01	27-Jun-2013	Tim Hudson / Rod Wideman / Stan Feather	Converted from draft proposal to OASIS template incorporating updates from Stan Feather and inclusion of references to KMIP 1.2 documents. Editorial and formatting cleanup.
wd02	6-August-2013	Tim Hudson	Updated to include Permitted Test Case Variations and updated Test Cases based on July 2013 Interop
wd03	8-August-2013	Stan Feather / Rod Wideman	Editorial changes to section 3
wd04	10-August-2013	Tim Hudson	Updated Permitted Test Case Variations
wd04a	24-October-2013	Tim Hudson	Editorial update to include VendorIdentification in the list of allowed variations as per TC motion.
pr01update	11-June-2014	Tim Hudson	Updated following Public Review

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