

KMIP Tape Library Profile Version 1.0

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- *Key Management Interoperability Protocol Profiles Version 1.0*. Edited by Robert Griffin and Subhash Sankuratipati. Latest version: <http://docs.oasis-open.org/kmip/profiles/v1.0/kmip-profiles-1.0.html>.
- *Key Management Interoperability Protocol Profiles Version 1.1*. Edited by Robert Griffin and Subhash Sankuratipati. Latest version: <http://docs.oasis-open.org/kmip/profiles/v1.1/kmip-profiles-v1.1.html>.
- *Key Management Interoperability Protocol Profiles Version 1.2*. Edited by Tim Hudson and Robert Lockhart. Latest version: <http://docs.oasis-open.org/kmip/profiles/v1.2/kmip-profiles-v1.2.html>.
- *Key Management Interoperability Protocol Specification Version 1.1*. Edited by Robert Haas and Indra Fitzgerald. Latest version: <http://docs.oasis-open.org/kmip/spec/v1.1/kmip-spec-v1.1.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>.
- *Key Management Interoperability Protocol Test Cases Version 1.2*. Edited by Tim Hudson and Faisal Faruqi. Latest version: <http://docs.oasis-open.org/kmip/testcases/v1.2/kmip-testcases-v1.2.html>.
- *Key Management Interoperability Protocol Usage Guide Version 1.2*. Edited by Indra Fitzgerald and Judith Furlong. Latest version: <http://docs.oasis-open.org/kmip/ug/v1.2/kmip-ug-v1.2.html>.

Abstract:

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

Status:

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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].

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>.
- [KMIP-ENCODE] *KMIP Additional Message Encodings Version 1.0*. Edited by Tim Hudson. Latest version: <http://docs.oasis-open.org/kmip/kmip-addtl-msg-enc/v1.0/kmip-addtl-msg-enc-v1.0.doc>.

19 **[KMIP-SPEC]** One or more of [KMIP-SPEC-1_0], [KMIP-SPEC-1_1], [KMIP-SPEC-1_2]
20 **[KMIP-SPEC-1_0]** Key Management Interoperability Protocol Specification Version 1.0
21 <http://docs.oasis-open.org/kmip/spec/v1.0/os/kmip-spec-1.0-os.doc>
22 OASIS Standard, October 2010.
23 **[KMIP-SPEC-1_1]** *Key Management Interoperability Protocol Specification Version 1.1.*
24 <http://docs.oasis-open.org/kmip/spec/v1.1/os/kmip-spec-v1.1-os.doc>
25 OASIS Standard. 24 January 2013.
26 **[KMIP-SPEC-1_2]** *Key Management Interoperability Protocol Specification Version 1.2.* Edited by
27 Kiran Thota and Kelley Burgin. Latest version: [http://docs.oasis-](http://docs.oasis-open.org/kmip/spec/v1.2/kmip-spec-v1.2.doc)
28 [open.org/kmip/spec/v1.2/kmip-spec-v1.2.doc](http://docs.oasis-open.org/kmip/spec/v1.2/kmip-spec-v1.2.doc).
29 **[KMIP-PROF]** One or more of [KMIP-PROF-1_0], [KMIP-PROF-1_1], [KMIP-PROF-1_2]
30 **[KMIP-PROF-1_0]** *Key Management Interoperability Protocol Profiles Version 1.0.*
31 <http://docs.oasis-open.org/kmip/profiles/v1.0/os/kmip-profiles-1.0-os.doc>
32 OASIS Standard. 1 October 2010.
33 **[KMIP-PROF-1_1]** *Key Management Interoperability Protocol Profiles Version 1.1.*
34 <http://docs.oasis-open.org/kmip/profiles/v1.1/os/kmip-profiles-v1.1-os.doc>
35 OASIS Standard 01. 24 January 2013.
36 **[KMIP-PROF-1_2]** *Key Management Interoperability Protocol Profiles Version 1.2.* Edited by Tim
37 Hudson and Robert Lockhart. Latest version: [http://docs.oasis-](http://docs.oasis-open.org/kmip/profiles/v1.2/kmip-profiles-v1.2.doc)
38 [open.org/kmip/profiles/v1.2/kmip-profiles-v1.2.doc](http://docs.oasis-open.org/kmip/profiles/v1.2/kmip-profiles-v1.2.doc).

39

2 Tape Library Profile

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

42 2.1 Authentication Suite

43 Implementations conformant to this profile SHALL support at least one of the Authentication Suites
44 defined within [KMIP-PROF].

45 2.2 Baseline Tape Library - Client

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

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

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

49 2. SHALL conform to the *Baseline Client Clause* (section 5.12) of [KMIP-PROF-1_1]

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

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

52 KMIP clients conformant to this profile

53 4. SHOULD support *Application Specific Information* [KMIP-SPEC] with Application Data provided
54 by the client in accordance with section 2.4

55 5. SHOULD NOT use a *Custom Attribute* [KMIP-SPEC] that duplicates information that is already
56 in standard *Attributes* [KMIP-SPEC]

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

58 7. MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other clause
59 within this section 2.2

60 8. MAY support extensions outside the scope of this standard (e.g., vendor extensions,
61 conformance clauses) that do not conflict with any KMIP requirements

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

63 9. SHALL support the following *Attributes* [KMIP-SPEC]

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

65 10. SHALL support the following *Message Encoding* [KMIP-SPEC-1_2]:

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

67 i. Uninterpreted Text String

68 11. SHALL store the media barcode information in an *Alternative Name* [KMIP-SPEC-1_2] *Attribute*
69 [KMIP-SPEC-1_2] in accordance with section 2.5

70 2.3 Baseline Tape Library - Server

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

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

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

74 2. SHALL conform to the *Baseline Server* of [KMIP-PROF-1_1]

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

76 3. SHALL conform to the *Baseline Server* of [KMIP-PROF-1_2]

77 KMIP servers conformant to this profile:

- 78 4. SHALL support the following *Objects* [KMIP-SPEC]
79 a. *Symmetric Key* [KMIP-SPEC]
80 5. SHALL support the following *Attributes* [KMIP-SPEC]:
81 a. *Name* [KMIP-SPEC]
82 b. *Cryptographic Algorithm* [KMIP-SPEC]
83 c. *Custom Attribute* [KMIP SPEC]
84 d. *Application Specific Information* [KMIP SPEC]
85 6. SHALL support the following *Client-to-Server Operations* [KMIP-SPEC]:
86 a. *Create* [KMIP-SPEC]
87 7. SHALL support the following *Message Contents* [KMIP-SPEC]:
88 a. *Batch Order Option* [KMIP-SPEC] value:
89 i. True
90 b. *Batch Count* [KMIP-SPEC] value:
91 i. 1 to 32
92 8. SHALL support the following *Message Encoding* [KMIP-SPEC]:
93 a. *Cryptographic Algorithm Enumeration* [KMIP-SPEC] value:
94 i. AES
95 b. *Object Type Enumeration* [KMIP-SPEC] value:
96 i. Symmetric Key
97 c. *Key Format Type Enumeration* [KMIP-SPEC] value:
98 i. Raw
99 d. *Cryptographic Length* [KMIP-SPEC] value :
100 i. 256-bit
101 e. *Name Type Enumeration* [KMIP-SPEC] value:
102 i. Uninterpreted Text String
103 9. SHALL support *Custom Attribute* [KMIP-SPEC] with the following data types and properties:
104 a. Text String
105 b. Integer
106 c. Date Time
107 10. SHALL support a minimum length of 256 characters for *Custom Attribute* [KMIP-SPEC] and
108 *Name* [KMIP-SPEC] values where the attribute type is of variable length
109 11. SHALL support a minimum of 30 *Custom Attribute* [KMIP-SPEC] per managed object
110 12. SHALL support a minimum of 64 characters in *Custom Attribute* [KMIP-SPEC] names
111 13. MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other clause
112 within this section 2.2
113 14. MAY support extensions outside the scope of this standard (e.g., vendor extensions,
114 conformance clauses) that do not conflict with any KMIP requirements
115
116 KMIP servers conformant to this profile under [KMIP-SPEC-1_2]:
117 15. SHALL support the following *Attributes* [KMIP-SPEC]
118 a. *Alternative Name* [KMIP-SPEC-1_2]
119 16. SHALL support the following *Message Encoding* [KMIP-SPEC-1_2]:
120 a. *Alternative Name Type Enumeration* [KMIP-SPEC-1_2] value:

121

i. Uninterpreted Text String

122 2.4 Using Application Specific Information for Key Identifiers

123 This information applies to Tape Libraries that use the *Application Specific Information* [KMIP-SPEC]
124 attribute to store key identifiers. KMIP clients are not required to use *Application Specific Information*
125 [KMIP-SPEC] however KMIP servers are required to support KMIP clients that use *Application Specific*
126 *Information* [KMIP-SPEC] and KMIP clients that do not use *Application Specific Information* [KMIP-
127 SPEC].

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

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

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

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

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

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

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

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

- 148 1. The unauthenticated KAD is converted to text;
- 149 2. The authenticated KAD is converted to text and;
- 150 3. The converted authenticated KAD text is concatenated to the end of the converted
151 unauthenticated KAD text.

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

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

- 158 1. Define an empty output buffer sufficient to contain a string with a maximum length of 2*N(k)
159 bytes.
- 160 2. Copy the tape format's unauthenticated KAD (if present) to the output buffer, converting each
161 byte value to exactly two Hexadecimal Numeric Characters. The first byte (i.e., byte 0) of the
162 output buffer is the first byte of unauthenticated KAD.
- 163 3. Concatenate the tape format's authenticated KAD to the output buffer, converting each byte
164 value to exactly two Hexadecimal Numeric Characters.

165

166 Note: the contents of the unauthenticated KAD and authenticated KAD fields may be less than the
167 maximum permitted lengths; the implementation provides the correct length values to use in the
168 algorithm rather than using fixed maximum length fields.

169 If *Application Specific Information* [KMIP-SPEC] is supported, then it SHALL be used by the client for
170 locating the object for the purpose of encrypting and decrypting data on tape. The *Application Specific*
171 *Information* [KMIP-SPEC] value SHALL solely be used for this purpose.

172 **2.5 Using Alternative Name for tape media barcode**

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

176
177 The relationship between key identifiers in *Application Specific Information* [KMIP-SPEC] and *Alternative*
178 *Name* [KMIP-SPEC-1_2] is as follows:

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

187

3 Tape Library Profile Test Cases

188

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

192

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

193

194

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

195

196

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

197

198

199

Note: the values for the returned items and the custom attributes are illustrative. Actual values from a real client system may vary as specified in section 4.7.

200

201

3.1 Mandatory Test Cases KMIP v1.0

202

3.1.1 TL-M-1-10 - Configuration

203

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

204

205

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

```

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>

```

206

207 3.1.2 TL-M-2-10 - Write with new (created) key

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

212 Additional custom attributes MAY be specified in order to:

- 213 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 214 - provide human-readable information (such as the tape Barcode value)
- 215 - 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="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"
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-

```


217 3.1.3 TL-M-3-10 - Read an encrypted tape

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

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

226

```

# 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>
0037       <ProtocolVersionMajor type="Integer" value="1"/>
0038       <ProtocolVersionMinor type="Integer" value="0"/>
0039     </ProtocolVersion>
0040     <TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0041     <BatchCount type="Integer" value="2"/>
  
```


	value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
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>
	<i># TIME 2</i>
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="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
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="AAAAAA1A1AA12345678901234567"/>
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>
	<i># TIME 3</i>
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
000"/>
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>

```

227

228 3.2 Mandatory Test Cases KMIP v1.1

229 3.2.1 TL-M-1-11 - Configuration

230 Determine server configuration details including operations supported (only the mandatory operations
231 are listed in the response example), objects supported (only the mandatory objects types are listed in the
232 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>

```

233

234 3.2.2 TL-M-2-11 - Write with new (created) key

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

239 Additional custom attributes MAY be specified in order to:

- 240 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 241 - provide human-readable information (such as the tape Barcode value)
- 242 - 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="AAAAAA1A1AA12345678901234567"/>
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-
05T22:08:19+00:00"/>
0061     </Attribute>
0062 </TemplateAttribute>
0063 </RequestPayload>
0064 </BatchItem>

```


249 unique within the Application Namespace. An implementation may also use custom attributes for vendor-
 250 unique purposes, or to improve usability.

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

253

```

# 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="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>
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"/>
0042   </ResponseHeader>
0043   <BatchItem>
0044     <Operation type="Enumeration" value="Locate"/>
0045     <UniqueBatchItemID type="ByteString" value="01"/>
0046     <ResultStatus type="Enumeration" value="Success"/>
0047   <ResponsePayload>

```


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="1"/>
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>
0147	# TIME 2 <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
0166 Information"/>
0167       <AttributeValue>
0168         <ApplicationNamespace type="TextString" value="LIBRARY-
0169 LTO"/>
0170         <ApplicationData type="TextString"
0171 value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
0172 000"/>
0173       </AttributeValue>
0174     </Attribute>
0175   </RequestPayload>
0176 </BatchItem>
0177 <BatchItem>
0178   <Operation type="Enumeration" value="GetAttributes"/>
0179   <UniqueBatchItemID type="ByteString" value="02"/>
0180 <RequestPayload>
0181 </RequestPayload>
0182 </BatchItem>
0183 </RequestMessage>
0184 <ResponseMessage>
0185   <ResponseHeader>
0186     <ProtocolVersion>
0187       <ProtocolVersionMajor type="Integer" value="1"/>
0188       <ProtocolVersionMinor type="Integer" value="1"/>
0189     </ProtocolVersion>
0190     <TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0191     <BatchCount type="Integer" value="2"/>
0192   </ResponseHeader>
0193   <BatchItem>
0194     <Operation type="Enumeration" value="Locate"/>
0195     <UniqueBatchItemID type="ByteString" value="01"/>
0196     <ResultStatus type="Enumeration" value="Success"/>
0197     <ResponsePayload>
0198       <UniqueIdentifier type="TextString"
0199 value="$UNIQUE_IDENTIFIER_0"/>
0200     </ResponsePayload>
0201   </BatchItem>
0202   <BatchItem>
0203     <Operation type="Enumeration" value="GetAttributes"/>
0204     <UniqueBatchItemID type="ByteString" value="02"/>
0205     <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="0bd3d7ada745e4eb34cc9d26cc84d4852a15906b2f77f80d01fc31c28108c
49b"/>
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="AAAAAA1A1AA12345678901234567"/>
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>
# TIME 3
0284 <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>

```

254

255 3.3 Mandatory Test Cases KMIP v1.2

256 3.3.1 TL-M-1-12 - Configuration

257 Determine server configuration details including operations supported (only the mandatory operations
258 are listed in the response example), objects supported (only the mandatory objects types are listed in the
259 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     <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>

```

260

261 3.3.2 TL-M-2-12 - Write with new (created) key

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

266 Additional custom attributes MAY be specified in order to:

- 267 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 268 - provide human-readable information (such as the tape Barcode value)
- 269 - 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"

```

```

0024 value="XXA012A1"/>
      <AlternativeNameType type="Enumeration"
0025 value="UninterpretedTextString"/>
      </AttributeValue>
0026 </Attribute>
0027 <Attribute>
0028 <AttributeName type="TextString" value="Name"/>
0029 <AttributeValue>
0030 <NameValue type="TextString"
value="AAAAAA1A1AA12345678901234567"/>
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"/>
0063 <AttributeValue type="Integer" value="0"/>
0064 </Attribute>
0065 <Attribute>
0066 <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0067 <AttributeValue type="DateTime" value="2012-10-

```


271 **3.3.3 TL-M-3-12 - Read an encrypted tape**

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

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

280

```

# 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>
0037       <ProtocolVersionMajor type="Integer" value="1"/>
0038       <ProtocolVersionMinor type="Integer" value="2"/>
0039     </ProtocolVersion>
0040     <TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0041     <BatchCount type="Integer" value="2"/>
  
```


0093	value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
0094	</AttributeValue>
0095	</Attribute>
0096	</RequestPayload>
0097	</BatchItem>
0098	<BatchItem>
0099	<Operation type="Enumeration" value="GetAttributeList"/>
0100	<UniqueBatchItemID type="ByteString" value="02"/>
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"
0119	value="\$UNIQUE_IDENTIFIER_0"/>
0120	</ResponsePayload>
0121	</BatchItem>
0122	<BatchItem>
0123	<Operation type="Enumeration" value="GetAttributeList"/>
0124	<UniqueBatchItemID type="ByteString" value="02"/>
0125	<ResultStatus type="Enumeration" value="Success"/>
0126	<ResponsePayload>
0127	<UniqueIdentifier type="TextString"
0128	value="\$UNIQUE_IDENTIFIER_0"/>
0129	<AttributeName type="TextString" value="x-ID"/>
0130	<AttributeName type="TextString" value="x-Barcode"/>
0131	<AttributeName type="TextString" value="x-VendorAttribute1"/>
0132	<AttributeName type="TextString" value="x-VendorAttribute2"/>
0133	<AttributeName type="TextString" value="x-VendorAttribute3"/>
0134	<AttributeName type="TextString" value="Unique Identifier"/>
0135	<AttributeName type="TextString" value="Object Type"/>
0136	<AttributeName type="TextString" value="Cryptographic
0137	Algorithm"/>
0138	<AttributeName type="TextString" value="Cryptographic
0139	Length"/>
0140	<AttributeName type="TextString" value="Application Specific
0141	Information"/>
0142	<AttributeName type="TextString" value="Cryptographic Usage
0143	Mask"/>
0144	<AttributeName type="TextString" value="Digest"/>
0145	<AttributeName type="TextString" value="Initial Date"/>
0146	<AttributeName type="TextString" value="Last Change Date"/>
0147	<AttributeName type="TextString" value="Lease Time"/>
0148	<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>
# TIME 2	
0148	<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"/>
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
0291	Date"/>
0292	<AttributeValue type="DateTime" value="2012-10-
0293	05T21:41:46+00:00"/>
0294	</Attribute>
0295	<AttributeName type="TextString" value="State"/>
0296	<AttributeValue type="Enumeration" value="PreActive"/>
0297	</Attribute>
0298	</ResponsePayload>
0299	</BatchItem>
0300	</ResponseMessage>
0300	# TIME 3
0301	<RequestMessage>
0302	<RequestHeader>
0303	<ProtocolVersion>
0304	<ProtocolVersionMajor type="Integer" value="1"/>
0305	<ProtocolVersionMinor type="Integer" value="2"/>
0306	</ProtocolVersion>
0307	<BatchOrderOption type="Boolean" value="true"/>
0308	<BatchCount type="Integer" value="3"/>
0309	</RequestHeader>
0310	<BatchItem>
0311	<Operation type="Enumeration" value="Locate"/>
0312	<UniqueBatchItemID type="ByteString" value="01"/>
0313	<RequestPayload>
0314	<Attribute>
0315	<AttributeName type="TextString" value="Object Type"/>
0316	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0317	</Attribute>
0318	<Attribute>
0319	<AttributeName type="TextString" value="Application Specific
0320	Information"/>
0321	<AttributeValue>
0322	<ApplicationNamespace type="TextString" value="LIBRARY-
0323	LTO"/>
0324	<ApplicationData type="TextString"
0325	value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
0326	000"/>
0327	</AttributeValue>
0328	</Attribute>
0329	</RequestPayload>
0330	</BatchItem>
0331	<BatchItem>
0332	<Operation type="Enumeration" value="ModifyAttribute"/>
0333	<UniqueBatchItemID type="ByteString" value="02"/>
0334	<RequestPayload>
0335	<Attribute>
0336	<AttributeName type="TextString" value="x-
0337	VendorAttribute3"/>
0338	<AttributeValue type="DateTime" value="2012-10-
	05T22:27:06+00:00"/>
	</Attribute>
	</RequestPayload>
	</BatchItem>
	<BatchItem>
	<Operation type="Enumeration" value="ModifyAttribute"/>
	<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>
	# TIME 4

0389	<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>

282 4 Conformance

283 4.1 Tape Library Client KMIP v1.0 Conformance

284 KMIP client implementations conformant to this profile:

- 285 1. SHALL support the Authentication Suite conditions (2.1);
- 286 2. SHALL support the Baseline Tape Library - Client conditions (2.2);
- 287 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 288 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and
- 289 5. SHALL support all the Mandatory Test Cases KMIP v1.0 (3.1).

290 4.2 Tape Library Client KMIP v1.1 Conformance

291 KMIP client implementations conformant to this profile:

- 292 1. SHALL support the Authentication Suite conditions (2.1);
- 293 2. SHALL support the Baseline Tape Library - Client conditions (2.2);
- 294 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 295 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and
- 296 5. SHALL support all the Mandatory Test Cases KMIP v1.1 (3.2).

297 4.3 Tape Library Client KMIP v1.2 Conformance

298 KMIP client implementations conformant to this profile:

- 299 1. SHALL support the Authentication Suite conditions (2.1);
- 300 2. SHALL support the Baseline Tape Library - Client conditions (2.2);
- 301 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 302 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and
- 303 5. SHALL support all the Mandatory Test Cases KMIP v1.2 (3.3).

304 4.4 Tape Library Server KMIP v1.0 Conformance

305 KMIP server implementations conformant to this profile:

- 306 1. SHALL support the Authentication Suite conditions (2.1);
- 307 2. SHALL support the Baseline Tape Library - Server conditions (2.3);
- 308 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 309 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and
- 310 5. SHALL support all the Mandatory Test Cases KMIP v1.0 (3.1).

311 4.5 Tape Library Server KMIP v1.1 Conformance

312 KMIP server implementations conformant to this profile:

- 313 1. SHALL support the Authentication Suite conditions (2.1);
- 314 2. SHALL support the Baseline Tape Library - Server conditions (2.3);
- 315 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 316 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and

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

318 **4.6 Tape Library Server KMIP v1.2 Conformance**

319 KMIP server implementations conformant to this profile:

- 320 1. SHALL support the Authentication Suite conditions (2.1);
- 321 2. SHALL support the Baseline Tape Library - Server conditions (2.3);
- 322 3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.4);
- 323 4. SHALL support the Using Alternative Name for tape media barcode conditions (2.5); and
- 324 5. SHALL support all the Mandatory Test Cases KMIP v1.2 (3.3).

325 **4.7 Permitted Test Case Variations**

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

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

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

331 **4.7.1 Variable Items**

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

- 333 1. UniqueIdentifier
- 334 2. PrivateKeyUniqueIdentifier
- 335 3. PublicKeyUniqueIdentifier
- 336 4. UniqueBatchItemIdentifier
- 337 5. AsynchronousCorrelationValue
- 338 6. TimeStamp
- 339 7. KeyValue / KeyMaterial including:
 - 340 a. key material content returned for managed cryptographic objects which are generated
 - 341 by the server
 - 342 b. wrapped versions of keys where the wrapping key is dynamic or the wrapping contains
 - 343 variable output for each wrap operation
- 344 8. For response containing the output of cryptographic operation in Data / SignatureData/
345 MACData / IVCounterNonce where:
 - 346 a. the managed object is generated by the server; or
 - 347 b. the operation inherently contains variable output
- 348 9. For the following DateTime attributes where the value is not specified in the request as a fixed
349 DateTime value:
 - 350 a. ActivationDate
 - 351 b. ArchiveDate
 - 352 c. CompromiseDate
 - 353 d. CompromiseOccurrenceDate
 - 354 e. DeactivationDate
 - 355 f. DestroyDate
 - 356 g. InitialDate
 - 357 h. LastChangeDate

- 358 i. ProtectStartDate
- 359 j. ProcessStopDate
- 360 k. ValidityDate
- 361 l. OriginalCreationDate
- 362 10. LinkedObjectIdentifier
- 363 11. DigestValue
 - 364 a. For those managed cryptographic objects which are dynamically generated
- 365 12. KeyFormatType
 - 366 a. The key format type selected by the server when it creates managed objects
- 367 13. Digest
 - 368 a. The HashingAlgorithm selected by the server when it calculates the digest for a
 - 369 managed object for which it has access to the key material
 - 370 b. The Digest Value
- 371 14. Extensions reported in Query for ExtensionList and ExtensionMap
- 372 15. Application Namespaces reported in Query
- 373 16. Object Types reported in Query other than those noted as required in this profile
- 374 17. Operation Types reported in Query other than those noted as required in this profile (or any
- 375 referenced profile documents)
- 376 18. For TextString attribute values containing test identifiers:
 - 377 a. Additional vendor or application prefixes
- 378 19. Additional attributes beyond those noted in the response

379

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

- 381 20. Object Group values – May or may not return one or more Object Group values not included in
- 382 the requests
- 383 21. y-CustomAttributes – May or may not include additional server-specific associated attributes not
- 384 included in requests
- 385 22. Message Extensions – May or may not include additional (non-critical) vendor extensions
- 386 23. TemplateAttribute – May or may not be included in responses where the Template Attribute
- 387 response is noted as optional in [KMIP-SPEC]
- 388 24. AttributeIndex – May or may not include Attribute Index value where the Attribute Index value is
- 389 0 for Protocol Versions 1.1 and above.
- 390 25. ResultMessage – May or may not be included in responses and the value (if included) may vary
- 391 from the text contained within the test case.
- 392 26. The list of Protocol Versions returned in a DiscoverVersion response may include additional
- 393 protocol versions if the request has not specified a list of client supported Protocol Versions.
- 394 27. VendorIdentification - The value (if included) may vary from the text contained within the test
- 395 case.

396 4.7.2 Variable behavior

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

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

- 403 a. Name; and
404 b. x-ID
405 3. A test MAY perform requests with multiple batch items or as multiple requests with a single
406 batch item provided the sequence of operations are equivalent
407 4. A request MAY contain an optional *Authentication* [KMIP_SPEC] structure within each request
408

Appendix A. Acknowledgments

409 The following individuals have participated in the creation of this specification and are gratefully
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411 **Participants:**

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418 Elaine Barker, NIST
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420 Tom Benjamin, IBM
421 Anthony Berglas, Cryptsoft
422 Mathias Björkqvist, IBM
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432 John Clark, Hewlett-Packard
433 Tom Clifford, Symantec Corp.
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435 Tony Cox, Cryptsoft
436 Russell Dietz, SafeNet, Inc
437 Graydon Dodson, Lexmark International Inc.
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439 Chris Dunn, SafeNet, Inc.
440 Michael Duren, Sypris Electronics
441 James Dzierzanowski, American Express CCoE
442 Faisal Faruqui, Thales e-Security
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444 David Finkelstein, Symantec Corp.
445 James Fitzgerald, SafeNet, Inc.
446 Indra Fitzgerald, Hewlett-Packard
447 Judith Furlong, EMC Corporation
448 Susan Gleeson, Oracle
449 Robert Griffin, EMC Corporation
450 Paul Grojean, Individual
451 Robert Haas, IBM
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454 Steve He, Vormetric
455 Kurt Heberlein, Hewlett-Packard
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465 Greg Kazmierczak, Wave Systems Corp.
466 Marc Kenig, SafeNet, Inc.
467 Mark Knight, Thales e-Security
468 Kathy Kriese, Symantec Corporation
469 Mark Lambiase, SecureAuth
470 John Leiseboer, Quintessence Labs
471 Hal Lockhart, Oracle Corporation
472 Robert Lockhart, Thales e-Security
473 Anne Luk, Cryptsoft
474 Sairam Manidi, Freescale
475 Luther Martin, Voltage Security
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477 Marina Milshtein, Individual
478 Dale Moberg, Axway Software
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480 Bryan Olson, Hewlett-Packard
481 John Peck, IBM
482 Rob Philpott, EMC Corporation
483 Denis Pochuev, SafeNet, Inc.
484 Reid Poole, Venafi, Inc.
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509 Paul Turner, Venafi, Inc.
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512 Jin Wong, QuintessenceLabs
513 Sameer Yami, Thales e-Security
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519 Magda Zdunkiewicz, Cryptsoft
520 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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