

# KMIP Tape Library Profile Version 1.0

## Committee Specification Draft 01 / Public Review Draft 01

09 January 2014

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<http://docs.oasis-open.org/kmip/kmip-tape-lib-profile/v1.0/csprd01/kmip-tape-lib-profile-v1.0-csprd01.html>  
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<http://docs.oasis-open.org/kmip/kmip-tape-lib-profile/v1.0/kmip-tape-lib-profile-v1.0.pdf>

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#### Related work:

This specification is related to:

- *Key Management Interoperability Protocol Profiles Version 1.0*. 01 October 2010. OASIS Standard. <http://docs.oasis-open.org/kmip/profiles/v1.0/os/kmip-profiles-1.0-os.html>.
- *Key Management Interoperability Protocol Specification Version 1.1*. 24 January 2013. OASIS Standard. <http://docs.oasis-open.org/kmip/spec/v1.1/os/kmip-spec-v1.1-os.html>.
- *Key Management Interoperability Protocol Specification Version 1.2*. Latest version. <http://docs.oasis-open.org/kmip/spec/v1.2/kmip-spec-v1.2.html>.

#### Abstract:

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

#### Status:

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

Technical Committee members should send comments on this specification to the Technical Committee's email list. Others should send comments to the Technical Committee by using the "Send A Comment" button on the Technical Committee's web page at <http://www.oasis-open.org/committees/kmip/>.

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# 1 Introduction

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

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

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

## 1.1 Terminology

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

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

## 1.2 Normative References

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

- [RFC2246] T. Dierks and C. Allen, *The TLS Protocol, Version 1.0*, IETF RFC 2246, Jan 1999, <http://www.ietf.org/rfc/rfc2246.txt>
- [KMIP-SPEC] One or more of [KMIP-SPEC-1\_0], [KMIP-SPEC-1\_1], [KMIP-SPEC-1\_2]
- [KMIP-SPEC-1\_0] Key Management Interoperability Protocol Specification Version 1.0  
<http://docs.oasis-open.org/kmip/spec/v1.0/os/kmip-spec-1.0-os.doc>  
 OASIS Standard, October 2010.
- [KMIP-SPEC-1\_1] *Key Management Interoperability Protocol Specification Version 1.1.*  
<http://docs.oasis-open.org/kmip/spec/v1.1/os/kmip-spec-v1.1-os.doc>  
 OASIS Standard. 24 January 2013.
- [KMIP-SPEC-1\_2] *Key Management Interoperability Protocol Specification Version 1.2.*  
 URL  
 Candidate OASIS Standard 01. DD MMM YYYY.
- [KMIP-PROF] One or more of [KMIP-PROF-1\_0], [KMIP-PROF-1\_1], [KMIP-PROF-1\_2]
- [KMIP-PROF-1\_0] *Key Management Interoperability Protocol Usage Guide Version 1.0.*  
<http://docs.oasis-open.org/kmip/profiles/v1.0/os/kmip-profiles-1.0-os.doc>  
 OASIS Standard. 1 October 2010.
- [KMIP-PROF-1\_1] *Key Management Interoperability Protocol Usage Guide Version 1.1.*  
<http://docs.oasis-open.org/kmip/profiles/v1.1/os/kmip-profiles-v1.1-os.doc>  
 OASIS Standard 01. 24 January 2013.
- [KMIP-PROF-1\_2] *Key Management Interoperability Protocol Usage Guide Version 1.2.*  
 URL  
 Candidate OASIS Standard 01. DD MMM YYYY.

### 1.3 Non-Normative References

- [KMIP-UG] One or more of [KMIP-UG-1\_0], [KMIP-UG-1\_1], [KMIP-UG-1\_2]
- [KMIP-UG-1\_0] *Key Management Interoperability Protocol Usage Guide Version 1.0.*  
<http://docs.oasis-open.org/kmip/ug/v1.1/kmip-ug-v1.1-cnd01.doc>  
 Committee Note Draft, 1 December 2011
- [KMIP-UG-1\_1] *Key Management Interoperability Protocol Usage Guide Version 1.1.*  
<http://docs.oasis-open.org/kmip/ug/v1.1/cn01/kmip-ug-v1.1-cn01.doc>  
 Committee Note 01, 27 July 2012
- [KMIP-UG-1\_2] *Key Management Interoperability Protocol Usage Guide Version 1.2.*  
 URL  
 Committee Note Draft, DD MMM YYYY
- [KMIP-TC-1\_1] *Key Management Interoperability Protocol Test Cases Version 1.1.*  
<http://docs.oasis-open.org/kmip/testcases/v1.1/cn01/kmip-testcases-v1.1-cn01.doc>, Committee Note 01, 27 July 2012.
- [KMIP-TC-1\_2] *Key Management Interoperability Protocol Test Cases Version 1.2.*  
 URL, Committee Note Draft, DD MMM YYYY.
- [KMIP-UC] *Key Management Interoperability Protocol Use Cases Version 1.0.*  
<http://docs.oasis-open.org/kmip/usecases/v1.0/cs01/kmip-usecases-1.0-cs-01.doc>, Committee Specification, 15 June 2010.

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## 2 Tape Library Profile

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

### 2.1 Authentication Suite

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

### 2.2 Baseline Tape Library

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

1. SHALL conform to the KMIP Baseline Client profile in [KMIP-PROF] and [KMIP-SPEC]
2. SHOULD support *Application Specific Information* [KMIP-SPEC] with Application Data provided by the client in accordance with section 2.3
3. SHOULD NOT use a *Custom Attribute* [KMIP-SPEC] that duplicates information that is already in standard *Attributes* [KMIP-SPEC]
4. MAY use x-Barcode as a *Custom Attribute* [KMIP-SPEC] of type Text String to store the barcode
5. MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other clause within this section 2.2
6. MAY support extensions outside the scope of this standard (e.g., vendor extensions, conformance clauses) that do not conflict with any KMIP requirements

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

1. SHALL support the following *Attributes* [KMIP-SPEC]
  - a. *Alternative Name* [KMIP-SPEC-1\_2]
2. SHALL support the following *Message Encoding* [KMIP-SPEC-1\_2]:
  - a. *Alternative Name Type Enumeration* [KMIP-SPEC-1\_2] value:
    - i. Uninterpreted Text String
3. SHALL store the media barcode information in an *Alternative Name* [KMIP-SPEC-1\_2] *Attribute* [KMIP-SPEC-1\_2] in accordance with section 2.4

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

1. SHALL conform to the KMIP Baseline Server profile in [KMIP-PROF] and [KMIP-SPEC]
2. SHALL support the following *Objects* [KMIP-SPEC]
  - a. *Symmetric Key* [KMIP-SPEC]
3. SHALL support the following *Attributes* [KMIP-SPEC]
  - a. *Name* [KMIP-SPEC]
  - b. *Cryptographic Algorithm* [KMIP-SPEC]
  - c. *Custom Attribute* [KMIP SPEC]
  - d. *Application Specific Information* [KMIP SPEC]
4. SHALL support the following *Client-to-Server Operations* [KMIP-SPEC]:
  - a. *Create* [KMIP-SPEC]



5. SHALL support the following *Message Contents* [KMIP-SPEC]:
  - a. *Batch Order Option* [KMIP-SPEC] value:
    - i. True
  - b. *Batch Count* [KMIP-SPEC] value:
    - i. 1 to 32
6. SHALL support the following *Message Encoding* [KMIP-SPEC]:
  - a. *Cryptographic Algorithm Enumeration* [KMIP-SPEC] value:
    - i. AES
  - b. *Object Type Enumeration* [KMIP-SPEC] value:
    - i. Symmetric Key
  - c. *Key Format Type Enumeration* [KMIP-SPEC] value:
    - i. Raw
  - d. *Cryptographic Length* [KMIP-SPEC] value :
    - i. 256-bit
  - e. *Name Type Enumeration* [KMIP-SPEC] value:
    - i. Uninterpreted Text String
7. SHALL support *Custom Attribute* [KMIP-SPEC] with the following data types and properties:
  - a. Text String
  - b. Integer
  - c. Date Time
8. SHALL support a minimum length of 256 characters for *Custom Attribute* [KMIP-SPEC] and *Name* [KMIP-SPEC] values where the attribute type is of variable length
9. SHALL support a minimum of 30 *Custom Attribute* [KMIP-SPEC] per managed object
10. SHALL support a minimum of 64 characters in *Custom Attribute* [KMIP-SPEC] names
11. SHALL support the Tape Library Profile Test Cases, returning results in accordance with the test cases
12. MAY support any clause within [KMIP-SPEC] provided it does not conflict with any other clause within this section 2.2
13. MAY support extensions outside the scope of this standard (e.g., vendor extensions, conformance clauses) that do not conflict with any KMIP requirements

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

1. SHALL support the following *Attributes* [KMIP-SPEC]
  - a. *Alternative Name* [KMIP-SPEC-1\_2]
2. SHALL support the following *Message Encoding* [KMIP-SPEC-1\_2]:
  - a. *Alternative Name Type Enumeration* [KMIP-SPEC-1\_2] value:
    - i. Uninterpreted Text String

## 2.3 Using Application Specific Information for Key Identifiers

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



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

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

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

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

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

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

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

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

1. The unauthenticated KAD is converted to text;
2. The authenticated KAD is converted to text and;
3. The converted authenticated KAD text is concatenated to the end of the converted unauthenticated KAD text.

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

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

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

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

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

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

## 2.4 Using Alternative Name for tape media barcode

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

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

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

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

## 3 Tape Library Profile Test Cases

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

Note: the values for the returned items and the *Custom Attributes* are illustrative. Actual values from a real client system will vary. These test cases demonstrate usage of all of the mandatory types that are required to be supported in a server implementation.

### 3.1 Mandatory Test Cases

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

#### 3.1.1 TL-M-1-10 - Configuration

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.

	# TIME 0
0001	<RequestMessage>
0002	<RequestHeader>
0003	<ProtocolVersion>
0004	<ProtocolVersionMajor type="Integer" value="1"/>
0005	<ProtocolVersionMinor type="Integer" value="0"/>
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="0"/>
0025	</ProtocolVersion>
0026	<TimeStamp type="DateTime" value="2012-10-05T21:35:17+00:00"/>
0027	<BatchCount type="Integer" value="1"/>
0028	</ResponseHeader>
0029	<BatchItem>
0030	<Operation type="Enumeration" value="Query"/>
0031	<UniqueBatchItemID type="ByteString" value="01"/>
0032	<ResultStatus type="Enumeration" value="Success"/>
0033	<ResponsePayload>

```

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

```

217

### 218 3.1.2 TL-M-2-10 - Write with new (created) key

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

223 Additional custom attributes MAY be specified in order to:

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

```

0001 # TIME 0
0002 <RequestMessage>
0003   <RequestHeader>
0004     <ProtocolVersion>
0005       <ProtocolVersionMajor type="Integer" value="1"/>
0006       <ProtocolVersionMinor type="Integer" value="0"/>
0007     </ProtocolVersion>
0008     <BatchOrderOption type="Boolean" value="true"/>
0009     <BatchCount type="Integer" value="2"/>
0010   </RequestHeader>
0011   <BatchItem>
0012     <Operation type="Enumeration" value="Create"/>
0013     <UniqueBatchItemID type="ByteString" value="01"/>
0014     <RequestPayload>
0015       <ObjectType type="Enumeration" value="SymmetricKey"/>
0016       <TemplateAttribute>
0017         <Attribute>
0018           <AttributeName type="TextString" value="x-ID"/>
0019           <AttributeValue type="TextString" value="TL-M-2-10"/>
0020         </Attribute>
0021       </TemplateAttribute>
0022     </RequestPayload>
0023   </BatchItem>
0024 </RequestMessage>

```

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>
0065	<BatchItem>



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

235 The test case destroys the key created in the previous test case to clean up after the test. Tape Library  
 236 implementations MAY not perform this step.

237

	# 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="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
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"/>
0042	</ResponseHeader>
0043	<BatchItem>
0044	<Operation type="Enumeration" value="Locate"/>
0045	<UniqueBatchItemID type="ByteString" value="01"/>
0046	<ResultStatus type="Enumeration" value="Success"/>
0047	<ResponsePayload>



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Standards Track Work Product

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"
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"/>
	<AttributeName type="TextString" value="Name"/>
	<AttributeName type="TextString" value="State"/>
	</ResponsePayload>
	</BatchItem>
	</ResponseMessage>
	# TIME 2
0147	<RequestMessage>

0148	<RequestHeader>
0149	<ProtocolVersion>
0150	<ProtocolVersionMajor type="Integer" value="1"/>
0151	<ProtocolVersionMinor type="Integer" value="0"/>
0152	</ProtocolVersion>
0153	<BatchOrderOption type="Boolean" value="true"/>
0154	<BatchCount type="Integer" value="2"/>
0155	</RequestHeader>
0156	<BatchItem>
0157	<Operation type="Enumeration" value="Locate"/>
0158	<UniqueBatchItemID type="ByteString" value="01"/>
0159	<RequestPayload>
0160	<Attribute>
0161	<AttributeName type="TextString" value="Object Type"/>
0162	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0163	</Attribute>
0164	<Attribute>
0165	<AttributeName type="TextString" value="Application Specific Information"/>
0166	<AttributeValue>
0167	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0168	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
0169	</AttributeValue>
0170	</Attribute>
0171	</RequestPayload>
0172	</BatchItem>
0173	<BatchItem>
0174	<Operation type="Enumeration" value="GetAttributes"/>
0175	<UniqueBatchItemID type="ByteString" value="02"/>
0176	<RequestPayload>
0177	</RequestPayload>
0178	</BatchItem>
0179	</RequestMessage>
0180	<ResponseMessage>
0181	<ResponseHeader>
0182	<ProtocolVersion>
0183	<ProtocolVersionMajor type="Integer" value="1"/>
0184	<ProtocolVersionMinor type="Integer" value="0"/>
0185	</ProtocolVersion>
0186	<TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0187	<BatchCount type="Integer" value="2"/>
0188	</ResponseHeader>
0189	<BatchItem>
0190	<Operation type="Enumeration" value="Locate"/>
0191	<UniqueBatchItemID type="ByteString" value="01"/>
0192	<ResultStatus type="Enumeration" value="Success"/>
0193	<ResponsePayload>
0194	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0195	</ResponsePayload>
0196	</BatchItem>
0197	<BatchItem>
0198	<Operation type="Enumeration" value="GetAttributes"/>
0199	<UniqueBatchItemID type="ByteString" value="02"/>
0200	<ResultStatus type="Enumeration" value="Success"/>

0201	<ResponsePayload>
0202	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0203	<Attribute>
0204	<AttributeName type="TextString" value="x-ID"/>
0205	<AttributeValue type="TextString" value="TL-M-2-10"/>
0206	</Attribute>
0207	<Attribute>
0208	<AttributeName type="TextString" value="x-Barcode"/>
0209	<AttributeValue type="TextString" value="XXA012A1"/>
0210	</Attribute>
0211	<Attribute>
0212	<AttributeName type="TextString" value="x-
	VendorAttribute1"/>
0213	<AttributeValue type="TextString" value="XXA012A1"/>
0214	</Attribute>
0215	<Attribute>
0216	<AttributeName type="TextString" value="x-
	VendorAttribute2"/>
0217	<AttributeValue type="Integer" value="0"/>
0218	</Attribute>
0219	<Attribute>
0220	<AttributeName type="TextString" value="x-
	VendorAttribute3"/>
0221	<AttributeValue type="DateTime" value="2012-10-
	05T22:08:19+00:00"/>
0222	</Attribute>
0223	<Attribute>
0224	<AttributeName type="TextString" value="Unique Identifier"/>
0225	<AttributeValue type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0226	</Attribute>
0227	<Attribute>
0228	<AttributeName type="TextString" value="Object Type"/>
0229	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0230	</Attribute>
0231	<Attribute>
0232	<AttributeName type="TextString" value="Cryptographic
	Algorithm"/>
0233	<AttributeValue type="Enumeration" value="AES"/>
0234	</Attribute>
0235	<Attribute>
0236	<AttributeName type="TextString" value="Cryptographic
	Length"/>
0237	<AttributeValue type="Integer" value="256"/>
0238	</Attribute>
0239	<Attribute>
0240	<AttributeName type="TextString" value="Application Specific
	Information"/>
0241	<AttributeValue>
0242	<ApplicationNamespace type="TextString" value="LIBRARY-
	LTO"/>
0243	<ApplicationData type="TextString"
	value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
	000"/>
0244	</AttributeValue>
0245	</Attribute>
0246	<Attribute>

0247	<code>&lt;AttributeName type="TextString" value="Cryptographic Usage Mask"/&gt;</code>
0248	<code>&lt;AttributeValue type="Integer" value="Decrypt Encrypt"/&gt;</code>
0249	<code>&lt;/Attribute&gt;</code>
0250	<code>&lt;Attribute&gt;</code>
0251	<code>&lt;AttributeName type="TextString" value="Digest"/&gt;</code>
0252	<code>&lt;AttributeValue&gt;</code>
0253	<code>&lt;HashingAlgorithm type="Enumeration" value="SHA_256"/&gt;</code>
0254	<code>&lt;DigestValue type="ByteString"</code> <code>value="0bd3d7ada745e4eb34cc9d26cc84d4852a15906b2f77f80d01fc31c28108c49b"/&gt;</code>
0255	<code>&lt;/AttributeValue&gt;</code>
0256	<code>&lt;/Attribute&gt;</code>
0257	<code>&lt;Attribute&gt;</code>
0258	<code>&lt;AttributeName type="TextString" value="Initial Date"/&gt;</code>
0259	<code>&lt;AttributeValue type="DateTime" value="2012-10-</code> <code>05T21:41:46+00:00"/&gt;</code>
0260	<code>&lt;/Attribute&gt;</code>
0261	<code>&lt;Attribute&gt;</code>
0262	<code>&lt;AttributeName type="TextString" value="Last Change Date"/&gt;</code>
0263	<code>&lt;AttributeValue type="DateTime" value="2012-10-</code> <code>05T21:41:46+00:00"/&gt;</code>
0264	<code>&lt;/Attribute&gt;</code>
0265	<code>&lt;Attribute&gt;</code>
0266	<code>&lt;AttributeName type="TextString" value="Lease Time"/&gt;</code>
0267	<code>&lt;AttributeValue type="Interval" value="3600"/&gt;</code>
0268	<code>&lt;/Attribute&gt;</code>
0269	<code>&lt;Attribute&gt;</code>
0270	<code>&lt;AttributeName type="TextString" value="Name"/&gt;</code>
0271	<code>&lt;AttributeValue&gt;</code>
0272	<code>&lt;NameValue type="TextString"</code> <code>value="AAAAAAlA1AA12345678901234567"/&gt;</code>
0273	<code>&lt;NameType type="Enumeration"</code> <code>value="UninterpretedTextString"/&gt;</code>
0274	<code>&lt;/AttributeValue&gt;</code>
0275	<code>&lt;/Attribute&gt;</code>
0276	<code>&lt;Attribute&gt;</code>
0277	<code>&lt;AttributeName type="TextString" value="State"/&gt;</code>
0278	<code>&lt;AttributeValue type="Enumeration" value="PreActive"/&gt;</code>
0279	<code>&lt;/Attribute&gt;</code>
0280	<code>&lt;/ResponsePayload&gt;</code>
0281	<code>&lt;/BatchItem&gt;</code>
0282	<code>&lt;/ResponseMessage&gt;</code>
0283	<code># TIME 3</code> <code>&lt;RequestMessage&gt;</code>
0284	<code>&lt;RequestHeader&gt;</code>
0285	<code>&lt;ProtocolVersion&gt;</code>
0286	<code>&lt;ProtocolVersionMajor type="Integer" value="1"/&gt;</code>
0287	<code>&lt;ProtocolVersionMinor type="Integer" value="0"/&gt;</code>
0288	<code>&lt;/ProtocolVersion&gt;</code>
0289	<code>&lt;BatchOrderOption type="Boolean" value="true"/&gt;</code>
0290	<code>&lt;BatchCount type="Integer" value="3"/&gt;</code>
0291	<code>&lt;/RequestHeader&gt;</code>
0292	<code>&lt;BatchItem&gt;</code>
0293	<code>&lt;Operation type="Enumeration" value="Locate"/&gt;</code>
0294	<code>&lt;UniqueBatchItemID type="ByteString" value="01"/&gt;</code>
0295	<code>&lt;RequestPayload&gt;</code>
0296	<code>&lt;Attribute&gt;</code>

0297	<AttributeName type="TextString" value="Object Type"/>
0298	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0299	</Attribute>
0300	<Attribute>
0301	<AttributeName type="TextString" value="Application Specific Information"/>
0302	<AttributeValue>
0303	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0304	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000"/>
0305	</AttributeValue>
0306	</Attribute>
0307	</RequestPayload>
0308	</BatchItem>
0309	<BatchItem>
0310	<Operation type="Enumeration" value="ModifyAttribute"/>
0311	<UniqueBatchItemID type="ByteString" value="02"/>
0312	<RequestPayload>
0313	<Attribute>
0314	<AttributeName type="TextString" value="x-VendorAttribute2"/>
0315	<AttributeValue type="DateTime" value="2012-10-05T22:27:06+00:00"/>
0316	</Attribute>
0317	</RequestPayload>
0318	</BatchItem>
0319	<BatchItem>
0320	<Operation type="Enumeration" value="ModifyAttribute"/>
0321	<UniqueBatchItemID type="ByteString" value="03"/>
0322	<RequestPayload>
0323	<Attribute>
0324	<AttributeName type="TextString" value="x-VendorAttribute3"/>
0325	<AttributeValue type="Integer" value="1"/>
0326	</Attribute>
0327	</RequestPayload>
0328	</BatchItem>
0329	</RequestMessage>
0330	<ResponseMessage>
0331	<ResponseHeader>
0332	<ProtocolVersion>
0333	<ProtocolVersionMajor type="Integer" value="1"/>
0334	<ProtocolVersionMinor type="Integer" value="0"/>
0335	</ProtocolVersion>
0336	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0337	<BatchCount type="Integer" value="3"/>
0338	</ResponseHeader>
0339	<BatchItem>
0340	<Operation type="Enumeration" value="Locate"/>
0341	<UniqueBatchItemID type="ByteString" value="01"/>
0342	<ResultStatus type="Enumeration" value="Success"/>
0343	<ResponsePayload>
0344	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0345	</ResponsePayload>
0346	</BatchItem>

0347	<BatchItem>
0348	<Operation type="Enumeration" value="ModifyAttribute"/>
0349	<UniqueBatchItemID type="ByteString" value="02"/>
0350	<ResultStatus type="Enumeration" value="Success"/>
0351	<ResponsePayload>
0352	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0353	<Attribute>
0354	<AttributeName type="TextString" value="x-
	VendorAttribute2"/>
0355	<AttributeValue type="DateTime" value="2012-10-
	05T22:27:06+00:00"/>
0356	</Attribute>
0357	</ResponsePayload>
0358	</BatchItem>
0359	<BatchItem>
0360	<Operation type="Enumeration" value="ModifyAttribute"/>
0361	<UniqueBatchItemID type="ByteString" value="03"/>
0362	<ResultStatus type="Enumeration" value="Success"/>
0363	<ResponsePayload>
0364	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0365	<Attribute>
0366	<AttributeName type="TextString" value="x-
	VendorAttribute3"/>
0367	<AttributeValue type="Integer" value="1"/>
0368	</Attribute>
0369	</ResponsePayload>
0370	</BatchItem>
0371	</ResponseMessage>
	# TIME 4
0372	<RequestMessage>
0373	<RequestHeader>
0374	<ProtocolVersion>
0375	<ProtocolVersionMajor type="Integer" value="1"/>
0376	<ProtocolVersionMinor type="Integer" value="0"/>
0377	</ProtocolVersion>
0378	<BatchCount type="Integer" value="1"/>
0379	</RequestHeader>
0380	<BatchItem>
0381	<Operation type="Enumeration" value="Destroy"/>
0382	<RequestPayload>
0383	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0384	</RequestPayload>
0385	</BatchItem>
0386	</RequestMessage>
0387	<ResponseMessage>
0388	<ResponseHeader>
0389	<ProtocolVersion>
0390	<ProtocolVersionMajor type="Integer" value="1"/>
0391	<ProtocolVersionMinor type="Integer" value="0"/>
0392	</ProtocolVersion>
0393	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0394	<BatchCount type="Integer" value="1"/>
0395	</ResponseHeader>
0396	<BatchItem>
0397	<Operation type="Enumeration" value="Destroy"/>



0398	<ResultStatus type="Enumeration" value="Success"/>
0399	<ResponsePayload>
0400	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0401	</ResponsePayload>
0402	</BatchItem>
0403	</ResponseMessage>

238

### 239 3.1.4 TL-M-1-11 - Configuration

240 Determine server configuration details including operations supported (only the mandatory operations are  
 241 listed in the response example), objects supported (only the mandatory objects types are listed in the  
 242 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>

243

### 244 3.1.5 TL-M-2-11 - Write with new (created) key

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

249 Additional custom attributes MAY be specified in order to:

- 250 - ensure uniqueness of the key identifier when later Locating the key via ASI
- 251 - provide human-readable information (such as the tape Barcode value)
- 252 - 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"/>
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>
0065	<BatchItem>
0066	<Operation type="Enumeration" value="Get"/>
0067	<UniqueBatchItemID type="ByteString" value="02"/>
0068	<RequestPayload>
0069	</RequestPayload>
0070	</BatchItem>
0071	</RequestMessage>
0072	<ResponseMessage>



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="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
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>
0048	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0049	</ResponsePayload>
0050	</BatchItem>
0051	<BatchItem>
0052	<Operation type="Enumeration" value="Get"/>
0053	<UniqueBatchItemID type="ByteString" value="02"/>
0054	<ResultStatus type="Enumeration" value="Success"/>



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>
	# TIME 2
0147	<RequestMessage>
0148	<RequestHeader>
0149	<ProtocolVersion>
0150	<ProtocolVersionMajor type="Integer" value="1"/>
0151	<ProtocolVersionMinor type="Integer" value="1"/>
0152	</ProtocolVersion>
0153	<BatchOrderOption type="Boolean" value="true"/>
0154	<BatchCount type="Integer" value="2"/>
0155	</RequestHeader>



0156	<BatchItem>
0157	<Operation type="Enumeration" value="Locate"/>
0158	<UniqueBatchItemID type="ByteString" value="01"/>
0159	<RequestPayload>
0160	<Attribute>
0161	<AttributeName type="TextString" value="Object Type"/>
0162	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0163	</Attribute>
0164	<Attribute>
0165	<AttributeName type="TextString" value="Application Specific Information"/>
0166	<AttributeValue>
0167	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0168	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
0169	</AttributeValue>
0170	</Attribute>
0171	</RequestPayload>
0172	</BatchItem>
0173	<BatchItem>
0174	<Operation type="Enumeration" value="GetAttributes"/>
0175	<UniqueBatchItemID type="ByteString" value="02"/>
0176	<RequestPayload>
0177	</RequestPayload>
0178	</BatchItem>
0179	</RequestMessage>
0180	<ResponseMessage>
0181	<ResponseHeader>
0182	<ProtocolVersion>
0183	<ProtocolVersionMajor type="Integer" value="1"/>
0184	<ProtocolVersionMinor type="Integer" value="1"/>
0185	</ProtocolVersion>
0186	<TimeStamp type="DateTime" value="2012-10-05T22:00:32+00:00"/>
0187	<BatchCount type="Integer" value="2"/>
0188	</ResponseHeader>
0189	<BatchItem>
0190	<Operation type="Enumeration" value="Locate"/>
0191	<UniqueBatchItemID type="ByteString" value="01"/>
0192	<ResultStatus type="Enumeration" value="Success"/>
0193	<ResponsePayload>
0194	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0195	</ResponsePayload>
0196	</BatchItem>
0197	<BatchItem>
0198	<Operation type="Enumeration" value="GetAttributes"/>
0199	<UniqueBatchItemID type="ByteString" value="02"/>
0200	<ResultStatus type="Enumeration" value="Success"/>
0201	<ResponsePayload>
0202	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0203	<Attribute>
0204	<AttributeName type="TextString" value="x-ID"/>
0205	<AttributeValue type="TextString" value="TL-M-2-11"/>
0206	</Attribute>
0207	<Attribute>

```

0208     <AttributeName type="TextString" value="x-
VendorAttribute1"/>
0209     <AttributeValue type="TextString" value="XXA012A1"/>
0210     </Attribute>
0211     <Attribute>
0212         <AttributeName type="TextString" value="x-
VendorAttribute2"/>
0213         <AttributeValue type="Integer" value="0"/>
0214         </Attribute>
0215         <Attribute>
0216             <AttributeName type="TextString" value="x-
VendorAttribute3"/>
0217             <AttributeValue type="DateTime" value="2012-10-
05T22:08:19+00:00"/>
0218             </Attribute>
0219             <Attribute>
0220                 <AttributeName type="TextString" value="Unique Identifier"/>
0221                 <AttributeValue type="TextString"
value="$UNIQUE_IDENTIFIER_0"/>
0222                 </Attribute>
0223                 <Attribute>
0224                     <AttributeName type="TextString" value="Object Type"/>
0225                     <AttributeValue type="Enumeration" value="SymmetricKey"/>
0226                     </Attribute>
0227                     <Attribute>
0228                         <AttributeName type="TextString" value="Cryptographic
Algorithm"/>
0229                         <AttributeValue type="Enumeration" value="AES"/>
0230                         </Attribute>
0231                         <Attribute>
0232                             <AttributeName type="TextString" value="Cryptographic
Length"/>
0233                             <AttributeValue type="Integer" value="256"/>
0234                             </Attribute>
0235                             <Attribute>
0236                                 <AttributeName type="TextString" value="Application Specific
Information"/>
0237                                 <AttributeValue>
0238                                     <ApplicationNamespace type="TextString" value="LIBRARY-
LTO"/>
0239                                     <ApplicationData type="TextString"
value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000
000"/>
0240                                     </AttributeValue>
0241                                     </Attribute>
0242                                     <Attribute>
0243                                         <AttributeName type="TextString" value="Cryptographic Usage
Mask"/>
0244                                         <AttributeValue type="Integer" value="Decrypt Encrypt"/>
0245                                         </Attribute>
0246                                         <Attribute>
0247                                             <AttributeName type="TextString" value="Digest"/>
0248                                             <AttributeValue>
0249                                                 <HashingAlgorithm type="Enumeration" value="SHA_256"/>
0250                                                 <DigestValue type="ByteString"
value="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="AAAAAAAAA1A1AA12345678901234567"/>
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"/>
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-
0356	VendorAttribute2"/>
0357	<AttributeValue type="DateTime" value="2012-10-
0358	05T22:27:06+00:00"/>
0359	</Attribute>
0360	</ResponsePayload>
0361	</BatchItem>
0362	<BatchItem>
0363	<Operation type="Enumeration" value="ModifyAttribute"/>
0364	<UniqueBatchItemID type="ByteString" value="03"/>
0365	<ResultStatus type="Enumeration" value="Success"/>
0366	<ResponsePayload>
0367	<UniqueIdentifier type="TextString"
0368	value="\$UNIQUE_IDENTIFIER_0"/>
0369	<Attribute>
0370	<AttributeName type="TextString" value="x-
0371	VendorAttribute3"/>
0372	<AttributeValue type="Integer" value="1"/>
0373	</Attribute>
0374	</ResponsePayload>
0375	</BatchItem>
0376	</ResponseMessage>
0377	# TIME 4
0378	<RequestMessage>
0379	<RequestHeader>
0380	<ProtocolVersion>
0381	<ProtocolVersionMajor type="Integer" value="1"/>
0382	<ProtocolVersionMinor type="Integer" value="1"/>
0383	</ProtocolVersion>
0384	<BatchCount type="Integer" value="1"/>
0385	</RequestHeader>
0386	<BatchItem>
0387	<Operation type="Enumeration" value="Destroy"/>
0388	<RequestPayload>
0389	<UniqueIdentifier type="TextString"
0390	value="\$UNIQUE_IDENTIFIER_0"/>
0391	</RequestPayload>
0392	</BatchItem>
0393	</RequestMessage>
0394	<ResponseMessage>
0395	<ResponseHeader>
0396	<ProtocolVersion>
0397	<ProtocolVersionMajor type="Integer" value="1"/>
0398	<ProtocolVersionMinor type="Integer" value="1"/>
0399	</ProtocolVersion>
0400	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0401	<BatchCount type="Integer" value="1"/>
0402	</ResponseHeader>
0403	<BatchItem>
0404	<Operation type="Enumeration" value="Destroy"/>
	<ResultStatus type="Enumeration" value="Success"/>
	<ResponsePayload>
	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
	</ResponsePayload>
	</BatchItem>
	</ResponseMessage>

### 265 3.1.7 TL-M-1-12 - Configuration

266 Determine server configuration details including operations supported (only the mandatory operations are  
 267 listed in the response example), objects supported (only the mandatory objects types are listed in the  
 268 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>

269

### 270 3.1.8 TL-M-2-12 - Write with new (created) key

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

275 Additional custom attributes MAY be specified in order to:

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

	# TIME 0
0001	<RequestMessage>
0002	<RequestHeader>
0003	<ProtocolVersion>
0004	<ProtocolVersionMajor type="Integer" value="1"/>
0005	<ProtocolVersionMinor type="Integer" value="2"/>
0006	</ProtocolVersion>
0007	<BatchOrderOption type="Boolean" value="true"/>
0008	<BatchCount type="Integer" value="2"/>
0009	</RequestHeader>
0010	<BatchItem>
0011	<Operation type="Enumeration" value="Create"/>
0012	<UniqueBatchItemID type="ByteString" value="01"/>
0013	<RequestPayload>
0014	<ObjectType type="Enumeration" value="SymmetricKey"/>
0015	<TemplateAttribute>
0016	<Attribute>
0017	<AttributeName type="TextString" value="x-ID"/>
0018	<AttributeValue type="TextString" value="TL-M-2-12"/>
0019	</Attribute>
0020	<Attribute>
0021	<AttributeName type="TextString" value="Alternative
	Name"/>
0022	<AttributeValue>
0023	<AlternativeNameValue type="TextString"
	value="XXA012A1"/>
0024	<AlternativeNameType type="Enumeration"
	value="UninterpretedTextString"/>
0025	</AttributeValue>
0026	</Attribute>
0027	<Attribute>
0028	<AttributeName type="TextString" value="Name"/>
0029	<AttributeValue>
0030	<NameValue type="TextString"
	value="AAAAAAA1A1AA12345678901234567"/>



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-
	05T22:08:19+00:00"/>
0068	</Attribute>
0069	</TemplateAttribute>
0070	</RequestPayload>
0071	</BatchItem>
0072	<BatchItem>
0073	<Operation type="Enumeration" value="Get"/>
0074	<UniqueBatchItemID type="ByteString" value="02"/>
0075	<RequestPayload>
0076	</RequestPayload>

[illegible]

279

280 **3.1.9 TL-M-3-12 - Read an encrypted tape**

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

287 The test case destroys the key created in the previous test case to clean up after the test. Tape Library  
288 implementations MAY not perform this step.

289

	# 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"/>
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"/>
0042	</ResponseHeader>
0043	<BatchItem>
0044	<Operation type="Enumeration" value="Locate"/>
0045	<UniqueBatchItemID type="ByteString" value="01"/>
0046	<ResultStatus type="Enumeration" value="Success"/>
0047	<ResponsePayload>
0048	<UniqueIdentifier type="TextString" value="\$UNIQUE_IDENTIFIER_0"/>
0049	</ResponsePayload>
0050	</BatchItem>
0051	<BatchItem>
0052	<Operation type="Enumeration" value="Get"/>

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0103	</RequestMessage>
0104	<ResponseMessage>
0105	<ResponseHeader>
0106	<ProtocolVersion>
0107	<ProtocolVersionMajor type="Integer" value="1"/>
0108	<ProtocolVersionMinor type="Integer" value="2"/>
0109	</ProtocolVersion>
0110	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0111	<BatchCount type="Integer" value="2"/>
0112	</ResponseHeader>
0113	<BatchItem>
0114	<Operation type="Enumeration" value="Locate"/>
0115	<UniqueBatchItemID type="ByteString" value="01"/>
0116	<ResultStatus type="Enumeration" value="Success"/>
0117	<ResponsePayload>
0118	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0119	</ResponsePayload>
0120	</BatchItem>
0121	<BatchItem>
0122	<Operation type="Enumeration" value="GetAttributeList"/>
0123	<UniqueBatchItemID type="ByteString" value="02"/>
0124	<ResultStatus type="Enumeration" value="Success"/>
0125	<ResponsePayload>
0126	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0127	<AttributeName type="TextString" value="x-ID"/>
0128	<AttributeName type="TextString" value="x-Barcode"/>
0129	<AttributeName type="TextString" value="x-VendorAttribute1"/>
0130	<AttributeName type="TextString" value="x-VendorAttribute2"/>
0131	<AttributeName type="TextString" value="x-VendorAttribute3"/>
0132	<AttributeName type="TextString" value="Unique Identifier"/>
0133	<AttributeName type="TextString" value="Object Type"/>
0134	<AttributeName type="TextString" value="Cryptographic
	Algorithm"/>
0135	<AttributeName type="TextString" value="Cryptographic
	Length"/>
0136	<AttributeName type="TextString" value="Application Specific
	Information"/>
0137	<AttributeName type="TextString" value="Cryptographic Usage
	Mask"/>
0138	<AttributeName type="TextString" value="Digest"/>
0139	<AttributeName type="TextString" value="Initial Date"/>
0140	<AttributeName type="TextString" value="Last Change Date"/>
0141	<AttributeName type="TextString" value="Lease Time"/>
0142	<AttributeName type="TextString" value="Name"/>
0143	<AttributeName type="TextString" value="Original Creation
	Date"/>
0144	<AttributeName type="TextString" value="State"/>
0145	</ResponsePayload>
0146	</BatchItem>
0147	</ResponseMessage>
	# 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="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
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

```

0252     000"/>
0253         </AttributeValue>
0254     </Attribute>
0255     <Attribute 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="AAAAAA1A1AA12345678901234567"/>
0286             <NameType type="Enumeration"
value="UninterpretedTextString"/>
0287         </AttributeValue>
0288     </Attribute>
0289     <Attribute>
0290         <AttributeName type="TextString" value="Original Creation
Date"/>
0291         <AttributeValue type="DateTime" value="2012-10-
05T21:41:46+00:00"/>
0292     </Attribute>
0293     <Attribute>
0294         <AttributeName type="TextString" value="State"/>
0295         <AttributeValue type="Enumeration" value="PreActive"/>
0296     </Attribute>
0297 </ResponsePayload>
0298 </BatchItem>
0299 </ResponseMessage>

```



	# TIME 3
0300	<RequestMessage>
0301	<RequestHeader>
0302	<ProtocolVersion>
0303	<ProtocolVersionMajor type="Integer" value="1"/>
0304	<ProtocolVersionMinor type="Integer" value="2"/>
0305	</ProtocolVersion>
0306	<BatchOrderOption type="Boolean" value="true"/>
0307	<BatchCount type="Integer" value="3"/>
0308	</RequestHeader>
0309	<BatchItem>
0310	<Operation type="Enumeration" value="Locate"/>
0311	<UniqueBatchItemID type="ByteString" value="01"/>
0312	<RequestPayload>
0313	<Attribute>
0314	<AttributeName type="TextString" value="Object Type"/>
0315	<AttributeValue type="Enumeration" value="SymmetricKey"/>
0316	</Attribute>
0317	<Attribute>
0318	<AttributeName type="TextString" value="Application Specific Information"/>
0319	<AttributeValue>
0320	<ApplicationNamespace type="TextString" value="LIBRARY-LTO"/>
0321	<ApplicationData type="TextString" value="123456789ABCDEF123456789123456789ABCDEF123456789ABCDEF1234000000"/>
0322	</AttributeValue>
0323	</Attribute>
0324	</RequestPayload>
0325	</BatchItem>
0326	<BatchItem>
0327	<Operation type="Enumeration" value="ModifyAttribute"/>
0328	<UniqueBatchItemID type="ByteString" value="02"/>
0329	<RequestPayload>
0330	<Attribute>
0331	<AttributeName type="TextString" value="x-VendorAttribute3"/>
0332	<AttributeValue type="DateTime" value="2012-10-05T22:27:06+00:00"/>
0333	</Attribute>
0334	</RequestPayload>
0335	</BatchItem>
0336	<BatchItem>
0337	<Operation type="Enumeration" value="ModifyAttribute"/>
0338	<UniqueBatchItemID type="ByteString" value="03"/>
0339	<RequestPayload>
0340	<Attribute>
0341	<AttributeName type="TextString" value="x-VendorAttribute2"/>
0342	<AttributeValue type="Integer" value="1"/>
0343	</Attribute>
0344	</RequestPayload>
0345	</BatchItem>
0346	</RequestMessage>
0347	<ResponseMessage>
0348	<ResponseHeader>
0349	<ProtocolVersion>

0350	<ProtocolVersionMajor type="Integer" value="1"/>
0351	<ProtocolVersionMinor type="Integer" value="2"/>
0352	</ProtocolVersion>
0353	<TimeStamp type="DateTime" value="2012-10-05T22:00:33+00:00"/>
0354	<BatchCount type="Integer" value="3"/>
0355	</ResponseHeader>
0356	<BatchItem>
0357	<Operation type="Enumeration" value="Locate"/>
0358	<UniqueBatchItemID type="ByteString" value="01"/>
0359	<ResultStatus type="Enumeration" value="Success"/>
0360	<ResponsePayload>
0361	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0362	</ResponsePayload>
0363	</BatchItem>
0364	<BatchItem>
0365	<Operation type="Enumeration" value="ModifyAttribute"/>
0366	<UniqueBatchItemID type="ByteString" value="02"/>
0367	<ResultStatus type="Enumeration" value="Success"/>
0368	<ResponsePayload>
0369	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0370	<Attribute>
0371	<AttributeName type="TextString" value="x-
	VendorAttribute3"/>
0372	<AttributeValue type="DateTime" value="2012-10-
	05T22:27:06+00:00"/>
0373	</Attribute>
0374	</ResponsePayload>
0375	</BatchItem>
0376	<BatchItem>
0377	<Operation type="Enumeration" value="ModifyAttribute"/>
0378	<UniqueBatchItemID type="ByteString" value="03"/>
0379	<ResultStatus type="Enumeration" value="Success"/>
0380	<ResponsePayload>
0381	<UniqueIdentifier type="TextString"
	value="\$UNIQUE_IDENTIFIER_0"/>
0382	<Attribute>
0383	<AttributeName type="TextString" value="x-
	VendorAttribute2"/>
0384	<AttributeValue type="Integer" value="1"/>
0385	</Attribute>
0386	</ResponsePayload>
0387	</BatchItem>
0388	</ResponseMessage>
# 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"

0401	value="\$UNIQUE_IDENTIFIER_0"/>
0402	</RequestPayload>
0403	</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"
0417	value="\$UNIQUE_IDENTIFIER_0"/>
0418	</ResponsePayload>
0419	</BatchItem>
0420	</ResponseMessage>

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## 4 Conformance

### 4.1 Conformance Statement

1. KMIP client and server implementations conformant to this profile: SHALL support the Authentication Suite conditions (2.1);
2. SHALL support the Baseline Tape Library conditions (2.2);
3. SHALL support the Using Application Specific Information for Key Identifiers conditions (2.3);
4. SHALL support the Using Alternative Name for tape media barcode conditions (2.4); and
5. SHALL support all the Mandatory Test Cases (3.1) for each supported protocol version (major and minor).

### 4.2 Permitted Test Case Variations

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

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

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

#### 4.2.1 Variable Items

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

1. UniqueIdentifier
2. PrivateKeyUniqueIdentifier
3. PublicKeyUniqueIdentifier
4. UniqueBatchItemIdentifier
5. AsynchronousCorrelationValue
6. TimeStamp
7. KeyValue / KeyMaterial including:
  - a. key material content returned for managed cryptographic objects which are generated by the server
  - b. wrapped versions of keys where the wrapping key is dynamic or the wrapping contains variable output for each wrap operation
8. For response containing the output of cryptographic operation in Data / SignatureData/ MACData / IVCounterNonce where:
  - a. the managed object is generated by the server; or
  - b. the operation inherently contains variable output
9. For the following DateTime attributes where the value is not specified in the request as a fixed DateTime value:
  - a. ActivationDate
  - b. ArchiveDate
  - c. CompromiseDate
  - d. CompromiseOccurrenceDate

- e. DeactivationDate
- f. DestroyDate
- g. InitialDate
- h. LastChangeDate
- i. ProtectStartDate
- j. ProcessStopDate
- k. ValidityDate
- l. OriginalCreationDate
- 10. LinkedObjectIdentifier
- 11. DigestValue
  - a. For those managed cryptographic objects which are dynamically generated
- 12. KeyFormatType
  - a. The key format type selected by the server when it creates managed objects
- 13. Digest
  - a. The HashingAlgorithm selected by the server when it calculates the digest for a managed object for which it has access to the key material
  - b. The Digest Value
- 14. Extensions reported in Query for ExtensionList and ExtensionMap
- 15. Application Namespaces reported in Query
- 16. Object Types reported in Query other than those noted as required in this profile
- 17. Operation Types reported in Query other than those noted as required in this profile (or any referenced profile documents)
- 18. For TextString attribute values containing test identifiers:
  - a. Additional vendor or application prefixes
- 19. Additional attributes beyond those noted in the response

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

1. Object Group values – May or may not return one or more Object Group values not included in the requests
2. y-CustomAttributes – May or may not include additional server-specific associated attributes not included in requests
3. Message Extensions – May or may not include additional (non-critical) vendor extensions
4. TemplateAttribute – May or may not be included in responses where the Template Attribute response is noted as optional in [KMIP-SPEC]
5. AttributeIndex – May or may not include Attribute Index value where the Attribute Index value is 0 for Protocol Versions 1.1 and above.
6. ResultMessage – May or may not be included in responses and the value (if included) may vary from the text contained within the test case.
7. The list of Protocol Versions returned in a DiscoverVersion response may include additional protocol versions if the request has not specified a list of client supported Protocol Versions.
8. VendorIdentification - The value (if included) may vary from the text contained within the test case.

## 4.2.2 Variable behavior

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

- 376 1. A test may omit the clean-up requests and responses (containing Revoke and/or Destroy) at the  
377 end of the test provided there is a separate mechanism to remove the created objects during  
378 testing.
- 379 2. A test may omit the test identifiers if the client is unable to include them in requests. This includes  
380 the following attributes:
- 381 a. Name; and
- 382 b. x-ID
- 383
- 384

---

## Appendix A. Acknowledgments

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### Participants:

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494 Michael Yoder, Vormetric. Inc.  
495 Magda Zdunkiewicz, Cryptsoft  
496 Peter Zelechowski, Election Systems & Software

## Appendix B. KMIP Specification Cross Reference

Reference Term	KMIP 1.0	KMIP 1.1	KMIP 1.2
<b>1 Introduction</b>			
<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.
<b>2 Objects</b>			
<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.
<b>3 Attributes</b>			
<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.

<b>Reference Term</b>	<b>KMIP 1.0</b>	<b>KMIP 1.1</b>	<b>KMIP 1.2</b>
<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.
<b>4 Client-to-Server Operations</b>			
<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.

<b>Reference Term</b>	<b>KMIP 1.0</b>	<b>KMIP 1.1</b>	<b>KMIP 1.2</b>
<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.
<b>5 Server-to-Client Operations</b>			
<i>Notify</i>	5.1.	5.1.	5.1.
<i>Put</i>	5.2.	5.2.	5.2.
<b>6 Message Contents</b>			
<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.
<b>7 Message Format</b>			

<b>Reference Term</b>	<b>KMIP 1.0</b>	<b>KMIP 1.1</b>	<b>KMIP 1.2</b>
<i>Message Structure</i>	7.1.	7.1.	7.1.
<i>Operations</i>	7.2.	7.2.	7.2.
<b>8 Authentication</b>			
<i>Authentication</i>	8	8	8
<b>9 Message Encoding</b>			
<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.

<b>Reference Term</b>	<b><u>KMIP 1.0</u></b>	<b><u>KMIP 1.1</u></b>	<b><u>KMIP 1.2</u></b>
<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.	-	-
<b>10 Transport</b>			
<i>Transport</i>	10	10	10
<b>12 KMIP Server and Client Implementation Conformance</b>			
<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.