



Key Management Interoperability Protocol Profiles Version 1.0

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Technical Committee:

OASIS Key Management Interoperability Protocol (KMIP) TC

Chair(s):

Robert Griffin, EMC Corporation <robert.griffin@rsa.com>
Subhash Sankuratripati, NetApp <Subhash.Sankuratripati@netapp.com>

Editor(s):

Robert Griffin, EMC Corporation <robert.griffin@rsa.com>
Subhash Sankuratripati, NetApp <Subhash.Sankuratripati@netapp.com>

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This specification replaces or supersedes:

- None

This specification is related to:

- [Key Management Interoperability Protocol Specification v1.0](#)
- [Key Management Interoperability Protocol Use Cases v1.0](#)
- [Key Management Interoperability Protocol Usage Guide v1.0](#)

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None

Abstract:

This document is intended for developers and architects who wish to design systems and applications that interoperate using the Key Management Interoperability Protocol specification.

Status:

This document was last revised or approved by the Key Management Interoperability Protocol TC on the above date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved 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

OASIS requires a conformance section in an approved committee specification (see [TCProc], section 2.18 Specification Quality):

A specification that is approved by the TC at the Public Review Draft, Committee Specification or OASIS Standard level must include a separate section, listing a set of numbered conformance clauses, to which any implementation of the specification must adhere in order to claim conformance to the specification (or any optional portion thereof).

This document intends to meet this OASIS requirement on conformance clauses for a KMIP Server ([KMIP-Spec] 12.1) through profiles that define the use of KMIP objects, attributes, operations, message elements and authentication methods within specific contexts of KMIP server and client interaction. These profiles define a set of normative constraints for employing KMIP within a particular environment or context of use. They may, optionally, require the use of specific KMIP functionality or in other respects define the processing rules to be followed by profile actors.

For normative definition of the elements of KMIP specified in these profiles, see the [KMIP Specification](#). Illustrative guidance for the implementation of KMIP clients and servers is provided in the [KMIP Usage Guide](#).

1.1 Terminology

The key words "SHALL", "SHALL NOT", "REQUIRED", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119]. The words 'must', 'can', and 'will' are forbidden.

For definitions not found in this document, see [KMIP-Spec] definitions **Error! Reference source not found.**

1.2 Normative References

- [RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- [KMIP-Spec] OASIS Committee Draft 10, *Key Management Interoperability Protocol Specification v1.0*, March 2010. <http://docs.oasis-open.org/kmip/spec/v1.0/cd10/kmip-spec-1.0-cd-10.doc>
- [RFC 2246] T. Dierks & C.Allen, *The TLS Protocol, Version 1.0*, <http://www.ietf.org/rfc/rfc2246.txt>, IETF RFC 2246, January 1999
- [RFC 3268] P. Chown, *Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)*, <http://www.ietf.org/rfc/rfc3268.txt>, IETF RFC 3268, June 2002
- [RFC 4346] T. Dierks & E. Rescorla, *The Transport Layer Security (TLS) Protocol, Version 1.1*, <http://www.ietf.org/rfc/rfc4346.txt>, IETF RFC 4346, April 2006
- [RFC 5246] T. Dierks & E. Rescorla, *The Transport Layer Security (TLS) Protocol, Version 1.2*, <http://www.ietf.org/rfc/rfc5246.txt>, IETF RFC 5246, August 2008
- [NIST 800-57 Part 3] Barker, Burr, et.al, *Recommendation for Key Management Part 3: Application-Specific Key Management Guidance*, http://csrc.nist.gov/publications/nistpubs/800-57/sp800-57_PART3_key-management_Dec2009.pdf, December 2009

1.3 Non-normative References

- [KMIP-UG] OASIS Committee Draft 05, *Key Management Interoperability Protocol Usage Guide v1.0*, November 2009. <http://docs.oasis-open.org/kmip/ug/v1.0/cd09/kmip-ug-1.0-cd-09.doc>

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47
48

[KMIP-UC]

OASIS Committee Draft 05, *Key Management Interoperability Protocol Use Cases v1.0*, November 2009. <http://docs.oasis-open.org/kmip/usecases/v1.0/cd09/kmip-usecases-1.0-cd-09.doc>

49 2 Profiles

50 This document defines a selected set of conformance clauses and authentication suites which when
51 “paired together” form KMIP Profiles. The KMIP TC also welcomes proposals for new profiles. KMIP TC
52 members are encouraged to submit these proposals to the KMIP TC for consideration for inclusion in a
53 future version of this TC-approved document. However, some OASIS members may simply wish to
54 inform the committee of profiles or other work related to KMIP.

55 2.1 Guidelines for Specifying Conformance Clauses

56 This section provides a checklist of issues that SHALL be addressed by each clause.

- 57 1. Implement functionality as mandated by Section 12.1 (Conformance clauses for a KMIP servers)
- 58 2. Specify the list of additional objects that SHALL be supported
- 59 3. Specify the list of additional attributes that SHALL be supported
- 60 4. Specify the list of additional operations that SHALL be supported
- 61 5. Specify any additional message content that SHALL be supported

62 2.2 Guidelines for Specifying Authentication Suites

- 63 1. Channel Security – Client to Server communication SHALL establish and maintain channel
64 confidentiality and integrity, and provide assurance of server authenticity
- 65 2. Channel Options – Options like protocol version and cipher suite
- 66 3. Client Authenticity – The options that are used to provide assurance of client authenticity

67 2.3 Guidelines for Specifying KMIP Profiles

68 A KMIP profile is a tuple of {Conformance Clause, Authentication Suite}

69 3 Authentication suites

70 This section contains the list of protocol versions and cipher suites that are to be used by profiles
71 contained within this document.

72 3.1 Basic Authentication Suite

73 This authentication set stipulates that a KMIP client and server SHALL use TLS to negotiate a mutually-
74 authenticated connection with the exception of the Query operation. The query operation SHALL NOT
75 require the client to provide assurance of its authenticity.

76 3.1.1 Protocols

77 Conformant KMIP servers SHALL support TLSv1.0. They MAY support TLS v1.1 [RFC 4346], TLS v1.2
78 [RFC 5246] bearing in mind that they are not compatible with each other and SHALL NOT support
79 SSLv3.0, SSLv2.0 and SSLv1.0.

80 3.1.2 Cipher Suites

81 Conformant KMIP servers SHALL support the following cipher suites:

- 82 • TLS_RSA_WITH_AES_128_CBC_SHA

83 Basic Authentication Suite Conformant KMIP servers MAY support the cipher suites listed in tables 4-1
84 through 4-4 of NIST 800-57 Part 3 with the exception of NULL ciphers (at the time this document was
85 created, the only NULL cipher in 800-57 Part 3 was: TLS_RSA_WITH_NONE_SHA)

86 Basic Authentication Suite Conformant KMIP servers SHALL NOT support any other cipher suites.

87 NOTE: TLS 1.0 has some security issues as described in <http://www.openssl.org/~bodo/tls-cbc.txt>.
88 Implementations that need protections against this attack should considering using the “TLS 1.2
89 Authentication Suite”

90 *At the time this document was published, NIST 800-57 Part 3 Table 4-1, for cipher suites that have both*
91 *SHA1 and SHA256 variants, erroneously categorizes SHA256 based ciphers under TLS versions 1.0, 1.1*
92 *and 1.2 and SHA1 based ciphers under TLS 1.2. The correct value for SHA256 based ciphers should 1.2*
93 *and for SHA1 based ciphers it should be 1.0, 1.2 and 1.2.*

94 3.1.3 Client Authenticity

95 For authenticated services (all operations save Query) KMIP servers SHALL require the use of channel
96 (TLS) mutual authentication to provide assurance of client authenticity.

97
98 In the absence of Credential information in the request header, KMIP servers SHALL use the identity
99 derived from the channel authentication as the client identity.

100
101 In the presence of Credential information in the request header, KMIP servers SHALL consider such
102 Credential information into their evaluation of client authenticity and identity, along with the authenticity
103 and identity derived from the channel. The exact mechanisms for such evaluation are outside the scope
104 of this specification.

105 3.1.4 Object Creator

106 KMIP objects have a `creator`. For those KMIP requests that result in new managed objects the client
107 identity SHALL be used as the creator of the managed object. For those operations that only access pre-
108 existent managed objects, the client identity SHALL be checked against the creator and access SHALL
109 be controlled as detailed in section 3.13 of [KMIP].

110 **3.2 TLS 1.2 Authentication Suite**

111 This authentication set stipulates that a KMIP client and server SHALL use TLS to negotiate a mutually-
112 authenticated connection with the exception of the Query operation. The query operation SHALL NOT
113 require the client to provide assurance of its authenticity.

114 **3.2.1 Protocols**

115 Conformant KMIP servers SHALL support TLSv1.2

116 **3.2.2 Cipher Suites**

117 Conformant KMIP servers SHALL support the following cipher suites:

- 118 • TLS_RSA_WITH_AES_256_CBC_SHA256
- 119 • TLS_RSA_WITH_AES_128_CBC_SHA256

120 TLS 1.2 Authentication Suite Conformant KMIP servers MAY support the cipher suites listed in tables 4-1
121 through 4-4 of NIST 800-57 Part 3 with the exception of NULL ciphers (at the time this document was
122 created, the only NULL cipher in 800-57 Part 3 was: TLS_RSA_WITH_NONE_SHA)

123 TLS 1.2 Authentication Suite Conformant KMIP servers SHALL NOT support any other cipher suites

124 *NIST 800-57 Part 3 Table 4-1, for cipher suites that have both SHA1 and SHA256 variants, erroneously*
125 *categorizes SHA256 based ciphers under TLS versions 1.0, 1.1 and 1.2 and SHA1 based ciphers under*
126 *TLS 1.2. The correct value for SHA256 based ciphers should be 1.2 and for SHA1 based ciphers it should*
127 *be 1.0, 1.2 and 1.2.*

128 **3.2.3 Client Authenticity**

129 Same as the basic authentication suite (See Section 3.1.3)

130 **3.2.4 Object Creator**

131 Same as the basic authentication suite (See Section 3.1.4)

132 **4 KMIP Profiles**

133 This section lists the KMIP profiles that are defined in this specification. More than one profile may be
134 supported at the same time provided there are no conflicting requirements.

135 **4.1 Secret Data KMIP Profile**

136 A profile that consists of the tuple {Secret Data Server Conformance Clause, Basic Authentication Suite}

137 **4.2 Basic Symmetric Key Store and Server KMIP Profile**

138 A profile that consists of the tuple {Basic Symmetric Key Store and Server Conformance Clause, Basic
139 Authentication Suite}

140 **4.3 Basic Symmetric Key Foundry and Server KMIP Profile**

141 A profile that consists of the tuple {Basic Symmetric Key Foundry and Server Conformance Clause, Basic
142 Authentication Suite}

143 **4.4 Secret Data TLS 1.2 Authentication KMIP Profile**

144 A profile that consists of the tuple {Secret Data Server Conformance Clause, TLS 1.2 Authentication
145 Suite}

146 **4.5 Basic Symmetric Key Store and Server TLS 1.2 Authentication 147 KMIP Profile**

148 A profile that consists of the tuple {Basic Symmetric Key Store and Server Conformance Clause, TLS 1.2
149 Authentication Suite}

150 **4.6 Basic Symmetric Key Foundry and Server TLS 1.2 151 Authentication KMIP Profile**

152 A profile that consists of the tuple {Basic Symmetric Key Foundry and Server Conformance Clause, TLS
153 1.2 Authentication Suite}

154

155 5 Conformance Clauses

156 The following subsections describe currently-defined profiles related to the use of KMIP in support of
157 secret data and symmetric key operations.

158 5.1 Secret Data Server Clause

159 This proposal builds on the KMIP server conformance clauses to provide some of the most basic
160 functionality that would be expected of a conformant KMIP server – the ability to create, register and get
161 secret data in an interoperable fashion.

162 5.1.1 Implementation Conformance

163 An implementation is a conforming Secret Data Server Clause if it meets the conditions as outlined in the
164 following section.

165 5.1.2 Conformance of a Secret Data Server

166 An implementation conforms to this specification as a Secret Data Server if it meets the following
167 conditions:

- 168 1. Supports the conditions required by the KMIP Server conformance clauses ([KMIP-Spec] 12.1)
- 169 2. Supports the following additional objects:
 - 170 a. Secret Data ([KMIP-Spec] 2.2.7)
- 171 3. Supports the following client-to-server operations:
 - 172 a. Register ([KMIP-Spec] 4.3)
- 173 4. Supports the following subsets of enumerated attributes:
 - 174 a. Object Type ([KMIP-Spec] 3.3 and 9.1.3.2.11)
 - 175 i. Secret Data
 - 176 b. Secret Data Type ([KMIP-Spec] 9.1.3.2.8)
 - 177 i. Password
- 178 5. Supports the following subsets of enumerated objects (see clauses 3 and 9):
 - 179 a. Key Format Type ([KMIP-Spec] 9.1.3.2.3)
 - 180 i. Opaque
- 181 6. Optionally supports any clause within [KMIP-Spec] specification that is not listed above
- 182 7. Optionally supports extensions outside the scope of this standard (e.g., vendor extensions,
183 conformance clauses) that do not contradict any KMIP requirements

184 5.2 Basic Symmetric Key Store and Server Conformance Clause

185 This proposal builds on the KMIP server conformance clauses to provide support for symmetric key store
186 and foundry use cases.

187 5.2.1 Implementation Conformance

188 An implementation is a conforming KMIP Basic Symmetric Key Store and Server if the implementation
189 meets the conditions as outlined in the following section.

190 **5.2.2 Conformance as a Basic Symmetric Key Store and Server**

191 An implementation conforms to this specification as a Basic Symmetric Key Store and Server if it meets
192 the following conditions:

- 193 1. Supports the conditions required by the KMIP Server conformance clauses. ([KMIP-Spec] 12.1)
- 194 2. Supports the following additional objects:
 - 195 a. Symmetric Key ([KMIP-Spec] 2.2.2)
- 196 3. Supports the following client-to-server operations:
 - 197 a. Register ([KMIP-Spec] 4.3)
- 198 4. Supports the following attributes:
 - 199 a. Process Start Date ([KMIP-Spec] 3.20)
 - 200 b. Protect Stop Date ([KMIP-Spec] 3.21)
- 201 5. Supports the following subsets of enumerated attributes:
 - 202 a. Cryptographic Algorithm ([KMIP-Spec] 3.4 and 9.1.3.2.12)
 - 203 i. 3DES
 - 204 ii. AES
 - 205 b. Object Type ([KMIP-Spec] 3.3 and 9.1.3.2.11)
 - 206 i. Symmetric Key
- 207 6. Supports the following subsets of enumerated objects:
 - 208 a. Key Format Type ([KMIP-Spec] 3.4 and 9.1.3.2.3)
 - 209 i. Raw
 - 210 ii. Transparent Symmetric Key
- 211 7. Optionally supports any clause within [KMIP-Spec] specification that is not listed above
- 212 8. Optionally supports extensions outside the scope of this standard (e.g., vendor extensions,
213 conformance clauses) that do not contradict any KMIP requirements

214 **5.3 Basic Symmetric Key Foundry and Server Conformance Clause**

215 This proposal intends to meet this OASIS requirement by building on the KMIP Server Conformance
216 Clause defined in the KMIP Specification to provide basic symmetric key services. The intent is to simply
217 allow key creation and serving with very limited key types.

218 **5.3.1 Implementation Conformance**

219 An implementation is a conforming KMIP Basic Symmetric Key Store and Server if the implementation
220 meets the conditions as outlined in the following section.

221 **5.3.2 Conformance as a KMIP Basic Symmetric Key Foundry and Server**

222 An implementation conforms to this specification as a KMIP Basic Symmetric Key Foundry and Server if it
223 meets the following conditions:

- 224 1. Supports the conditions required by the KMIP Server conformance clauses. ([KMIP-Spec] 12.1)
- 225 2. Supports the following additional objects
 - 226 a. Symmetric Key ([KMIP-Spec] 2.2.2)
- 227 3. Supports the following client-to-server operations:
 - 228 a. Create ([KMIP-Spec] 4.1)
- 229 4. Supports the following attributes:
 - 230 a. Process Start Date ([KMIP-Spec] 3.20)

- 231 b. Protect Stop Date ([KMIP-Spec] 3.21)
- 232 5. Supports the following subsets of enumerated attributes:
- 233 a. Cryptographic Algorithm ([KMIP-Spec] 3.4 and 9.1.3.2.12)
- 234 i. 3DES
- 235 ii. AES
- 236 b. Object Type ([KMIP-Spec] 3.3 and 9.1.3.2.11)
- 237 i. Symmetric Key
- 238 6. Supports the following subsets of enumerated objects:
- 239 a. Key Format Type ([KMIP-Spec] 3.4 and 9.1.3.2.3)
- 240 i. Raw
- 241 ii. Transparent Symmetric Key
- 242 7. Optionally supports any clause within [KMIP-Spec] specification that is not listed above
- 243 8. Optionally supports extensions outside the scope of this standard (e.g., vendor extensions,
- 244 conformance clauses) that do not contradict any KMIP requirements
- 245
- 246

247

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250 **Original Authors of the initial contribution:**

251 Bruce Rich, IBM

252

253 **Participants:**

254

255 Mike Allen, PGP Corporation

256 Gordon Arnold, IBM

257 Todd Arnold, IBM

258 Matthew Ball, Oracle Corporation

259 Elaine Barker, NIST

260 Peter Bartok, Venafi, Inc.

261 Mathias Björkqvist, IBM

262 Kevin Bocek, Thales e-Security

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270 Indra Fitzgerald, Hewlett-Packard

271 Alan Frindell, SafeNet, Inc.

272 Judith Furlong, EMC Corporation

273 Jonathan Geater, Thales e-Security

274 Robert Griffin, EMC Corporation

275 Robert Haas, IBM

276 Thomas Hardjono, M.I.T.

277 Kurt Heberlein, 3PAR, Inc.

278 Marc Hocking, BeCrypt Ltd.

279 Larry Hofer, Emulex Corporation

280 Brandon Hoff, Emulex Corporation

281 Walt Hubis, LSI Corporation

282 Wyllys Ingersoll, Oracle Corporation

283 Jay Jacobs, Target Corporation

284 Glen Jaquette, IBM

285 Scott Kipp, Brocade Communications Systems, Inc.

286 David Lawson, Emulex Corporation

287 Hal Lockhart, Oracle Corporation

288 Robert Lockhart, Thales e-Security

289 Shyam Mankala, EMC Corporation

290 Upendra Mardikar, PayPal Inc.

291 Marc Massar, Individual

292 Don McAlister, Associate

293 Hyrum Mills, Mitre Corporation

294 Bob Nixon, Emulex Corporation

295 Landon Curt Noll, Cisco Systems, Inc.

296 René Pawlitzek, IBM

297 Rob Philpott, EMC Corporation

298 Scott Rea, Individual

299 Bruce Rich, IBM

300 Scott Rotondo, Oracle Corporation
301 Saikat Saha, Vormetric, Inc.
302 Anil Saldhana, Red Hat
303 Subhash Sankuratripati, NetApp
304 Mark Schiller, Hewlett-Packard
305 Jitendra Singh, Brocade Communications Systems, Inc.
306 Servesh Singh, EMC Corporation
307 Terence Spies, Voltage Security
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309 Marcus Streets, Thales e-Security
310 Brett Thompson, SafeNet, Inc.
311 Benjamin Tomhave, Individual
312 Sean Turner, IECA, Inc.
313 Paul Turner, Venafi, Inc.
314 Marko Vukolić, IBM
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316 Steven Wierenga, Hewlett-Packard
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319 Peter Zelechowski, Election Systems & Software
320 Grace Zhang, Skyworth TTG Holdings Limited

B. Revision History

Revision	Date	Editor	Changes Made
ed-0.98	2009-09-18	Robert Griffin	Initial conversion of symmetric key profiles, as created by Bruce Rich, into this KMIP Profiles document.
ed-0.98	2009-09-29	Subhash Sankuratripati	Adding the notion of authentication sets
ed-0.99	2009-10-05	Subhash Sankuratripati	Incorporating feedback that was received during the F2F
ed-0.99	2009-10-21	Subhash Sankuratripati	Incorporating additional feedback and getting the document ready to be committee draft
ed-0.99	2009-10-23	Subhash Sankuratripati	Other minor edits
ed-0.99	2009-11-01	Subhash Sankuratripati	More editorial changes
ed-0.99	2009-11-06	Subhash Sankuratripati	Version that is to be submitted as committee draft
cd-01	2009-11-06	Subhash Sankuratripati	First version as committee draft
cd-02	2009-11-09	Subhash Sankuratripati	Corrected reference to conformance clause section of [KMIP-Spec] from 13.1 to 12.1 and another minor edit.
cd-03	2009-11-11	Subhash Sankuratripati	Accepting all changes and removing previous versions
cd-04	2009-11-12	Subhash Sankuratripati	Corrected document URIs
cd-05	2009-03-05	Subhash Sankuratripati	Addressing public review comments by adding <ul style="list-style-type: none"> - Support for TLS 1.2, - Adding references to normative documents - Added an informative warning regarding the usage of TLS 1.0 in certain scenarios due to a security issue - Added an errata for NIST 800-57 Part 3