

PKCS #11 Cryptographic Token Interface Profiles Version 2.40

Committee Specification 01

16 September 2014

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Technical Committee:

OASIS PKCS 11 TC

Chairs:

Robert Griffin (robert.griffin@rsa.com), EMC Corporation Valerie Fenwick (valerie.fenwick@oracle.com), Oracle

Editor:

Tim Hudson (tjh@cryptsoft.com), Cryptsoft Pty Ltd.

Related work:

This specification is related to:

- PKCS #11 Cryptographic Token Interface Base Specification Version 2.40. Edited by Susan Gleeson and Chris Zimman. Latest version. http://docs.oasis-open.org/pkcs11/pkcs11-base/v2.40/pkcs11-base-v2.40.html.
- PKCS #11 Cryptographic Token Interface Current Mechanisms Specification Version 2.40.
 Edited by Susan Gleeson and Chris Zimman. Latest version. http://docs.oasis-open.org/pkcs11/pkcs11-curr/v2.40/pkcs11-curr-v2.40.html.
- PKCS #11 Cryptographic Token Interface Historical Mechanisms Specification Version 2.40.
 Edited by Susan Gleeson and Chris Zimman. Latest version. http://docs.oasis-open.org/pkcs11-hist/v2.40/pkcs11-hist-v2.40.html.
- PKCS #11 Cryptographic Token Interface Usage Guide Version 2.40. Edited by John Leiseboer and Robert Griffin. Latest version. http://docs.oasis-open.org/pkcs11/pkcs11ug/v2.40/pkcs11-ug-v2.40.html.

Abstract:

This document is intended for developers and architects who wish to design systems and applications that conform to the PKCS #11 Cryptographic Token Interface standard.

The PKCS #11 Cryptographic Token Interface standard documents an API for devices that may hold cryptographic information and may perform cryptographic functions.

Status:

This document was last revised or approved by the OASIS PKCS 11 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. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://www.oasis-open.org/committees/tc home.php?wg abbrev=pkcs11#technical.

TC members should send comments on this specification to the TC's email list. Others should send comments to the TC's public comment list, after subscribing to it by following the instructions at the "Send A Comment" button on the TC's web page at https://www.oasis-open.org/committees/pkcs11/.

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Table of Contents

1 Ir	ntroduction	5
1.1	Description of this Document	5
1.2	Terminology	5
1.3	Normative References	5
1.4	Non-Normative References	6
2 P	Profiles	7
2.1	PKCS #11 Profiles	7
2.2	Guidelines for Specifying Conformance Clauses	7
2.3	Guidelines for Validating Conformance to PKCS #11 Profiles	7
3 C	Conformance	8
3.1	Purpose of this Section	8
	Baseline Consumer Clause	
3	2.1 Implementation Conformance	8
3	2.2 Conformance of a PKCS #11 Baseline Consumer	8
3.3	Baseline Provider Clause	9
3	3.1 Implementation Conformance	9
3	3.2 Conformance of a PKCS #11 Baseline Provider	9
3.4	Extended Consumer Clause1	0
3	.4.1 Implementation Conformance1	0
	.4.2 Conformance of a PKCS #11 Extended Consumer1	
3.5	Extended Provider Clause1	1
3	.5.1 Implementation Conformance1	1
3	.5.2 Conformance of a PKCS #11 Extended Provider1	1
3.6	Authentication Token Clause1	1
3	.6.1 Implementation Conformance1	1
3	.6.2 Conformance of a Authentication Token1	1
Appen	dix A. Acknowledgments1	3
Appen	dix B. Revision History1	6

1 Introduction

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1.1 Description of this Document

OASIS requires a conformance section in an approved committee specification ([PKCS11-Base] [TCPROC], section 2.18 Work Product Quality, paragraph 8a):

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 providers and consumers of cryptographic services via PKCS #11 ([PKCS11-Base] Section 6 (PKCS#11

- 11 Implementation Conformance) through profiles that define the use of PKCS #11 data types, objects,
- 12 functions and mechanisms within specific contexts of provider and consumer interaction. These profiles
- define a set of normative constraints for employing PKCS #11 within a particular environment or context
- of use. They may, optionally, require the use of specific PKCS #11 functionality or in other respects define
- of use. They may, optionally, require the use of specific PKCS #11 functionality of in other respects define
- 15 the processing rules to be followed by profile actors.
- 16 For normative definition of the elements of PKCS #11 specified in these profiles, see the PKCS #11
- 17 Cryptographic Token Interface Base Specification ([PKCS11-Base]) and the PKCS #11 Cryptographic
- 18 <u>Token Interface Current Mechanisms ([PKCS11-Curr])</u>. Illustrative guidance for the implementation of
- 19 providers and consumers of PKCS #11 is provided in the PKCS #11 Cryptographic Token Interface
- 20 <u>Usage Guide</u> ([PKCS11-UG]).

1.2 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
- 24 in [RFC2119].

1.3 Normative References

26 27 28 29 30	[PKCS11-Base]	PKCS #11 Cryptographic Token Interface Base Specification Version 2.40. Edited by Susan Gleeson and Chris Zimman. 16 September 2014. OASIS Committee Specification 01. http://docs.oasis-open.org/pkcs11/pkcs11-base/v2.40/cs01/pkcs11-base-v2.40-cs01.html. Latest version: http://docs.oasis-open.org/pkcs11/pkcs11-base/v2.40/pkcs11-base-v2.40.html.
31	[PKCS11-Curr]	PKCS #11 Cryptographic Token Interface Current Mechanisms Specification
32		Version 2.40. Edited by Susan Gleeson and Chris Zimman. 16 September 2014.
33		OASIS Committee Specification 01. http://docs.oasis-open.org/pkcs11/pkcs11-
34		curr/v2.40/cs01/pkcs11-curr-v2.40-cs01.html. Latest version: http://docs.oasis-
35		open.org/pkcs11/pkcs11-curr/v2.40/pkcs11-curr-v2.40.html.
36	[PKCS11-Hist]	PKCS #11 Cryptographic Token Interface Historical Mechanisms Specification
37		Version 2.40. Edited by Susan Gleeson and Chris Zimman. 16 September 2014.
38		OASIS Committee Specification 01. http://docs.oasis-open.org/pkcs11/pkcs11-
39		hist/v2.40/cs01/pkcs11-hist-v2.40-cs01.html. Latest version: http://docs.oasis-
40		open.org/pkcs11/pkcs11-hist/v2.40/pkcs11-hist-v2.40.html.
41	[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP
42	-	14, RFC 2119, March 1997. http://www.ietf.org/rfc/rfc2119.txt.
43	[TCPROC]	OASIS, Technical Committee (TC) Process, Version 31 January 2013,
44		31January 2013, https://www.oasis-open.org/policies-guidelines/tc-process.
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1.4 Non-Normative References

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51 52 [PKCS11-UG] PKCS #11 Cryptographic Token Interface Usage Guide Version 2.40. Edited by John Leiseboer and Robert Griffin. 16 September 2014. OASIS Committee Note 01. http://docs.oasis-open.org/pkcs11/pkcs11-ug/v2.40/cn01/pkcs11-ug-v2.40-cn01.html. Latest version: http://docs.oasis-open.org/pkcs11/pkcs11-ug/v2.40/pkcs11-ug-v2.40.html.

2 Profiles

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2.1 PKCS #11 Profiles 54

- 55 This document defines a selected set of conformance clauses which form PKCS #11 Profiles. The PKCS
- 56 11 TC also welcomes proposals for new profiles. PKCS 11 TC members are encouraged to submit these
- proposals to the PKCS 11 TC for consideration for inclusion in a future version of this TC-approved 57
- 58 document. However, some OASIS members MAY simply wish to inform the committee of profiles or other
- work related to PKCS #11. 59

2.2 Guidelines for Specifying Conformance Clauses

- This section provides a checklist of issues that SHALL be addressed by each clause. 61
 - Implement functionality as mandated by [PKCS11-Base] Section 6 (PKCS#11 Implementation Conformance)
 - Specify the list of additional data types that SHALL be supported
 - Specify the list of additional objects that SHALL be supported
 - Specify the list of additional functions that SHALL be supported
- Specify the list of additional mechanisms that SHALL be supported 67

2.3 Guidelines for Validating Conformance to PKCS #11 Profiles

A PKCS #11 provider implementation SHALL claim conformance to a specific provider profile only if it instruments all required data types, objects, functions and mechanisms of that profile

- All data types specified as required in that profile
- All objects specified as required in that profile
 - All functions specified as required in that profile
- 75 All mechanisms specified as required in that profile

76 A PKCS #11 consumer implementation SHALL claim conformance to a specific consumer profile only if it instruments all required data types, objects, functions and mechanisms of that profile

- 78 All data types specified as required in that profile
 - All objects specified as required in that profile
 - All functions specified as required in that profile
- All mechanisms specified as required in that profile 81

3 Conformance

84 3.1 Purpose of this Section

- The following subsections describe currently-defined profiles related to the use of PKCS #11. The profiles
- 86 define classes of PKCS #11 functionality to which an implementation can declare conformance.

87 3.2 Baseline Consumer Clause

- A PKCS #11 consumer calls a PKCS #11 provider implementation of the PKCS #11 API in order to use
- 89 the cryptographic functionality from that provider.

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- 91 This profile specifies the most basic functionality that would be expected of a conformant PKCS #11
- 92 consumer the ability to consume information via the cryptographic services offered by a provider.

93 3.2.1 Implementation Conformance

- An implementation is a conforming Baseline Consumer Clause if it meets the conditions as outlined in the
- 95 following section.

96 3.2.2 Conformance of a PKCS #11 Baseline Consumer

- 97 An implementation conforms to this specification as a Baseline Consumer if it meets the following 98 conditions:
 - 1. Supports the conditions required by the PKCS #11 conformance clauses ([PKCS11-Base] Section 6 (PKCS#11 Implementation Conformance)
 - 2. Supports the following data types:
 - a. CK_VERSION ([PKCS11-Base] 3.1)
 - b. CK INFO ([PKCS11-Base] 3.1)
 - c. CK SLOT ID ([PKCS11-Base] 3.2)
 - d. CK SLOT INFO ([PKCS11-Base] 3.2)
 - e. CK_TOKEN_INFO ([PKCS11-Base] 3.2)
 - f. CK_SESSION_HANDLE ([PKCS11-Base] 3.3)
 - g. CK_USER_TYPE ([PKCS11-Basel 3.3)
 - h. CK SESSION INFO ([PKCS11-Base] 3.3)
 - i. CK OBJECT HANDLE ([PKCS11-Base] 3.4)
 - j. CK_OBJECT_CLASS ([PKCS11-Base] 3.4)
 - k. CK_ATTRIBUTE_TYPE ([PKCS11-Base] 3.4)
 - I. CK_ATTRIBUTE ([PKCS11-Base] 3.4)
- m. CK RV ([PKCS11-Base] 3.6)
 - n. CK FUNCTION LIST ([PKCS11-Base] 3.6)
 - o. CK C INITIALIZE ARGS ([PKCS11-Base] 3.7)
 - 3. Supports the following objects:
 - a. CKA_CLASS ([PKCS11-Base] 4.2)
 - b. CKA_VALUE ([PKCS11-Base])
- 4. Supports the following functions:
 - a. C GetFunctionList ([PKCS11-Base] 5.4)
 - b. C_Initialize ([PKCS11-Base] 5.4)
 - c. C_Finalize ([PKCS11-Base] 5.4)
 - d. C_GetInfo ([PKCS11-Base] 5.4)
- e. C_GetSlotList ([PKCS11-Base] 5.5)

- 126 f. C_GetSlotInfo ([PKCS11-Base] 5.5) g. C GetTokenInfo ([PKCS11-Base] 5.5) 127 128
 - h. C OpenSession ([PKCS11-Base] 5.6)
- i. C CloseSession ([PKCS11-Base] 5.6) 129
- 130 5. Supports the following mechanisms:
- a. None specified 131
- 6. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism 132
- 7. Optionally supports any clause within [PKCS11-Base] that is not listed above 133
 - 8. Optionally supports extensions outside the scope of this standard (e.g., vendor defined extensions, conformance clauses) that do not contradict any PKCS #11 requirements

3.3 Baseline Provider Clause 136

- 137 A PKCS #11 provider makes cryptographic functionality available to a consuming application in terms of
- 138 the PKCS #11 API.
- 139 This profile specifies the most basic functionality that would be expected of a conformant PKCS #11
- 140 provider – the ability to provide information about the capabilities of the cryptographic services provided.

141 3.3.1 Implementation Conformance

- 142 An implementation is a conforming Baseline Provider if it meets the conditions as outlined in the following
- 143 section.

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3.3.2 Conformance of a PKCS #11 Baseline Provider 144

- 145 An implementation conforms to this specification as a Baseline Provider if it meets the following 146 conditions:
 - Supports the conditions required by the PKCS #11 conformance clauses ([PKCS11-Base] Section 6 (PKCS#11 Implementation Conformance)
 - 2. Supports the following data types:
 - a. CK VERSION ([PKCS11-Base] 3.1)
 - b. CK_INFO ([PKCS11-Base] 3.1)
 - c. CK SLOT ID ([PKCS11-Base] 3.2)
 - d. CK SLOT INFO ([PKCS11-Base] 3.2)
 - e. CK TOKEN INFO ([PKCS11-Base] 3.2)
 - f. CK SESSION HANDLE ([PKCS11-Base] 3.3)
 - g. CK_USER_TYPE ([PKCS11-Basel 3.3)
 - h. CK_SESSION_INFO ([PKCS11-Base] 3.3)
 - i. CK OBJECT HANDLE ([PKCS11-Base] 3.4)
 - j. CK_OBJECT_CLASS ([PKCS11-Base] 3.4)
 - k. CK_ATTRIBUTE_TYPE ([PKCS11-Base] 3.4)
 - CK ATTRIBUTE ([PKCS11-Base] 3.4)
 - m. CK_RV ([PKCS11-Base] 3.6)
 - n. CK_FUNCTION_LIST ([PKCS11-Base] 3.6)
 - o. CK C INITIALIZE ARGS (IPKCS11-Basel 3.7)
- 3. Supports the following objects: 165
 - a. CKA_CLASS ([PKCS11-Base] 4.2)
 - b. CKA_TOKEN ([PKCS11-Base] 4.2)
 - c. CKA VALUE ([PKCS11-Base])
 - d. CKA ID ([PKCS11-Base])
 - e. CKA PRIVATE ([PKCS11-Base] x.v)
- 171 CKA MODIFIABLE ([PKCS11-Base)
- g. CKA_LABEL ([PKCS11-Base) 172
- 173 4. Supports the following functions:

- a. C_GetFunctionList ([PKCS11-Base] 5.4) 174 b. C Initialize ([PKCS11-Base] 5.4) 175 176 c. C Finalize ([PKCS11-Base] 5.4) 177 d. C GetInfo ([PKCS11-Base] 5.4) e. C GetSlotList ([PKCS11-Base] 5.5) 178 f. C GetSlotInfo ([PKCS11-Base] 5.5) 179 g. C_GetTokenInfo ([PKCS11-Base] 5.5) 180 h. C_OpenSession ([PKCS11-Base] 5.6) 181 182 C_CloseSession ([PKCS11-Base] 5.6) i. C_GetSessionInfo ([PKCS11-Base] 5.6) 183 j. k. C_FindObjectsInit ([PKCS11-Base] 5.6) 184
- C FindObjects ([PKCS11-Base] 5.6) 185 186
 - m. C FindObjectsFinal ([PKCS11-Base] 5.6)
 - n. C GetAttributeValue ([PKCS11-Base] 5.7)
- 188 5. Supports the following mechanisms:
 - a. None specified
 - 6. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
- 191 7. Optionally supports any clause within [PKCS11-Base] that is not listed above
- 192 8. Optionally supports extensions outside the scope of this standard (e.g., vendor defined 193 extensions, conformance clauses) that do not contradict any PKCS #11 requirements

3.4 Extended Consumer Clause 194

- 195 This profile builds on the PKCS#11 Baseline Consumer profile to add support for mechanism-based
- 196 usage.

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3.4.1 Implementation Conformance 197

- 198 An implementation is a conforming Extended Consumer if it meets the conditions as outlined in the
- following section. 199

3.4.2 Conformance of a PKCS #11 Extended Consumer 200

- An implementation conforms to this specification as Extended Consumer if it meets the following 201 202 conditions:
 - 1. Supports the conditions required by the PKCS11 conformance clauses ([PKCS11-Base] Section 6 (PKCS#11 Implementation Conformance)
 - 2. Supports the conditions required by the PKCS11 Baseline Consumer clauses section 3.2
- 206 3. Supports the following additional data types:
 - a. CK_MECHANISM_TYPE ([PKCS11-Base] 3.4)
 - b. CK_MECHANISM ([PKCS11-Base] 3.4)
 - 4. Supports the following additional objects:
 - a. None specified
 - 5. Supports the following additional functions:
 - a. C GetMechanismList ([PKCS11-Base] 5.5)
 - b. C GetMechanismInfo ([PKCS11-Base] 5.5)
- 214 6. Supports the following additional mechanisms:
 - a. None specified
- 216 7. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
- 217 8. Optionally supports any clause within [PKCS11-Base] that is not listed above
 - Optionally supports extensions outside the scope of this standard (e.g., vendor defined extensions, conformance clauses) that do not contradict any PKCS #11 requirements

3.5 Extended Provider Clause 220

221 This profile builds on the PKCS#11 Baseline Provider to add support for mechanism-based usage.

3.5.1 Implementation Conformance 222

- 223 An implementation is a conforming Extended Provider if it meets the conditions as outlined in the
- following section. 224

3.5.2 Conformance of a PKCS #11 Extended Provider 225

- An implementation conforms to this specification as Extended Provider if it meets the following conditions: 226
 - Supports the conditions required by the PKCS #11 conformance clauses ([PKCS11-Base] Section 6 (PKCS#11 Implementation Conformance)
 - 2. Supports the conditions required by the PKCS #11 Baseline Provider clauses section 3.3.
 - 3. Supports the following additional data types:
 - a. CK_MECHANISM_TYPE ([PKCS11-Base] 3.4)
 - b. CK MECHANISM ([PKCS11-Base] 3.4)

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- 4. Supports the following additional objects:
 - a. None specified
- 5. Supports the following additional functions:
 - a. C GetMechanismList ([PKCS11-Base] 5.5)
 - b. C_GetMechanismInfo ([PKCS11-Base] 5.5)
 - c. C_Login ([PKCS11-Base] 5.6)
 - d. C Logout ([PKCS11-Base] 5.6)
- 6. Supports the following additional mechanisms: 241
 - a. None specified
 - 7. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
- 244 8. Optionally supports any clause within [PKCS11-Base] that is not listed above
- 9. Optionally supports extensions outside the scope of this standard (e.g., vendor defined 245 extensions, conformance clauses) that do not contradict any PKCS #11 requirements 246

3.6 Authentication Token Clause 247

- This profile builds on the PKCS #11 Baseline Provider and/or Baseline Consumer profiles to provide for 248
- use in the context of an authentication token. 249

3.6.1 Implementation Conformance 250

- An implementation is a conforming Authentication Token if it meets the conditions as outlined in the 251
- 252 following section.

3.6.2 Conformance of a Authentication Token

- An implementation conforms to this specification as an Authentication Token if it meets the following 254 255 conditions:
- 256 1. If the implementation is a consumer then it SHALL support the conditions required by the PKCS 257 #11 Baseline Consumer Clause (Section 3.2)
 - 2. If the implementation is a provider then it SHALL support the conditions required by the PKCS #11 Baseline Provider Clause (Section 3.3)
 - 3. Supports the following objects:

261		a. CKO_PRIVATE_KEY
262		b. CKO_PUBLIC_KEY
263	4.	Supports the following functions:
264		a. C_Login
265		b. C_Logout
266		c. C_SignInit
267		d. C_Sign and/or C_SignUpdate and C_SignFinal
268	5.	Supports the following mechanisms:
269		a. None specified
270	6.	Optionally supports any clause within [PKCS11-Base] that is not listed above
271 272	7.	Optionally supports extensions outside the scope of this standard (e.g., vendor defined extensions, conformance clauses) that do not contradict any PKCS #11 requirements.
273		

Appendix A. Acknowledgments

- The following individuals have participated in the creation of this specification and are gratefully
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278 Participants:

279

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- 281 Warren Armstrong, QuintessenceLabs
- 282 Jeff Bartell, Semper Foris Solutions LLC
- 283 Peter Bartok, Venafi, Inc.
- 284 Anthony Berglas, Cryptsoft
- 285 Joseph Brand, Semper Fortis Solutions LLC
- 286 Kelley Burgin, National Security Agency
- 287 Robert Burns, Thales e-Security
- 288 Wan-Teh Chang, Google Inc.
- 289 Hai-May Chao, Oracle
- 290 Janice Cheng, Vormetric, Inc.
- 291 Sangrae Cho, Electronics and Telecommunications Research Institute (ETRI)
- 292 Doron Cohen, SafeNet, Inc.
- 293 Fadi Cotran, Futurex
- 294 Tony Cox, Cryptsoft
- 295 Christopher Duane, EMC
- 296 Chris Dunn, SafeNet, Inc.
- 297 Valerie Fenwick, Oracle
- 298 Terry Fletcher, SafeNet, Inc.
- 299 Susan Gleeson, Oracle
- 300 Sven Gossel, Charismathics
- 301 John Green, QuintessenceLabs
- 302 Robert Griffin, EMC
- 303 Paul Grojean, Individual
- 304 Peter Gutmann, Individual
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- 306 Thomas Hardjono, M.I.T.
- 307 Tim Hudson, Cryptsoft
- 308 Gershon Janssen, Individual
- 309 Seunghun Jin, Electronics and Telecommunications Research Institute (ETRI)
- 310 Wang Jingman, Feitan Technologies
- 311 Andrey Jivsov, Symantec Corp.
- 312 Mark Joseph, P6R
- 313 Stefan Kaesar, Infineon Technologies

- 314 Greg Kazmierczak, Wave Systems Corp.
- 315 Mark Knight, Thales e-Security
- 316 Darren Krahn, Google Inc.
- 317 Alex Krasnov, Infineon Technologies AG
- 318 Dina Kurktchi-Nimeh, Oracle
- 319 Mark Lambiase, SecureAuth Corporation
- 320 Lawrence Lee, GoTrust Technology Inc.
- 321 John Leiseboer, QuintessenceLabs
- 322 Sean Leon, Infineon Technologies
- 323 Geoffrey Li, Infineon Technologies
- 324 Howie Liu, Infineon Technologies
- 325 Hal Lockhart, Oracle
- 326 Robert Lockhart, Thales e-Security
- 327 Dale Moberg, Axway Software
- 328 Darren Moffat, Oracle
- 329 Valery Osheter, SafeNet, Inc.
- 330 Sean Parkinson, EMC
- 331 Rob Philpott, EMC
- 332 Mark Powers, Oracle
- 333 Ajai Puri, SafeNet, Inc.
- 334 Robert Relyea, Red Hat
- 335 Saikat Saha, Oracle
- 336 Subhash Sankuratripati, NetApp
- 337 Anthony Scarpino, Oracle
- 338 Johann Schoetz, Infineon Technologies AG
- 339 Rayees Shamsuddin, Wave Systems Corp.
- 340 Radhika Siravara, Oracle
- 341 Brian Smith, Mozilla Corporation
- 342 David Smith, Venafi, Inc.
- 343 Ryan Smith, Futurex
- 344 Jerry Smith, US Department of Defense (DoD)
- 345 Oscar So, Oracle
- 346 Graham Steel, Cryptosense
- 347 Michael Stevens, QuintessenceLabs
- 348 Michael StJohns, Individual
- 349 Jim Susoy, P6R
- 350 Sander Temme, Thales e-Security
- 351 Kiran Thota, VMware, Inc.
- Walter-John Turnes, Gemini Security Solutions, Inc.
- 353 Stef Walter, Red Hat
- 354 James Wang, Vormetric
- 355 Jeff Webb, Dell

356	Peng Yu, Feitian Technologies
357	Magda Zdunkiewicz, Cryptsoft
358	Chris Zimman, Individual
359	

Appendix B. Revision History

361

360

Revision	Date	Editor	Changes Made
wd01	20-Mar-2013	Tim Hudson	Template provided by OASIS
wd02	3-Apr-2013	Tim Hudson	Initial draft
wd03	18-Sep-2013	Tim Hudson	Updated draft matching current drafts of the specification
wd04	27-Oct-2013	Robert Griffin	Final participant list and other editorial changes for Committee Specification Draft
wd04a	27-Oct-2013	Tim Hudson	Deleted no longer valid comment and corrected unknown section reference.
csd01	30-Oct-2013	OASIS	Committeee Specification Draft
wd05	25-Feb-2014	Tim Hudson / Robert Griffin	Incorporated changes from v2.40 public review
csd02	23-Apr-2014	OASIS	Committeee Specification Draft
csd02a	Sep 3 2013	Robert Griffin	Updated revision history and participant list in preparation for Committee Specification ballot

362

363