PKCS #11 Cryptographic Token Interface Profiles Version 2.40

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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/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/pkcs11-ug/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.

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 https://www.oasis-open.org/committees/pkcs11/.

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1 Introduction

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 Implementation Conformance) through profiles that define the use of PKCS #11 data types, objects, 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 the processing rules to be followed by profile actors.

For normative definition of the elements of PKCS #11 specified in these profiles, see the PKCS #11 Cryptographic Token Interface Base Specification ([PKCS11-Base]).and the PKCS #11 Cryptographic Token Interface Current Mechanisms ([PKCS11-Curr]). Illustrative guidance for the implementation of providers and consumers of PKCS #11 is provided in the PKCS #11 Cryptographic Token Interface Usage Guide ([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 in **[RFC2119]**.

1.3 Normative References

[PKCS11-Base] *PKCS #11 Cryptographic Token Interface Base Specification Version 2.40* <<DATE>>. OASIS Working Draft, http://docs.oasis-open.org/pkcs11/pkcs11-base/v2.40/pkcs11-base-v2.40.html.

[PKCS11-Curr] *PKCS #11 Cryptographic Token Interface Current Mechanisms Specification Version 2.40* <<DATE>>. OASIS Working Draft, http://docs.oasis-open.org/pkcs11/pkcs11-curr/v2.40/pkcs11-curr-v2.40.html.

[PKCS11-Hist] *PKCS #11 Cryptographic Token Interface Historical Mechanisms Specification Version <<VERSION>>*. <<DATE>>, OASIS Working Draft, http://docs.oasis-open.org/pkcs11/pkcs11-hist/v2.40/pkcs11-hist-v2.40.html

[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.

[TCPROC] OASIS, *Technical Committee (TC) Process, Version 31 January 2013, 31January 2013, https://www.oasis-open.org/policies-guidelines/tc-process*.

1.4 Non-Normative References

[PKCS11-UG] *PKCS #11 Cryptographic Token Interface Usage Guide Specification Version 2.40* <<DATE>>. OASIS Working Draft, http://docs.oasis-open.org/pkcs11/pkcs11-ug/v2.40/pkcs11-ug-v2.40.html

2 Profiles

2.1 PKCS #11 Profiles

This document defines a selected set of conformance clauses which form PKCS #11 Profiles. The PKCS 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 document. However, some OASIS members MAY simply wish to inform the committee of profiles or other work related to PKCS #11.

2.2 Guidelines for Specifying Conformance Clauses

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

1. Implement functionality as mandated by **[PKCS11-Base] Section 6** (PKCS#11 Implementation Conformance)
2. Specify the list of additional data types that SHALL be supported
3. Specify the list of additional objects that SHALL be supported
4. Specify the list of additional functions that SHALL be supported
5. Specify the list of additional mechanisms that SHALL be supported

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
- All mechanisms specified as required in that profile

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

- 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

3 Conformance

3.1 Purpose of this Section

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

3.2 Baseline Consumer Clause

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

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

3.2.1 Implementation Conformance

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

3.2.2 Conformance of a PKCS #11 Baseline Consumer

An implementation conforms to this specification as a Baseline Consumer if it meets the following 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-Base] 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)
    l. 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)

f. C_GetSlotInfo ([PKCS11-Base] 5.5)
g. C_GetTokenInfo ([PKCS11-Base] 5.5)
h. C_OpenSession ([PKCS11-Base] 5.6)
i. C_CloseSession ([PKCS11-Base] 5.6)

5. Supports the following mechanisms:
   a. None specified
6. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
7. Optionally supports any clause within [PKCS11-Base] that is not listed above
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

A PKCS #11 provider makes cryptographic functionality available to a consuming application in terms of the PKCS #11 API.

This profile specifies the most basic functionality that would be expected of a conformant PKCS #11 provider – the ability to provide information about the capabilities of the cryptographic services provided.

3.3.1 Implementation Conformance

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

3.3.2 Conformance of a PKCS #11 Baseline Provider

An implementation conforms to this specification as a Baseline Provider if it meets the following 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-Base] 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)
   l. 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_TOKEN ([PKCS11-Base] 4.2)
   c. CKA_VALUE ([PKCS11-Base])
   d. CKA_ID ([PKCS11-Base])
   e. CKA_PRIVATE ([PKCS11-Base] x.y)
   f. CKA_MODIFIABLE ([PKCS11-Base)
   g. CKA_LABEL ([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)
f. C_GetSlotInfo ([PKCS11-Base] 5.5)
g. C_GetTokenInfo ([PKCS11-Base] 5.5)
h. C_OpenSession ([PKCS11-Base] 5.6)
i. C_CloseSession ([PKCS11-Base] 5.6)
j. C_GetSessionInfo ([PKCS11-Base] 5.6)
k. C_FindObjectsInit ([PKCS11-Base] 5.6)
l. C_FindObjects ([PKCS11-Base] 5.6)
m. C_FindObjectsFinal ([PKCS11-Base] 5.6)
n. C_GetAttributeValue ([PKCS11-Base] 5.7)

5. Supports the following mechanisms:
   a. None specified
6. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
7. Optionally supports any clause within [PKCS11-Base] that is not listed above
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

3.4 Extended Consumer Clause

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

3.4.1 Implementation Conformance

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

3.4.2 Conformance of a PKCS #11 Extended Consumer

An implementation conforms to this specification as Extended Consumer if it meets the following 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
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)
6. Supports the following additional mechanisms:
   a. None specified
7. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
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 extensions, conformance clauses) that do not contradict any PKCS #11 requirements

3.5 Extended Provider Clause

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

3.5.1 Implementation Conformance

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

3.5.2 Conformance of a PKCS #11 Extended Provider

An implementation conforms to this specification as Extended Provider if it meets the following conditions:

1. 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)
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:
    a. None specified
7. Supports Error Handling ([PKCS11-Base] 5.1) for any supported object, function or mechanism
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 extensions, conformance clauses) that do not contradict any PKCS #11 requirements

3.6 Authentication Token Clause

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

3.6.1 Implementation Conformance

An implementation is a conforming Authentication Token if it meets the conditions as outlined in the 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 conditions:

1. If the implementation is a consumer then it SHALL support the conditions required by the PKCS #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:

253 a. CKO_PRIVATE_KEY
254 b. CKO_PUBLIC_KEY
255 4. Supports the following functions:
256 a. C_Login
257 b. C_Logout
258 c. C_SignInit
259 d. C_Sign and/or C_SignUpdate and C_SignFinal
260 5. Supports the following mechanisms:
261 a. None specified
262 6. Optionally supports any clause within [PKCS11-Base] that is not listed above
263 7. Optionally supports extensions outside the scope of this standard (e.g., vendor defined
264 extensions, conformance clauses) that do not contradict any PKCS #11 requirements.
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Appendix A. Acknowledgments

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

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Appendix B. Revision History

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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.
wd05	25-Feb-2014	Tim Hudson / Robert Griffin	Incorporated changes from v2.40 public review