

Intel® SGX PCK Certificate and Certificate Revocation List Profile Specification

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1.1 Introduction

This document specifies the hierarchy and format of X.509 v3 certificates and X.509 v2 Certificate Revocation Lists (CRLs) issued by Intel for Provisioning Certification Keys. Certificates and CRLs use a standard set of extensions described in the document. Additionally, a number of PCK-specific extensions are defined.

1.1.1 Terminology

Provisioning Certification Enclave (PCE)	Intel® Software Guard Extensions (Intel® SGX) enclave that uses Provisioning Certification Key to sign proofs that attestation keys or attestation key provisioning protocol messages are created on genuine hardware.
Provisioning Certification Key (PCK)	Signing key available to Provisioning Certification Enclave (PCE). The key is unique to the processor package or platform instance and its Trusted Computing Base (HW and PCE). The public part of the key is distributed as a PCK Certificate.
Platform Provisioning ID (PPID)	Unique Provisioning ID of the processor package or platform instance used by Provisioning Certification Enclave. The PPID does not depend on the Trusted Computing Base (TCB).
Platform Instance ID (PIID)	Unique identifier of the platform instance established on a multi-package platform. The PIID does not depend on the Trusted Computing Base (TCB).
Trusted Computing Base (TCB)	Set of hardware and software components that are critical to security of a solution.
Security Version Number (SVN)	Version number of a component that indicates when security-related updates have been applied to the component. The SVN might not correlate with the functional version of the component.
Family-Model-Stepping-Platform-Custom SKU (FMSPC)	Description of the processor package or platform instance including its Family, Model, Stepping, Platform Type, and Customized SKU (if applies).

Table 0-1: Terminology

1.1.2 References

RFC 4648 (Base16, Base32 and Base64)	October 2006	http://www.ietf.org/rfc/rfc4648.txt
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RFC 5280 (X.509 Certificate and CRL)	May 2008	http://tools.ietf.org/html/rfc5280
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Table 0-2: References

1.2 Certificate Hierarchy

The figure below illustrates the hierarchy of PCK certificates and CRLs issued by Intel. High level description of these certificates and CRLs is in the 2.1 Certificates and 2.2 Certificate Revocation Lists tables.

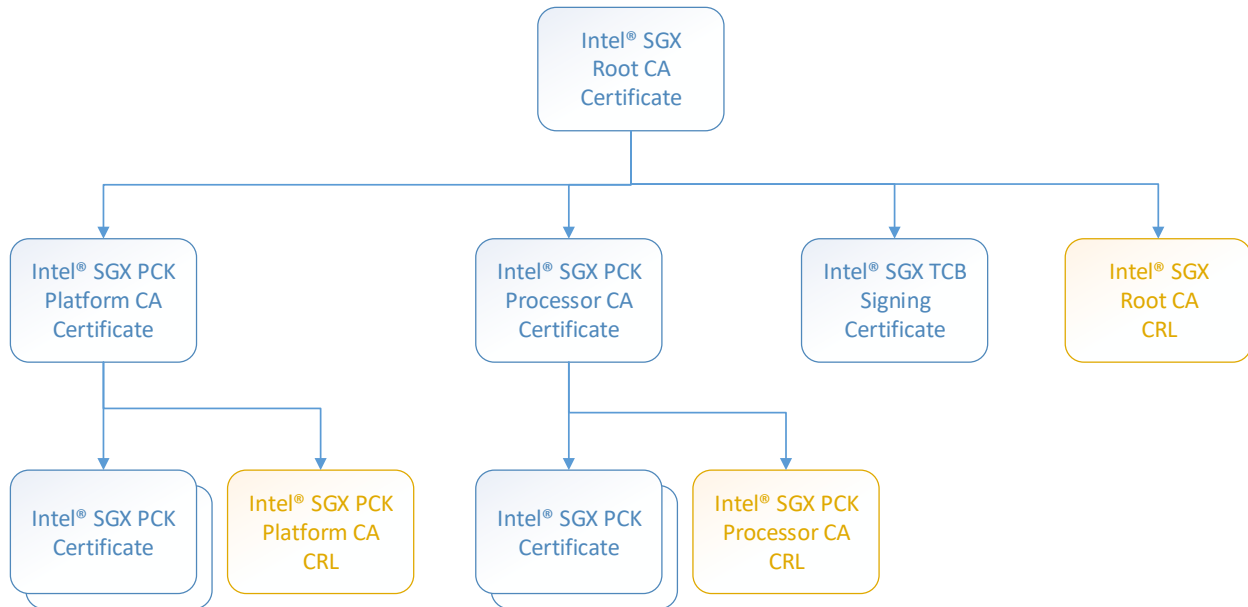


Figure 0-1: Certificate Hierarchy

1.2.1 Certificates

Certificate	Description
Intel® SGX Root CA Certificate	Intel® self-signed root Certificate Authority (CA) certificate (in X.509 format as defined in RFC 5280) that is designated to issue certificates related to Intel® Software Guard Extensions (Intel® SGX). <i>For more details, see Intel® SGX Root CA Certificate.</i>
Intel® SGX PCK Platform CA Certificate	Intermediate CA certificate (in X.509 format as defined in RFC 5280) that issues Intel® SGX PCK Certificates and corresponding CRLs for multi-package platforms. <i>For more details, see Intel® SGX PCK Platform CA Certificate.</i>
Intel® SGX PCK Processor CA Certificate	Intermediate CA certificate (in X.509 format as defined in RFC 5280) that issues Intel® SGX PCK Certificates and corresponding CRLs for single-package platforms. <i>For more details, see Intel® SGX PCK Processor CA Certificate.</i>

Intel® SGX TCB Signing Certificate	Leaf certificate (in X.509 format as defined in RFC 5280) that signs the Intel® SGX TCB data for Intel platforms (both single and multi-package). <i>For more details, see Intel® SGX TCB Signing Certificate.</i>
Intel® SGX PCK Certificate	Leaf certificate (in X.509 format as defined in RFC 5280) that contains a public part of a PCK for an Intel® SGX platform on a specific TCB level. <i>For more details, see Intel® SGX PCK Certificate.</i>

Table 0-3: Certificates

1.2.2 Certificate Revocation Lists

Certificate Revocation List	Description
Intel® SGX Root CA CRL	Certificate Revocation List (in X.509 format as defined in RFC 5280) issued by the Intel® SGX Root Certification Authority (CA). <i>For more details, see Intel® SGX Root CA CRL.</i>
Intel® SGX PCK Platform CA CRL	Certificate Revocation List (in X.509 format as defined in RFC 5280) issued by the Intel® SGX PCK Platform CA. <i>For more details, see Intel® SGX PCK Platform CA CRL.</i>
Intel® SGX PCK Processor CA CRL	Certificate Revocation List (in X.509 format as defined in RFC 5280) issued by the Intel® SGX PCK Processor CA. <i>For more details, see Intel® SGX PCK Processor CA CRL.</i>

Table 0-4: Certificate Revocation Lists

1.3 Certificate Formats

All certificates described in this section follow X.509 standard (as defined in [RFC 5280](#)). Placeholders for variable values, such as signatures, are marked as *<placeholder>*.

1.3.1 Intel® Software Guard Extensions Root CA Certificate

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

<serial number>

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Validity

Not Before: *<time of issuing>*

Not After: Dec 31 2049 23:59:59 UTC

Subject: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:

<public key>

ASN1 OID: prime256v1

X509v3 extensions:

X509v3 Authority Key Identifier:

keyid:*<keyid of issuer public key>*

X509v3 CRL Distribution Points:

Full Name:

URI: *<URL>*

X509v3 Subject Key Identifier:

keyid:*<keyid of public key>*

X509v3 Key Usage: critical

Certificate Sign, CRL Sign

X509v3 Basic Constraints: critical

CA:TRUE, pathlen:1

Signature Algorithm: ecdsa-with-SHA256

<signature>

1.3.2 Intel® SGX PCK Platform CA Certificate

Certificate:

Data:

Version: 3 (0x2)

Serial Number:
<serial number>

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Validity

Not Before: **<start of validity period>**

Not After : **<expiration date, should be valid for about 15 years>**

Subject: CN=Intel SGX PCK Platform CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:
<public key>

ASN1 OID: prime256v1

X509v3 extensions:

X509v3 Authority Key Identifier:
keyid:**<keyid of issuer public key>**

X509v3 CRL Distribution Points:

Full Name:
URI: **<URL>**

X509v3 Subject Key Identifier:
<keyid of public key>

X509v3 Key Usage: critical
Certificate Sign, CRL Sign

X509v3 Basic Constraints: critical
CA:TRUE, pathlen:0

Signature Algorithm: ecdsa-with-SHA256
<signature>

1.3.3 Intel® SGX PCK Processor CA Certificate

Certificate:

Data:

Version: 3 (0x2)

Serial Number:
<serial number>

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Validity
Not Before: **<start of validity period>**
Not After : **<expiration date, should be valid for about 15 years>**
Subject: CN=Intel SGX PCK Processor CA, O=Intel Corporation, L=Santa Clara,
ST=CA, C=US

Subject Public Key Info:
Public Key Algorithm: id-ecPublicKey
Public-Key: (256 bit)
pub:
<public key>
ASN1 OID: prime256v1

X509v3 extensions:
X509v3 Authority Key Identifier:
keyid:**<keyid of issuer public key>**
X509v3 CRL Distribution Points:
Full Name:
URI: **<URL>**
X509v3 Subject Key Identifier:
<keyid of public key>
X509v3 Key Usage: critical
Certificate Sign, CRL Sign
X509v3 Basic Constraints: critical
CA:TRUE, pathlen:0

Signature Algorithm: ecdsa-with-SHA256
<signature>

1.3.4 Intel® SGX TCB Signing Certificate

Certificate:
Data:
Version: 3 (0x2)
Serial Number:
<serial number>
Signature Algorithm: ecdsa-with-SHA256
Issuer: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US
Validity
Not Before: **<start of validity period>**
Not After : **<expiration date, should be valid for about 7 years>**
Subject: CN=Intel SGX TCB Signing, O=Intel Corporation, L=Santa Clara, ST=CA,
C=US
Subject Public Key Info:

```
Public Key Algorithm: id-ecPublicKey
  Public-Key: (256 bit)
  pub:
    <public key>
  ASN1 OID: prime256v1
X509v3 extensions:
  X509v3 Authority Key Identifier:
    keyid:<keyid of issuer public key>
  X509v3 CRL Distribution Points:
    Full Name:
      URI: <URL>
  X509v3 Subject Key Identifier:
    <keyid of public key>
  X509v3 Key Usage: critical
    Digital Signature, Non Repudiation
  X509v3 Basic Constraints: critical
    CA:FALSE
```

```
Signature Algorithm: ecdsa-with-SHA256
  <signature>
```

1.3.5 Intel® SGX PCK Certificate

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

<serial number>

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=<Intel SGX PCK Platform CA | Intel SGX PCK Processor CA>, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Validity

Not Before: <start of validity period>

Not After : <expiration date, should be valid for about 7 years>

Subject: CN=Intel SGX PCK Certificate, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Subject Public Key Info:

Public Key Algorithm: id-ecPublicKey

Public-Key: (256 bit)

pub:

<public key>

ASN1 OID: prime256v1

```

X509v3 extensions:
  X509v3 Authority Key Identifier:
    keyid:<keyid of issuer public key>
  X509v3 CRL Distribution Points:
    Full Name:
      URI: <URL>
  X509v3 Subject Key Identifier:
    <keyid of public key>
  X509v3 Key Usage: critical
    Digital Signature, Non Repudiation
  X509v3 Basic Constraints: critical
    CA:FALSE
  <SGX Extensions OID>:
    <PPID OID>: <PPID value>
    <TCB OID>:
      <SGX TCB Comp01 SVN OID>: <SGX TCB Comp01 SVN value>
      <SGX TCB Comp02 SVN OID>: <SGX TCB Comp02 SVN value>
      ...
      <SGX TCB Comp16 SVN OID>: <SGX TCB Comp16 SVN value>
    <PCESVN OID>: <PCESVN value>
    <CPUSVN OID>: <CPUSVN value>
    <PCE-ID OID>: <PCE-ID value>
    <FMSPC OID>: <FMSPC value>
    <SGX Type OID>: <SGX Type value>
    <PlatformInstanceID OID>: <PlatformInstanceID value>
    <Configuration OID>:
      <Dynamic Platform OID>: <Dynamic Platform flag value>
      <Cached Keys OID>: <Cached Keys flag value>
      <SMT Enabled OID>: <SMT Enabled flag value>

Signature Algorithm: ecdsa-with-SHA256
  <signature>

```

The table below describes custom x.509 extensions for PCK Certificates. For details about ASN.1 encoding of the extensions, refer to [Appendix A: Profile for Specific Certificate Extensions for the Intel® SGX](#).

Name	Object Identifier (OID)	Type	Description
SGX Extensions	1.2.840.113741.1.13.1	ASN.1 Sequence	Sequence of extensions specific to the Intel® Software Guard Extensions (Intel® SGX).

			<i>This field is mandatory (it must appear in PCK Certificate).</i>
PPID	1.2.840.113741.1.13.1.1	ASN.1 Octet String	Value of Platform Provisioning ID. (16 bytes) <i>This field is mandatory (it must appear in PCK Certificate).</i>
TCB	1.2.840.113741.1.13.1.2	ASN.1 Sequence	Sequence of TCB components. <i>This field is mandatory (it must appear in PCK Certificate).</i>
SGX TCB Comp01 SVN	1.2.840.113741.1.13.1.2.1	ASN.1 Integer	Value of the Intel® SGX TCB Comp01 SVN. <i>This field is mandatory (it must appear in PCK Certificate).</i>
SGX TCB Comp02 SVN	1.2.840.113741.1.13.1.2.2	ASN.1 Integer	Value of the Intel® SGX TCB Comp02 SVN. <i>This field is mandatory (it must appear in PCK Certificate).</i>
...			
SGX TCB Comp16 SVN	1.2.840.113741.1.13.1.2.16	ASN.1 Integer	Value of the Intel® SGX TCB Comp16 SVN. <i>This field is mandatory (it must appear in PCK Certificate).</i>
PCESVN	1.2.840.113741.1.13.1.2.17	ASN.1 Integer	Value of PCESVN. <i>This field is mandatory (it must appear in PCK Certificate).</i>
CPUSVN	1.2.840.113741.1.13.1.2.18	ASN.1 Octet String	Value of CPUSVN. (16 bytes) <i>This field is mandatory (it must appear in PCK Certificate).</i>
PCE-ID	1.2.840.113741.1.13.1.3	ASN.1 Octet String	Value of PCE-ID. (2 bytes)

			<i>This field is mandatory (it must appear in PCK Certificate).</i>
FMSPC	1.2.840.113741.1.13.1.4	ASN.1 Octet String	Value of FMSPC. (6 bytes) <i>This field is mandatory (it must appear in PCK Certificate).</i>
SGX Type	1.2.840.113741.1.13.1.5	ASN.1 Enumerated	Enum representing the Intel® SGX Type. One of the following values: - Standard (0) - Scalable (1) <i>This field is mandatory (it must appear in PCK Certificate).</i>
Platform Instance ID	1.2.840.113741.1.13.1.6	ASN.1 Octet String	Value of Platform Instance ID. It is only relevant to PCK Certificates issued by PCK Platform CA. (16 bytes) <i>This field is optional:</i> - Certificates issued by PCK Platform CA must contain this field. - Certificates issued by PCK Processor CA do not contain this field.
Configuration	1.2.840.113741.1.13.1.7	ASN.1 Sequence	Optional sequence of additional configuration settings. It is only relevant to PCK Certificates issued by PCK Platform CA. <i>This field is optional:</i> - Certificates issued by PCK Platform CA must contain this field. - Certificates issued by PCK Processor CA do not contain this field.
Dynamic Platform	1.2.840.113741.1.13.1.7.1	ASN.1 Boolean	Optional flag that indicates whether a platform can be extended with additional packages (via Package Add

			<p>calls to SGX Registration Backend). It is only relevant to PCK Certificates issued by PCK Platform CA.</p> <p><i>This field is optional:</i></p> <ul style="list-style-type: none"> - Certificates issued by PCK Platform CA must contain this field. - Certificates issued by PCK Processor CA do not contain this field.
Cached Keys	1.2.840.113741.1.13.1.7.2	ASN.1 Boolean	<p>Optional flag that indicates whether platform root keys are cached by SGX Registration Backend. It is only relevant to PCK Certificates issued by PCK Platform CA.</p> <p><i>This field is optional:</i></p> <ul style="list-style-type: none"> - Certificates issued by PCK Platform CA must contain this field. - Certificates issued by PCK Processor CA do not contain this field.
SMT Enabled	1.2.840.113741.1.13.1.7.3	ASN.1 Boolean	<p>Optional flag that indicates whether a platform has SMT (simultaneous multithreading) enabled. It is only relevant to PCK Certificates issued by PCK Platform CA.</p> <p><i>This field is optional:</i></p> <ul style="list-style-type: none"> - Certificates issued by PCK Platform CA must contain this field. - Certificates issued by PCK Processor CA do not contain this field.

Table 0-5: Custom OIDs for PCK certificate

1.4 Certificate Revocation List Formats

All certificate revocation lists described in this section follow X.509 standard (as defined in [RFC 5280](#)).

1.4.1 Intel® SGX Root CA CRL

Certificate Revocation List (CRL):

Version 2 (0x1)

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX Root CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Last Update: *<issuing date>*

Next Update: *<date of next update>*

CRL extensions:

X509v3 CRL Number:

<crl number>

X509v3 Authority Key Identifier:

keyid: *<keyid of issuer public key>*

<list of revoked certificates>

Signature Algorithm: ecdsa-with-SHA256

<signature>

1.4.2 Intel® SGX PCK Platform CA CRL

Certificate Revocation List (CRL):

Version 2 (0x1)

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX PCK Platform CA, O=Intel Corporation, L=Santa Clara, ST=CA, C=US

Last Update: *<issuing date>*

Next Update: *<date of next update>*

CRL extensions:

X509v3 CRL Number:

<crl number>

X509v3 Authority Key Identifier:

keyid: *<keyid of issuer public key>*

<list of revoked certificates>

Signature Algorithm: ecdsa-with-SHA256

<signature>

1.4.3 Intel® SGX PCK Processor CA CRL

Certificate Revocation List (CRL):

Version 2 (0x1)

Signature Algorithm: ecdsa-with-SHA256

Issuer: CN=Intel SGX PCK Processor CA, O=Intel Corporation, L=Santa Clara,
ST=CA, C=US

Last Update: *<issuing date>*

Next Update: *<date of next update>*

CRL extensions:

X509v3 CRL Number:

<crl number>

X509v3 Authority Key Identifier:

keyid: *<keyid of issuer public key>*

<list of revoked certificates>

Signature Algorithm: ecdsa-with-SHA256

<signature>

1.5 Appendices

1.5.1 Appendix A: Profile for Specific Certificate Extensions for the Intel® Software Guard Extensions

This section describes a profile for specific certificate extensions used in the Intel® SGX PCK Certificate. This section is based on the X.509 v3 certificate format and the standard certificate extensions defined in [RFC 5280](#) and uses 1988 ASN.1 syntax.

```
id-ce-sGXExtensions OBJECT IDENTIFIER ::= { 1 2 840 113741 1 13 1 }

SGXExtensions ::= SEQUENCE SIZE (1..MAX) OF SEQUENCE {
    sGXExtensionId    SGXExtensionId,
    sGXExtensionValue ANY DEFINED BY sGXExtensionId }

-- sGXExtensionIds for Intel SGX PCK Certificates

id-ce-sGXExtensions-pPID          OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 1 }
id-ce-sGXExtensions-tCB          OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 2 }
id-ce-sGXExtensions-pCE-ID       OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 3 }
id-ce-sGXExtensions-fMSPC        OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 4 }
id-ce-sGXExtensions-sGXType      OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 5 }
id-ce-sGXExtensions-platformInstanceID OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 6 }
id-ce-sGXExtensions-configuration OBJECT IDENTIFIER ::= { id-ce-sGXExtensions 7 }

SGXExtensionId ::= OBJECT IDENTIFIER ( id-ce-sGXExtensions-pPID | id-ce-sGXExtensions-
tCB | id-ce-sGXExtensions-pCE-ID | id-ce-sGXExtensions-fMSPC | id-ce-sGXExtensions-
sGXType | id-ce-sGXExtensions-platformInstanceID | id-ce-sGXExtensions-configuration)

SGXExtensionValue ::= CHOICE {
    pPID          [0] PPID,
    tCB           [1] TCB,
    pCE-ID        [2] PCE-ID,
    fMSPC         [3] FMSPC,
    sGXType       [4] SGXType,
    platformInstanceID [5] PlatformInstanceID,
    configuration  [6] Configuration
}
}
```

PPID ::= OCTET STRING (SIZE (16))

TCB ::= SEQUENCE SIZE (18) OF SEQUENCE {
 tCBId TCBId,
 tCBValue ANY DEFINED BY tCBId }

-- tCBIds for Intel SGX PCK Certificates

id-ce-tCB-sGXTCBComp01SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 1 }
id-ce-tCB-sGXTCBComp02SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 2 }
id-ce-tCB-sGXTCBComp03SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 3 }
id-ce-tCB-sGXTCBComp04SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 4 }
id-ce-tCB-sGXTCBComp05SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 5 }
id-ce-tCB-sGXTCBComp06SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 6 }
id-ce-tCB-sGXTCBComp07SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 7 }
id-ce-tCB-sGXTCBComp08SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 8 }
id-ce-tCB-sGXTCBComp09SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 9 }
id-ce-tCB-sGXTCBComp10SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 10 }
}
id-ce-tCB-sGXTCBComp11SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 11 }
}
id-ce-tCB-sGXTCBComp12SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 12 }
}
id-ce-tCB-sGXTCBComp13SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 13 }
}
id-ce-tCB-sGXTCBComp14SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 14 }
}
id-ce-tCB-sGXTCBComp15SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 15 }
}
id-ce-tCB-sGXTCBComp16SVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 16 }
}
id-ce-tCB-pCESVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 17 }
}
id-ce-tCB-cPUSVN OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-tCB 18 }
}

TCBId ::= OBJECT IDENTIFIER (id-ce-tCB-sGXTCBComp01SVN | id-ce-tCB-sGXTCBComp02SVN |
id-ce-tCB-sGXTCBComp03SVN | id-ce-tCB-sGXTCBComp04SVN | id-ce-tCB-sGXTCBComp05SVN |
id-ce-tCB-sGXTCBComp06SVN | id-ce-tCB-sGXTCBComp07SVN | id-ce-tCB-sGXTCBComp08SVN |
id-ce-tCB-sGXTCBComp09SVN | id-ce-tCB-sGXTCBComp10SVN | id-ce-tCB-sGXTCBComp11SVN |
id-ce-tCB-sGXTCBComp12SVN | id-ce-tCB-sGXTCBComp13SVN | id-ce-tCB-sGXTCBComp14SVN |

id-ce-tCB-sGXTCBComp15SVN | id-ce-tCB-sGXTCBComp16SVN | id-ce-tCB-pCESVN | id-ce-tCB-cPUSVN)

```
TCBValue ::= CHOICE {
    sGXTCBComp01SVN    [0] INTEGER,
    sGXTCBComp02SVN    [1] INTEGER,
    sGXTCBComp03SVN    [2] INTEGER,
    sGXTCBComp04SVN    [3] INTEGER,
    sGXTCBComp05SVN    [4] INTEGER,
    sGXTCBComp06SVN    [5] INTEGER,
    sGXTCBComp07SVN    [6] INTEGER,
    sGXTCBComp08SVN    [7] INTEGER,
    sGXTCBComp09SVN    [8] INTEGER,
    sGXTCBComp10SVN    [9] INTEGER,
    sGXTCBComp11SVN    [10] INTEGER,
    sGXTCBComp12SVN    [11] INTEGER,
    sGXTCBComp13SVN    [12] INTEGER,
    sGXTCBComp14SVN    [13] INTEGER,
    sGXTCBComp15SVN    [14] INTEGER,
    sGXTCBComp16SVN    [15] INTEGER,
    pCESVN              [16] INTEGER,
    cPUSVN              [17] CPUSVN }
```

```
CPUSVN ::= OCTET STRING (SIZE (16))
```

```
PCE-ID ::= OCTET STRING (SIZE (2))
```

```
FMSPC  ::= OCTET STRING (SIZE (6))
```

```
SGXType ::= ENUMERATED {
    standard (0),
    scalable (1) }
```

```
PlatformInstanceID ::= OCTET STRING (SIZE (16))
```

```
Configuration ::= SEQUENCE SIZE (1..MAX) OF SEQUENCE {
    configurationId    ConfigurationId,
    configurationValue ANY DEFINED BY configurationId }
```

```
-- configurationIds for Intel SGX PCK Certificates
```

```
id-ce-configuration-dynamicPlatform OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-configuration 1 }
```

```
id-ce-configuration-cachedKeys OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-configuration 2 }
```

```
id-ce-configuration-sMTEnabled OBJECT IDENTIFIER ::= { id-ce-sGXExtensions-configuration 3 }
```

```
ConfigurationId ::= OBJECT IDENTIFIER (id-ce-configuration-dynamicPlatform | id-ce-configuration-cachedKeys | id-ce-configuration-sMTEnabled)
```

```
ConfigurationValue ::= CHOICE {  
    dynamicPlatform [0] BOOLEAN,  
    cachedKeys [1] BOOLEAN,  
    sMTEnabled [2] BOOLEAN }
```