TCG Platform Certificate Profile

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Draft

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Work in Progress

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The TCG wishes to thank those who contributed to this specification. This document builds on considerable work done in the various working groups in the TCG.

Special thanks to the members of the IWG group and others contributing to this document:

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<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-01-11</td>
<td>1.0</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
1. Introduction

1.1 Purpose

The purpose of this document is to define the Platform Certificate profile. This specification contains the description of the certificate and sample X.509 instances of the certificate which vendors and customers could use with their products. This specification defines the Platform Certificate for use with any TPM Family 1.2 and 2.0 version. This specification defines the abstract definition of the certificate and specifically how it would appear as an X.509 certificate.

This specification builds upon the Platform Attribute Credential Profile version 1.0 [14] by incorporating the following changes:

- Fixed errors identified in the Platform Attribute Certificate specification version 1.0 errata document [14].
- Modified the ComponentIdentifier field of the Platform Configuration attribute to include a reference to the component’s Platform Certificate. This change enables the issuer to construct a certificate tree of platform components and subcomponents.
- Added the field componentClass to the ComponentIdentifier element to unambiguously identify the type of component being referenced.
- Introduced the definition for the Delta Platform Certificate, modified the TCG Attributes definitions to identify applicability to the Delta Platform Certificate.
- Removed the Platform Certificate public key certificate format since it was considered redundant.
- Added support for multiple TPM EK Certificates by allowing the issuer to include multiple references using the TargetingInformation extension.
- Incorporated ComponentClass registry OID and value in the ComponentIdentifier field.

This specification replaces the existing Platform Credential Specification version 1.2 [6]. This certificate attests that a specific manufactured platform, identified by the platform serial number and TPM EK certificates, contains a unique TPM and Trusted Building Block (TBB). TBB is defined in the TCG Generic Server Specification [9].

1.2 Document Scope

This document specifies a complete definition of the Platform Certificate for use with any TPM Family version. This specification describes the abstract definition of the certificate and specifically how it would appear as an X.509 certificate.

1.3 Relationship to Other TCG Specifications

This specification references the TCG Infrastructure Working Group Reference Architecture for Interoperability [2], the TCG TPM Main Specification [3], the TCG Credential Profiles for TPM Family 1.2 [6], the EK Credential Profile Specification [7], the PC Client Platform TPM Profile Specification [10], the Generic Server Platform Specification [9], and the TCG Algorithm Registry Specification [12]. This specification replaces the Platform Credential Specification defined in the TCG Credential Profiles for TPM Family 1.2 [6].
1.4  Keywords

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 RFC 2119 [4].

1.5  Intended Audiences

The intended audience for this document is people who work for the entities, such as Privacy CAs (AKA Attestation CAs), who are expected to participate in the TCG infrastructure. People who work for computer OEMs and the companies in the OEM supply chain, such as TPM vendors and software vendors, are also intended audiences for this document.

This document specifies one aspect of the architectural framework described in sections 3, 4, 5, and 6 of the document entitled “TCG Infrastructure Working Group Reference Architecture for Interoperability” [2].

1.6  Definition of Terms

The TCG Glossary [1] contains definitions that are fundamental to this specification. Rather than repeat those definitions, the reader is assumed to be familiar with the terms in the TCG glossary.

The following operational definitions, however, are specific to this specification.

**Certificate** – An artifact that cryptographically binds a subject’s identity to its public key or attributes using the industry-standard certificate structure from ISO/IEC/ITU-T X.509 version 3. Certificate generation consists of (a) assembling values for the certificate fields and (b) signing over the assembled fields.

NOTE: The term “Credential” has been replaced with “Certificate” throughout the document. Certificate is a more precise term to describe this artifact. Any uses of the word “Credential” in this document refer to titles of previously published specifications, attributes, or extensions.
2. Certificate Overview
This section describes the Platform Certificate type. The Platform Certificate provides the foundation for binding the identity of the platform to the TPM and the Trusted Building Block of the platform.

2.1 Platform Certificate
A Platform Certificate attests that a specific platform contains a unique TPM and Trusted Building Block (TBB).

A TBB consists of the parts of the Root of Trust that do not have shielded locations or protected capabilities. Normally, this includes just the Core Root of Trust for Measurement (CRTM) and the TPM initialization functions. The definition of a TBB is typically platform specific. One example of a TBB, specific to the PC Client platform, is the combination of CRTM, connection of the CRTM storage to the motherboard, and mechanisms for determining Physical Presence.

Platform Certificates contain assertions about trust made by a platform manufacturer. The certificate asserts the platform's security properties and configuration as shipped. Delta Platform Certificates may be used to reflect platform changes made by system integrators, resellers, and other entities after the platform has left the manufacturer’s facility.

2.1.1 Who Uses a Platform Certificate?
A consumer of a Platform Certificate is a Privacy-CA. A Platform Certificate contains information that the Privacy-CA can use in attesting to the integrity characteristics of a platform. The Privacy-CA can copy field entries from the Platform Certificate to a new AK Certificate that the Privacy-CA creates for a trusted platform.

Another consumer of the Platform Certificate is an Enterprise, which wishes to remotely provision multiple devices that belong to it. Typically, in this case, the Enterprise knows the serial number of the systems it owns, and the Platform Certificate is used to associate those serial numbers with particular EK certificates [6][7]. This way, for example, a VPN can be provisioned using the TPM to provide keys securely to clients of an Enterprise. In order to support this use case, the optional Platform Serial Number attribute MUST be included in the certificate. In addition, an Enterprise could use the Platform Certificate to assert non-security related properties, such as platform components, included optionally by the platform manufacturer in the certificate.

For other users of the Platform Certificate, refer to section 6.2 of Reference Architecture for Interoperability Specification [2].

2.1.2 Who Issues a Platform Certificate?
In general, the issuer of a Platform Certificate is the platform manufacturer (for example, an OEM). An entity should not generate a Platform Certificate unless the entity is satisfied that the platform contains the TPM referenced inside the certificate. Other types of entities in the platform manufacturing supply chain could issue a Platform Certificate. For more information, refer to section 3 of Reference Architecture for Interoperability Specification [2].
2.1.3 Platform Certificate Privacy Protection Requirements

If the Platform Certificate is stored on a platform after an Owner has taken ownership of that platform, it SHALL exist only in storage to which access is controlled and is available to authorized entities; this is to protect the privacy of the platform owner and the privacy of users of the platform. Access to the Platform Certificate must be restricted to entities that have a “need to know.” This is for reasons of privacy protection.

2.1.4 Revocation of a Platform Certificate

A Platform Certificate MAY only be revoked if there is evidence of CA compromise. Otherwise, platform configuration changes made after the platform is shipped can be addressed by the issuance of a Delta Platform Certificate.

A Platform Certificate is not expected to expire during the normal life expectancy of the platform.

2.1.5 Assertions Made by a Platform Certificate

The following table lists all the fields that are central to the use of this certificate by TCG and which MUST or MAY be in a Platform Certificate.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate Type Label</td>
<td>Distinguish certificate types issued under a shared key</td>
<td>MUST</td>
</tr>
<tr>
<td>EK Certificates</td>
<td>Identifies the associated EK Certificates</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Manufacturer String</td>
<td>Name of platform manufacturer as a string</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Model</td>
<td>Manufacturer-specific identifier</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Version</td>
<td>Manufacturer-specific identifier</td>
<td>MUST</td>
</tr>
<tr>
<td>Issuer</td>
<td>Identifies the issuer of the certificate</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Specification</td>
<td>Platform Specification to which this platform is built</td>
<td>MUST</td>
</tr>
<tr>
<td>Validity Period</td>
<td>Time period when certificate is valid</td>
<td>MUST</td>
</tr>
<tr>
<td>Signature Value</td>
<td>Signature of the issuer over the other fields</td>
<td>MUST</td>
</tr>
</tbody>
</table>
Table 1: Platform Certificate Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Serial Number</td>
<td>Platform’s unique serial number</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Assertions</td>
<td>Security assertions about the platform</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Configuration</td>
<td>Non-security related platform properties</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Manufacturer Identifier</td>
<td>Platform manufacturer unique identifier</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Configuration Uri</td>
<td>URI where PCR information can be obtained</td>
<td>MAY</td>
</tr>
<tr>
<td>Policy Reference</td>
<td>Certificate policy reference</td>
<td>MAY</td>
</tr>
<tr>
<td>Revocation Locator</td>
<td>Identifies source of revocation status information</td>
<td>MAY</td>
</tr>
</tbody>
</table>

2.1.5.1 Certificate Type Label

The label enables the issuer to sign the certificate with a key that is not reserved exclusively for signing a Platform Certificate. It allows different types of certificates to be reliably distinguished from each other by this label instead of based on which signer key was used. TCG [3] reserved this flexible key re-purposing capability and the certificate labels have been retained for compatibility.

For Platform Certificates, the value of this field MUST be the string, “TCG Trusted Platform Endorsement”.

2.1.5.2 EK Certificates

This assertion is used by the Privacy-CA to verify that the platform contains a unique TPM referenced by this Platform Certificate.

This SHALL be an unambiguous indication of the EK Certificates of the TPM incorporated into the platform. The Platform Certificate SHALL contain a reference to all mandatory (those with MUST or SHALL) Endorsement Key (EK) Certificates. The requirements for the Endorsement Key Certificates is typically stated in the Platform TPM Profile for that platform class. For example, the Endorsement Key and Endorsement Key Certificate requirements for the PC Client platform class is stated in the "TCG PC Client Platform TPM Profile (PTP) Specification" [21] and described in Section 3.6.1 NV Storage Size. The Platform Certificate MAY also contain references to non-mandatory EK Certificates if they exist for the TPM.

2.1.5.3 Platform Manufacturer String

This assertion identifies the platform manufacturer using a Platform Manufacturer assigned string.
2.1.5.4 Platform Manufacturer Identifier

This assertion identifies the platform manufacturer with a globally unique and verifiable value. If included, the issuer SHALL use the manufacturer’s Internet Assigned Numbers Authority (IANA) Private Enterprise Number as the identifier [8].

2.1.5.5 Platform Model

This assertion identifies the specific platform model implementation. This is used by a Privacy-CA to verify that the platform contains a specific root of trust implementation.

The platform model is encoded as a string and is manufacturer-specific.

2.1.5.6 Platform Version

This assertion identifies the specific version of the platform. This is used by a Privacy-CA to verify that the platform contains a specific root of trust implementation.

The platform version is encoded as a string and is the manufacturer-specific implementation version of the platform.

2.1.5.7 Issuer

This assertion identifies the entity that signed and issued the Platform Certificate.

2.1.5.8 Platform Specification

This assertion identifies the relevant TCG platform specific specification to which the platform was designed. This describes the platform class as well as the major and minor version number and the revision level.

2.1.5.9 Certificate Specification

This assertion identifies the Platform Certificate Profile Specification version. Includes this specification’s Version, Level, and Revision.

2.1.5.10 Validity Period

This assertion enables the certificate user to determine whether the Platform Certificate has begun to be valid or has expired.

2.1.5.11 Signature Value

This assertion is the signature of the issuer over the other fields in the certificate.

2.1.5.12 Platform Serial Number

This assertion is a value that uniquely identifies the platform. This is used by the verifier to correlate the certificate to a physical platform. The manufacturer SHALL use a customer visible serial number as the identifier. Even though this attribute is OPTIONAL, the field MUST be included when enabling Enterprise use cases such as remote provisioning using the platform TPM.

The Platform Serial Number is encoded as a string and is manufacturer specific.
2.1.5.13 Platform Assertions

This field contains assertions about the general security properties of the platform. This could be used by the certificate user to verify that the platform implements acceptable security policies.

For more information, see Section 5, Entities, Assertions, and Signed Structures [2].

2.1.5.14 Platform Configuration

This field contains assertions of properties that are not security related. These properties MAY include the platform’s component serial numbers, network adapter MAC addresses, and motherboard serial number.

2.1.5.15 Platform Configuration Uri

This assertion provides an optional Uniform Resource Identifier where valid PCR and platform configuration information can be obtained.

2.1.5.16 Policy Reference

This assertion enables the certificate user to identify the certificate issuance policy of the Platform Certificate issuer.

2.1.5.17 Revocation Locator

This assertion enables the certificate consumer to determine whether the Platform Certificate has been revoked and should no longer be used as the basis for a trust decision.

2.2 Delta Platform Certificate

A Delta Platform Certificate attests to specific changes made to the platform that are not reflected in the original Platform Certificate. A system integrator or value added retailer (VAR) can make modifications to a platform resulting in the Platform Certificate inaccurately reflecting its current configuration.

The entity making platform modifications could issue a Delta Platform Certificate to reflect those changes. A chain consisting of a Platform Certificate followed by multiple Delta Platform Certificates is supported in cases where multiple entities make valid modifications to a platform. A Delta Platform Certificate MUST only include additions, modifications and deletions of certain platform attributes. The issuer of the Delta Platform Certificate MUST verify that the changes made to the platform are adequately represented by the Delta Platform Certificate and that it references the appropriate base Platform or Delta Certificate.

Figure 1 illustrates how a chain of Platform and Delta Platform certificates can be constructed by linking the certificates using a base certificate reference.
2.2.1 Who Uses a Delta Platform Certificate?

A Delta Platform Certificate will be used by Privacy-CAs and Enterprises wanting to verify changes in platform attributes. This certificate allows a verifier to attest changes made to the platform as it progresses through the supply chain.

2.2.2 Who Issues a Delta Platform Certificate?

In addition to the entities that traditionally issue Platform Certificates, a system integrator or value added reseller could issue a Delta Platform Certificate to reflect platform attribute changes.

2.2.3 Conditions for Issuing a Delta Platform Certificate

Any authorized entity, typically a system integrator or value added retailer, modifying a platform’s configuration can issue a Delta Platform Certificate. This certificate MAY be issued as long as the following conditions are maintained:

- Changes made to the platform do not invalidate the TBB security claims made by the original platform manufacturer. The Delta Platform Certificate issuer MUST NOT invalidate platform security assertions made by the base Platform Certificate.
- Changes made to the platform do not invalidate the TCG Platform Specification compliance claims made by the platform manufacturer. Changes to the platform MAY NOT introduce non-compliances to the TCG specification.
- The issuing entity MUST NOT modify the TPM embedded in the platform (replace or modify the TPM including replacing the EK keys or EK certificates). The issuing entity MAY issue new EK keys and certificates.
2.2.4 Delta Platform Certificate Privacy Protection Requirements

The Delta Platform Certificate SHALL adhere to the same private protection requirements as the Platform Certificate.

2.2.5 Revocation of a Delta Platform Certificate

If the platform is modified such that the chain of the Platform Certificate and the sequence of Delta Platform Certificates no longer reflects the configuration of the platform, a new Delta Platform Certificate can be issued. The current Delta Platform Certificate becomes the new base certificate.

A Delta Certificate MAY only be revoked if there is evidence of CA compromise.

2.2.6 Assertions Made by a Delta Platform Certificate

The following table lists all the fields that are central to the use of this certificate type and which MUST or MAY be in a Delta Platform Certificate.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate Type Label</td>
<td>Distinguishes certificate types issued under a shared key</td>
<td>MUST</td>
</tr>
<tr>
<td>Base Platform Certificate</td>
<td>Identifies the base Platform or Delta Platform certificate</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Manufacturer String</td>
<td>Name of platform manufacturer as a string</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Model</td>
<td>Manufacturer-specific identifier</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Version</td>
<td>Manufacturer-specific identifier</td>
<td>MUST</td>
</tr>
<tr>
<td>Issuer</td>
<td>Identifies the issuer of certificate</td>
<td>MUST</td>
</tr>
<tr>
<td>Validity Period</td>
<td>Time period when certificate is valid</td>
<td>MUST</td>
</tr>
<tr>
<td>Signature Value</td>
<td>Signature of the issuer over the other fields</td>
<td>MUST</td>
</tr>
<tr>
<td>Platform Serial Number</td>
<td>Platform’s unique serial number</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Configuration</td>
<td>Non-security related platform properties</td>
<td>MAY</td>
</tr>
</tbody>
</table>
Table 2: Delta Platform Certificate Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Manufacturer Identifier</td>
<td>Platform manufacturer unique identifier as an IANA identifier</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Configuration Uri</td>
<td>URI where PCR information can be obtained</td>
<td>MAY</td>
</tr>
<tr>
<td>Policy Reference</td>
<td>Certificate policy reference</td>
<td>MAY</td>
</tr>
<tr>
<td>Revocation Locator</td>
<td>Identifies source of revocation status information</td>
<td>MAY</td>
</tr>
<tr>
<td>EK Certificates</td>
<td>Identifies newly issued EK Certificates</td>
<td>MAY</td>
</tr>
</tbody>
</table>

2.2.6.1 Certificate Type Label

For Platform Certificates, the value of this field MUST be the string, “TCG Trusted Platform Endorsement”.

2.2.6.2 EK Certificates

This assertion is used to reference additional EK certificates issued by the Delta Platform Certificate issuer. This SHALL be an unambiguous indication of the EK certificates of the TPM incorporated into the platform.

2.2.6.3 Base Platform Certificate

This assertion is used by the verifier to bind the certificate to the previously issued Platform Certificate or Delta Platform Certificate. The base certificate is the previously issued Platform Certificate or Delta Platform Certificate amended by this certificate. This SHALL be an unambiguous indication of the base Platform Certificate.

2.2.6.4 Platform Manufacturer String

This assertion identifies the platform manufacturer using a Platform Manufacturer assigned string. This field MUST equal that of the base Platform Certificate or base Delta Platform Certificate.

2.2.6.5 Platform Manufacturer Identifier

This assertion identifies the platform manufacturer with a globally unique and verifiable value. If included, the issuer SHALL use the manufacturer’s Internet Assigned Numbers Authority (IANA) Private Enterprise Number as the identifier [8]. This field MUST equal that of the base Platform Certificate or base Delta Platform Certificate.
2.2.6.6 Platform Model

This assertion identifies the specific platform model implementation. This is used by a Privacy-CA to verify that the platform contains a specific root of trust implementation. This field MUST equal that of the base Platform Certificate or base Delta Platform Certificate. The platform model is encoded as a string and is manufacturer-specific.

2.2.6.7 Platform Version

This assertion identifies the specific version of the platform. This is used by a Privacy-CA to verify that the platform contains a specific root of trust implementation. This field MUST equal that of the base Platform Certificate or base Delta Platform Certificate. The platform version is encoded as a string and is the manufacturer-specific implementation version of the platform.

2.2.6.8 Issuer

This assertion identifies the entity that signed and issued the Delta Platform Certificate.

2.2.6.9 Certificate Specification

This assertion identifies the Platform Certificate Profile Specification version. Includes this specification’s Version, Level, and Revision. Included only if the delta certificate is issued under an updated version of this specification.

2.2.6.10 Validity Period

The validity period’s “Not After” date MUST match that of the base certificate.

2.2.6.11 Signature Value

This assertion is the signature of the issuer over the other fields in the certificate.

2.2.6.12 Platform Serial Number

This assertion is a value that uniquely identifies the platform. This is used by the verifier to correlate the certificate to a physical platform. The issuer SHALL use a customer visible serial number as the identifier. This field MUST equal that of the base Platform Certificate or base Delta Platform Certificate. The Platform Serial Number is encoded as a string and is manufacturer specific.

2.2.6.13 Platform Configuration

This field contains assertions of properties that are not security related. The Delta Platform Certificate MUST only include platform properties that have changed (added, modified, or deleted) with respect to the base certificate.
2.2.6.14 Platform Configuration Uri

This assertion provides an optional Uniform Resource Identifier where valid PCR and platform configuration information can be obtained. This field MAY be included only if the Platform Configuration Uri has changed.

2.2.6.15 Policy Reference

This assertion enables the certificate user to identify the certificate issuance policy of the Delta Platform Certificate issuer.

2.2.6.16 Revocation Locator

This assertion enables the certificate consumer to determine whether the Delta Platform Certificate has been revoked and should no longer be used as the basis for a trust decision.
3. X.509 ASN.1 Definitions

This section contains the format for the Platform Attribute Certificate instantiated as an X.509 certificate for all the common and information fields in this specification. All fields are defined in ASN.1 and encoded using DER.

3.1 TCG Attributes

3.1.1 Security Qualities

This attribute describes the platform security qualities in the Platform Certificate.

The text string describing the qualities of the TPM is manufacturer-specific. This attribute is deprecated but is retained for compatibility with previously published TCG and TCPA specifications. If present, the security qualities attribute, which has manufacturer-specific syntax, should be consistent with any Platform Assertions attributes in the certificate.

```
securityQualities ATTRIBUTE ::= {
  WITH SYNTAX SecurityQualities
  ID tcg-at-securityQualities }
```

This attribute MUST NOT be included in Delta Platform Certificates.

3.1.2 TPM and Platform Assertions

These two attributes describe security-related assertions about the TPM or platform TBB.

These attributes replace the Security Qualities attribute from TCPA 1.1b which has been deprecated but retained for compatibility.

Each attribute begins with a version number that identifies the version of the assertion syntax. Future versions of this profile may add new assertions by appending new fields at the end of the ASN.1 SEQUENCE and increasing the version number to identify which version of the assertion syntax is encoded.

The MeasurementRootType indicates which types of Root of Trust for Measurement are implemented as part of the platform TBB. A Static RTM is required and support for a dynamic RTM is optional.

In the CommonCriteriaMeasures, the profile and target for the evaluation can be described by either an OID, a URI to a document describing the value, or both. If both are present, they MUST represent consistent values. The URI values are included in an URIReference which describes the URI to the document and a cryptographic hash value which identifies a specific version of the document.

The tBBSecurityAssertions attribute MUST NOT be included in the Delta Platform Certificate.

URIMAX is a constant used to provide an upper bound on the length of a URI included in the certificate. This upper bound may be helpful to consumers of the extension and also helps limit the overall size of the certificate. In order to provide a reasonable upper bound for ASN.1
parsers, URIMAX SHOULD NOT exceed a value of 1024. This value was selected as it matches the length limit for \(<A>\) anchors in HTML as specified by the SGML declaration (LITLEN) for HTML[5].

STRMAX is a constant defining the upper bound on the length of a string type. Like the URIMAX this is to aid ASN.1 parsers and help limit the upper bound on the length of the certificate. Based on the expected sizes of the strings in the ASN.1 in this document an upper bound of 256 was selected. STRMAX SHOULD NOT exceed a value of 256.

```
Version ::= INTEGER { v1(0) }

tBBSecurityAssertions ATTRIBUTE ::= {
   ID tcg-at-tbbSecurityAssertions
}

TBBSecurityAssertions ::= SEQUENCE {
   version Version DEFAULT v1,
   ccInfo [0] IMPLICIT CommonCriteriaMeasures OPTIONAL,
   fipsLevel [1] IMPLICIT FIPSLevel OPTIONAL,
   rtmType [2] IMPLICIT MeasurementRootType OPTIONAL,
   iso9000Certified BOOLEAN DEFAULT FALSE,
   iso9000Uri IA5STRING (SIZE (1..URIMAX) OPTIONAL }

-- Hybrid means the measurement root is capable of static AND dynamic
-- Physical means that the root is anchored by a physical TPM
-- Virtual means the TPM is virtualized (possibly running in a VMM).
-- TPMs or RTMs might leverage other lower layer RTMs to virtualize the
-- capabilities of the platform.
MeasurementRootType ::= ENUMERATED {
   static (0),
   dynamic (1),
   nonHost (2),
   hybrid (3),
   physical (4),
   virtual (5) }

-- common criteria evaluation
CommonCriteriaMeasures ::= SEQUENCE {
   version IA5STRING (SIZE (1..STRMAX)), -- "2.2" or "3.1"; future syntax defined by CC
   assurancelevel EvaluationAssuranceLevel,
   evaluationStatus EvaluationStatus,
   plus BOOLEAN DEFAULT FALSE,
   strengthOfFunction [0] IMPLICIT StrengthOfFunction OPTIONAL,
   profileOid [1] IMPLICIT OBJECT IDENTIFIER OPTIONAL,
   profileUri [2] IMPLICIT URIReference OPTIONAL,
   targetOid [3] IMPLICIT OBJECT IDENTIFIER OPTIONAL,
   targetUri [4] IMPLICIT URIReference OPTIONAL }

EvaluationAssuranceLevel ::= ENUMERATED {
   level1 (1),
   level2 (2),
   level3 (3),
   level4 (4),
   level5 (5),
   level6 (6),
   level7 (7) }

StrengthOfFunction ::= ENUMERATED {
   basic (0),
   medium (1),
   high (2) }

-- Reference to external document containing information relevant to this subject.
-- The hashAlgorithm and hashValue MUST both exist in each reference if either
-- appear at all.
URIReference ::= SEQUENCE {
   "Reference to external document containing information relevant to this subject."
   hashAlgorithm OCTET STRING,
   hashValue OCTET STRING
}
uniformResourceIdentifier IA5String (SIZE (1..URIMAX)),
hashAlgorithm AlgorithmIdentifier OPTIONAL,
hashValue BIT STRING OPTIONAL }

EvaluationStatus ::= ENUMERATED {
    designedToMeet (0),
    evaluationInProgress (1),
    evaluationCompleted (2) }

-- fips evaluation
FIPSLevel ::= SEQUENCE {
    version IA5STRING (SIZE (1..STRMAX)), -- "140-1" or "140-2"
    level SecurityLevel,
    plus BOOLEAN DEFAULT FALSE }

SecurityLevel ::= ENUMERATED {
    level1 (1),
    level2 (2),
    level3 (3),
    level4 (4) }

3.1.3 Conformance Attributes

Conformance Attributes are the syntax of the protection profile and security target attributes. These attributes are deprecated and replaced with the TPM and Platform Assertion attributes. They MAY be present for compatibility with previously published TCG and TCPA specifications.

ProtectionProfile ::= OBJECT IDENTIFIER
SecurityTarget ::= OBJECT IDENTIFIER

TBBProtectionProfile ATTRIBUTE ::= {
    WITH SYNTAX ProtectionProfile
    ID tcg-at-tbbProtectionProfile }

TBBSecurityTarget ATTRIBUTE ::= {
    WITH SYNTAX SecurityTarget
    ID tcg-at-tbbSecurityTarget }

3.1.4 Name Attributes

The following definitions define the syntax of the relative distinguished names (RDNs) used in the subject alternative name extension to identify the type of the TPM and the platform. The value of the PlatformManufacturerStr attribute is a UTF 8 string with the name of platform manufacturing company.

The PlatformModel attribute is a UTF 8 string with the manufacturer-specific model.

The PlatformVersion attribute is a UTF 8 string with manufacturer-specific platform version value.

The PlatformSerial optional attribute is a UTF 8 string with manufacturer-specific platform serial number value.

The PlatformManufacturerId optional attribute is the OID of the IANA Private Enterprise Number [8] assigned to the platform manufacturer.

These attributes MUST be included in the Delta Platform Certificate.

PlatformManufacturerStr ATTRIBUTE ::= {

}
with syntax UTF8String (size (1..STRMAX))
ID tcg-at-platformManufacturerStr }

PlatformModel ATTRIBUTE ::= {
  with syntax UTF8String (size (1..STRMAX))
  ID tcg-at-platformModel }

PlatformVersion ATTRIBUTE ::= {
  with syntax UTF8String (size (1..STRMAX))
  ID tcg-at-platformVersion }

PlatformSerial ATTRIBUTE ::= {
  with syntax UTF8String (size (1..STRMAX))
  ID tcg-at-platformSerial }

PlatformManufacturerId ATTRIBUTE ::= {
  with syntax ManufacturerId
  ID tcg-at-platformManufacturerId }

ManufacturerId ::= SEQUENCE {
  manufacturerIdentifier PrivateEnterpriseNumber
}

enterprise OBJECT IDENTIFIER ::= {
  iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1)
}

PrivateEnterpriseNumber OBJECT IDENTIFIER ::= {
  enterprise private-enterprise-number }

All assigned private enterprise numbers are listed at the Internet Assigned Numbers Authority (IANA) web site [8].

3.1.5 TCG Specification Attributes

The following definitions define the syntax of the TPM and platform-specific specification attributes.

The TCGPlatformSpecification attribute identifies the platform class, version and revision of the platform-specific specification with which a platform implementation is compliant. The platform specification refers either to the PC Client Platform Specification [10] or the Server Specification [9]. Standardized platform class values are defined in Section 5 of the Registry of Reserved TPM 2.0 Handles and Localities [22]. This attribute MUST NOT be included in the Delta Platform Certificate.

tCGPlatformSpecification ATTRIBUTE ::= {
  with syntax TCGPlatformSpecification
  ID tcg-at-tcgPlatformSpecification }

TCGSpecificationVersion ::= SEQUENCE {
  majorVersion INTEGER,
  minorVersion INTEGER,
  revision INTEGER }

TCGPlatformSpecification ::= SEQUENCE {
  Version TCGSpecificationVersion,
  platformClass OCTET STRING SIZE(4) }

3.1.6 TCG Certificate Type Attributes

The following defines the syntax of the certificate type attribute.

The TCGCredentialType attribute identifies the type of Platform Certificate. Values supported are Platform Certificate and Delta Platform Certificate in both attribute and public
key formats. Values are encoded as TCG registered OIDs. This attribute MUST be included in the Delta Platform Certificate to differentiate from a Platform Certificate.

```
tCGCredentialType ATTRIBUTE ::= {
    WITH SYNTAX TCGCredentialType
    ID tcg-at-tcgCredentialType}

TCGCredentialType ::= SEQUENCE {
    certificateType CredentialType}

CredentialType ::= OBJECT IDENTIFIER (tcg-kp-PlatformAttributeCertificate | tcg-kp-DeltaPlatformAttributeCertificate)
```

### 3.1.7 TCG Certificate Specification Attributes

The following defines the syntax of the certificate specification attributes.

The `TCGCredentialSpecification` attribute identifies the major version, minor version, and revision of the certificate specification with which a certificate is compliant. Values are encoded as three integers in this attribute. This attribute MAY be included in the Delta Platform Certificate if issued under a different specification version than the base certificate.

```
tCGCredentialSpecification ATTRIBUTE ::= {
    WITH SYNTAX TCGSpecificationVersion
    ID tcg-at-tcgCredentialSpecification}

TCGSpecificationVersion ::= SEQUENCE {
    majorVersion INTEGER,
    minorVersion INTEGER,
    revision INTEGER}
```

### 3.1.8 Platform Configuration Attributes

The following defines the syntax of the platform configuration attribute.

The `platformConfiguration` attribute contains optional lists of platform component identifiers, component identifier URI, platform properties, and platform property URI. The `componentIdentifier` field contains a list of individual components that constitute the platform. The issuer MUST include the component class, manufacturer and model, and optionally provide the component serial number, revision, and the component manufacturer's IANA `PrivateEnterpriseNumber`. In addition, each component identifier MAY contain information such as whether it is field replaceable, its network address, platform certificate, and platform certificate URI.

The `componentClass` sequence is used to identify the type of component. The `componentClass` field consists of a `componentClassRegistry OID` and the `componentClassValue`. The `componentClassRegistry OID` allows the issuer to convey which component class registry is used to identify the component. The `componentClassValue` is the specific registry value for the component.

The `componentPlatformCert` field contains information about the component’s Platform Certificate. This field allows the issuer to create a hierarchy of platforms by constructing a general tree of Platform Certificates. The issuer MUST include `attributeCertificateId` or `genericCertIdentifier` to provide a reference to the component’s Platform Certificate. The verifier can use the `componentPlatformCert` attribute to cryptographically verify the constituent components and subcomponents of a platform. In order to verify the certificate hierarchy, the verifier can use the `attributeCertificateId` or `genericCertIdentifier`
fields to identify the component Platform Certificate. This operation would have to be repeated for any component of the platform, and subsequently down the hierarchical tree. The verifier can use this information to effectively confirm a platform’s components remain unchanged from the as-built configuration.

The platform manufacturer can use the `componentPlatformCertificateUri` to identify the public distribution point of the component platform certificate.

The `status` field contained within the `componentIdentifier` field MUST be used only in Delta Platform Certificates.

The optional `platformProperties` field SHALL contain characteristics of the platform that the issuer considers of interest to the consumer. Such properties are not prescribed by this specification and the certificate issuer is free to choose which information to include in this field. The manufacturer MAY use the `platformPropertiesUri` to publish information about the Properties included in the `platformProperties` field. This MAY include the list of `propertyName` and their semantics.

The `status` field contained within the `Properties` field MUST be used only in Delta Platform Certificates.

The `platformConfiguration` attribute MAY be included in the Delta Platform Certificate to reflect changes made to the `componentIdentifiers`, `componentIdentifiersUri`, `platformProperties`, and `platformPropertiesUri` fields. In this case, the `status` enumerator MUST be included to indicate whether the field was added, modified, or removed from the base certificate.

```plaintext
platformConfiguration ATTRIBUTE ::= {
  WITH SYNTAX PlatformConfiguration
  ID tcg-at-platformConfiguration-v2
}

PlatformConfiguration ::= SEQUENCE {
  componentIdentifiers [0] IMPLICIT SEQUENCE(SIZE(1..MAX)) OF ComponentIdentifier OPTIONAL,
  componentIdentifiersUri [1] IMPLICIT URIReference OPTIONAL,
  platformProperties [2] IMPLICIT SEQUENCE(SIZE(1..MAX)) OF Property OPTIONAL,
  platformPropertiesUri [3] IMPLICIT URIReference OPTIONAL
}

ComponentIdentifier ::= SEQUENCE {
  componentClass ComponentClass,
  componentManufacturer UTF8String (SIZE (1..STRMAX)),
  componentModel UTF8String (SIZE (1..STRMAX)),
  componentSerial[0] IMPLICIT UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentRevision [1] IMPLICIT UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentManufacturerId [2] IMPLICIT PrivateEnterpriseNumber OPTIONAL,
  fieldReplaceable [3] IMPLICIT BOOLEAN OPTIONAL,
  componentAddresses [4] IMPLICIT SEQUENCE(SIZE(1.. MAX)) OF ComponentAddress OPTIONAL
  componentPlatformCert [5] IMPLICIT CertificateIdentifier OPTIONAL,
  componentPlatformCertUri [6] IMPLICIT URIReference OPTIONAL,
  status [7] IMPLICIT AttributeStatus OPTIONAL
}

ComponentClass ::= SEQUENCE {
  componentClassRegistry ComponentClassRegistry,
  componentClassValue OCTET STRING SIZE(4) }

ComponentClassRegistry ::= OBJECT IDENTIFIER { tcg-registry-componentClass-tcg | tcg-registry-componentClass-ietf | tcg-registry-componentClass-dmtf }

ComponentAddress ::= SEQUENCE {
  addressType AddressType,
  addressValue OCTET STRING SIZE(1..STRMAX) }
```
Three ComponentClassRegistry OIDs have been defined by the TCG. The tcg-registry-componentClass-tcg is a placeholder that refers to a future TCG Component Class Registry. The tcg-registry-componentClass-ietf refers to the IETF RFC8348 [19] IANA Hardware Class. The tcg-registry-componentClass-dmtf is a placeholder, but may refer to a future SMBIOS based registry.

The AttributeCertificateIdentifier sequence is comprised of the hashAlgorithm field and the hashOverSignatureValue. The hashAlgorithm field is of type AlgorithmIdentifier as defined in RFC5280 [13]. This field identifies the hashing algorithm used in hashOverSignatureValue field. The hashOverSignatureValue is calculated over the Platform Certificate’s BIT STRING signatureValue (excluding the tag, length, and number of unused bits).

The definition of AlgorithmIdentifier from RFC5280 [13] is provided here for convenience:

```plaintext
AlgorithmIdentifier ::= SEQUENCE {
    algorithm OBJECT IDENTIFIER,
    parameters ANY DEFINED BY algorithm OPTIONAL }
```

Since the algorithms used are all hashing algorithms, the parameters field SHOULD not be used. The issuer MAY utilize any of the hash algorithm OIDs found in RFC3279 [15], RFC4055 [16], SHA-3 Related Algorithms and Identifiers for PKIX [17], and GB/T 33560-2017 [18].

MAX is to be interpreted, as described in RFC 5280[13], to mean the upper bound is unspecified.

**NOTE:** Future versions of this specification could introduce modifications to the platformConfiguration attribute. If such changes impact the structure and semantics of existing fields (componentIdentifiers, componentIdentifiersURI, platformProperties, and platformPropertiesURI) the attribute’s OID will be updated to the next version (tcg-at-
platformConfiguration-v3). Parsers and verifiers should be version aware, and make the necessary adjustments to support current and prior versions of the attribute.

### 3.1.9 Platform Configuration Uri Attribute

The following defines the syntax of the platform configuration Uri attribute.

The PlatformConfigUri attribute contains the URI where the reference integrity measurements could be obtained by the verifier. The format used to convey the reference measurement values is vendor specific and not defined by the TCG. This field uses an URIReference sequence.

```
PlatformConfigUri ATTRIBUTE ::= {
    WITH SYNTAX URIReference
    ID tcg-at-platformConfigUri }
```

The PlatformConfigUri attribute MAY be included in the Delta Platform Certificate to assert changes to the URI where PCR values are published.

### 3.2 Platform Certificate

This section contains the format for a Platform Certificate conforming to version 1.0 of this specification.

The Platform Certificate makes the assertions listed in section 2.1.6. This certificate format adheres to RFC 5755 [11] and all requirements and limitations from that specification apply unless otherwise noted.

Note: some fields are assigned a value even though the certificate user performs no action with that value. In such cases, the intention is to inhibit non-TCG implementations from making inappropriate use of the certificate.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>RFC 5755 Type</th>
<th>Value</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>INTEGER</td>
<td>V2 (encoded as value 1)</td>
<td>Standard</td>
</tr>
<tr>
<td>Serial Number</td>
<td>INTEGER</td>
<td>Positive integer value unique relative to the issuer</td>
<td>Standard</td>
</tr>
<tr>
<td>Signature Algorithm</td>
<td>AlgorithmIdentifier</td>
<td>Algorithm used by the issuer to sign this certificate</td>
<td>Standard</td>
</tr>
<tr>
<td>Holder</td>
<td>Holder</td>
<td>Identity of the associated TPM EK Certificate, use BaseCertificateID. Additional EK Certificates can be referenced using the TargetingInformation extension.</td>
<td>Standard</td>
</tr>
<tr>
<td>Issuer</td>
<td>Name</td>
<td>Distinguished name of the platform certificate issuer</td>
<td>Standard</td>
</tr>
<tr>
<td>Field Name</td>
<td>RFC 5755 Type</td>
<td>Value</td>
<td>Field Status</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------</td>
<td>------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Validity</td>
<td>notBefore notAfter</td>
<td>Beginning and end of validity period</td>
<td>Standard</td>
</tr>
</tbody>
</table>

### Attributes

<table>
<thead>
<tr>
<th>Field Name</th>
<th>RFC 5755 Type</th>
<th>Value</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBB Security Assertions</td>
<td>version ccInfo fipsLevel rtmType iso9000Certified iso9000Uri</td>
<td>Describes security-related assertions about the platform TBB</td>
<td>SHOULD</td>
</tr>
<tr>
<td>TCG Platform Specification</td>
<td>majorVersion minorVersion revision platformClass</td>
<td>Identifies platform class, version, and revision of the platform-specific specification</td>
<td>SHOULD</td>
</tr>
<tr>
<td>TCG Certificate Type</td>
<td>credentialType</td>
<td>Identifies the Platform Certificate in attribute certificate format</td>
<td>SHOULD</td>
</tr>
<tr>
<td>TCG Certificate Specification</td>
<td>majorVersion minorVersion revision</td>
<td>Major, minor, and revision of the Platform Certificate spec under which the Platform Certificate was issued</td>
<td>SHOULD</td>
</tr>
<tr>
<td>Platform Configuration</td>
<td>componentIdentifier platformProperties platformPropertiesUri</td>
<td>Platform components and properties MAY be reflected by this attribute</td>
<td>MAY</td>
</tr>
<tr>
<td>Platform Configuration URI</td>
<td>URIReference</td>
<td>Points to the PCR list</td>
<td>MAY</td>
</tr>
</tbody>
</table>

### Extensions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>RFC 5755 Type</th>
<th>Value</th>
<th>Field Status</th>
</tr>
</thead>
</table>
### Table 3: Attribute Certificate Format Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>RFC 5755 Type</th>
<th>Value</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Alternative Names</td>
<td>GeneralName</td>
<td>PlatformManufacturerStr platformModel PlatformVersion PlatformSerial (optional) PlatformManufacturerId (optional)</td>
<td>MUST non-critical</td>
</tr>
<tr>
<td>Targeting Information</td>
<td>TargetingInformation</td>
<td>Additional TPM EK Certificates not included in Holder. Use targetingName option.</td>
<td>MAY critical</td>
</tr>
<tr>
<td>Authority Key Id</td>
<td>AuthorityKeyIdentifier</td>
<td>Key identifier Issuer name and serial number (optional)</td>
<td>MUST non-critical</td>
</tr>
<tr>
<td>Authority Info Access</td>
<td>AuthorityInfoAccessSyntax</td>
<td>id-ad-caIssuers id-ad-ocsp (optional) URI to OCSP responder</td>
<td>SHOULD non-critical</td>
</tr>
<tr>
<td>CRL Distribution</td>
<td>CRLDistributionPoints</td>
<td>URI to CRL</td>
<td>MAY non-critical</td>
</tr>
<tr>
<td>Issuer Unique Id</td>
<td>UniqueIdentifier</td>
<td>Unique value when using a shared issuer name</td>
<td>SHOULD NOT</td>
</tr>
</tbody>
</table>

#### 3.2.1 Version

This field contains the version of the certificate syntax. Since Platform Certificates always contain mandatory extensions the version number MUST be set to 2 (which is encoded as the value 1 in ASN.1).

#### 3.2.2 Serial Number

The serial number MUST be a positive integer which is uniquely assigned to each certificate by the issuer. The combination of an issuer’s DN and the serial number MUST uniquely describe a single certificate.

Assign a value unique per instance of a TBB amongst all certificates issued by "issuer".

#### 3.2.3 Signature Algorithm

This OID identifies the algorithm used by the platform certificate issuer to sign the certificate. Platform Certificate verifiers MUST support certificates signed with algorithms available in the TCG Algorithm Registry [12].
3.2.4 **Holder**

This field contains a reference to the X.509 certificate of the TPM EK certificate. The BaseCertificateID choice MUST be used. Additional TPM EK certificates MAY be referenced using the TargetingInformation extension.

3.2.5 **Issuer**

This field contains the distinguished name of the entity that issued this Platform Certificate. This is the entity that asserts that the platform incorporates a TPM and RTM in a manner that conforms to the relevant TCG Platform Specific specification.

3.2.6 **Validity**

This field contains the period during which the binding between the attributes and TPM EK certificates is considered valid. It is represented by two date values named notBefore and notAfter. Issuers SHOULD assign notBefore to the current time when the certificate is issued and notAfter to the last date that the certificate will be considered valid. Both notBefore and notAfter MUST use the appropriate time format as indicated by RFC 5755, section 4.2.6.

3.2.7 **Certificate Policies**

This extension indicates policy terms under which the certificate was issued.

Assign “critical” the value FALSE. Assign `policyIdentifier` at least one object identifier.

Assign the `cpsuri` policy qualifier the value of an HTTP URL at which a plain language version of the platform endorsement entity’s certificate policy may be obtained. Assign the explicit text `userNotice` policy qualifier the value “TCG Trusted Platform Endorsement”.

During certificate path validation, check that at least one acceptable `policyIdentifier` value is present.

3.2.8 **Subject Alternative Names**

This extension contains the alternative name of the entity associated with this certificate.

Assign “critical” the value FALSE. Include the platform model, using the directory name-form with RDNs for the platform manufacturer, model, version number, and optionally, the serial number, and manufacturer ID. The “Platform Manufacturer Identifier” optional field uniquely identifies the platform’s manufacturer using the IANA Private Enterprise Number OID [8].

During certificate validation, the Privacy-CA MUST check that the platform manufacturer, model, version, serial numbers, and manufacturer ID are acceptable.

3.2.9 **Targeting Information**

This extension contains references to additional EK certificates not included in the Holder field. This extension is implemented using AC Targeting extension defined in RFC5755 [11]. This extension is OPTIONAL, but if included, assign “critical” the value of TRUE. Use the `targetName` option. The EK certificate serial number MUST be included by adding the RDN attribute `serialNumber` to the `GeneralName`. Attribute `serialNumber` is defined in ITU-T X.520 specification [19].
### 3.2.10 Attributes

The following attributes SHOULD be included:

- The “TCG Platform Specification” attribute references the platform class, version and revision level of the TCG platform-specific specification to which the platform was designed.
- The “TCG Certificate Type” attribute identifies the type of certificate and its format.
- The “TCG Certificate Specification” attribute references the version, level, and revision of this specification.
- The platform “TBB Security Assertions” attribute describes various assertions about the security properties of the TBB of the platform.

The following attributes MAY be included:

- The “Platform Configuration” attribute describes various assertions of platform properties that are not security related. Including CPU and motherboard serial numbers, network adapter MAC addresses.
- The “Platform Configuration Uri” attribute which provides the URI to the manufacturer published list of valid PCR values.

The following attributes are documented for compatibility with previous published TCG or TCPA specifications but SHOULD NOT be included in Platform Certificates:

- The “TCPA Specification Version” attribute, with field values correctly reflecting the highest version of the TCG specification with which the TPM implementation conforms.
- If the TPM has been successfully evaluated against a Common Criteria protection profile, then include the TPM protection profile identifier attribute.
- If the TPM has been successfully evaluated against a Common Criteria security target, then include the TPM security target identifier attribute.
- If the RTM and the means by which the TPM and RTM have been incorporated into the platform have been successfully evaluated against a Common Criteria protection profile, then include the “TBB protection profile” identifier attribute.
- If the RTM and the means by which the TPM and RTM have been incorporated into the platform have been successfully evaluated against a Common Criteria security target, then include the “TBB security target” identifier attribute.
- Optionally, include the "security qualities" attribute with a text string reflecting the security qualities of the platform.

### 3.2.11 Authority Key Identifier

This extension identifies the subject public key of the certificate issuer. Assign “critical” the value FALSE. Assign the value of “subject key identifier” from the issuer’s public-key certificate, if available, else omit.

### 3.2.12 Authority Info Access

This extension contains additional information about the issuer. Assign “critical” the value FALSE. It MAY be omitted. If included, then the accessMethod OID SHOULD be set to id-ad-
ocsp (RFC 5755 [11]) and the accessLocation value SHOULD point to the access value of the
OCSP responder (HTTP URI).

The relying party can access the certificate status for this certificate by sending a properly
formatted OCSPRequest to the URI. If both a CRL Distribution Point (CDP) and OCSP AIA
extension are present in the certificate, then the relying parties SHOULD use OCSP as the
primary validation mechanism.

3.2.13 CRL Distribution

This extension provides the location of the subject’s revocation information. Assign “critical”
the value FALSE. The relying party can access the CRL for this certificate from this URI. If
both a CDP and OCSP AIA extension are present in the certificate, then relying parties
SHOULD use OCSP as the primary validation mechanism.

3.2.14 Issuer Unique Id

These fields uniquely identify certificates which share names with other certificates issued by
the same issuer. Under this specification these fields MUST be omitted.

3.3 Delta Platform Certificate

This section contains the format for a Delta Platform Certificate. The Delta Platform Certificate
makes the assertions listed in section 2.2.6. This certificate format adheres to RFC 5755 [11]
and all requirements and limitations from that specification apply unless otherwise noted.

Note: some fields are assigned a value even though the certificate user performs no action
with that value. In such cases, the intention is to inhibit non-TCG implementations from
making inappropriate use of the certificate.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>RFC 5755 Type</th>
<th>Value</th>
<th>Field Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>INTEGER</td>
<td>V2 (encoded as value 1)</td>
<td>Standard</td>
</tr>
<tr>
<td>Serial Number</td>
<td>INTEGER</td>
<td>Positive integer value unique relative to the issuer</td>
<td>Standard</td>
</tr>
<tr>
<td>Signature Algorithm</td>
<td>AlgorithmIdentifier</td>
<td>Algorithm used by the issuer to sign this certificate</td>
<td>Standard</td>
</tr>
<tr>
<td>Holder</td>
<td>Holder</td>
<td>Identity of the associated base Platform/Delta Platform Certificate, use BaseCertificateID.</td>
<td>Standard</td>
</tr>
<tr>
<td>Issuer</td>
<td>Name</td>
<td>Distinguished name of the delta platform certificate issuer</td>
<td>Standard</td>
</tr>
<tr>
<td>Validity</td>
<td>notBefore notAfter</td>
<td>Beginning and end of validity period</td>
<td>Standard</td>
</tr>
<tr>
<td>Field Name</td>
<td>RFC 5755 Type</td>
<td>Value</td>
<td>Field Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCG Certificate Type</td>
<td>credentialType</td>
<td>Identifies the Delta Platform Certificate</td>
<td>MUST</td>
</tr>
<tr>
<td>TCG Certificate Specification</td>
<td>majorVersion</td>
<td>Major, minor, and revision of the Platform Certificate spec under which this certificate was issued</td>
<td>MAY (If different from base Platform Certificate)</td>
</tr>
<tr>
<td></td>
<td>minorVersion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform Configuration</td>
<td>componentIdentifier</td>
<td>Changes to platform components and properties MAY be reflected by this attribute</td>
<td>MAY (If different from base Platform Certificate)</td>
</tr>
<tr>
<td></td>
<td>platformProperties</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>platformPropertiesUri</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform Configuration URI</td>
<td>URIReference</td>
<td>Points to the PCR list</td>
<td>MAY (If different from base Platform Certificate)</td>
</tr>
<tr>
<td>Extensions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-critical</td>
</tr>
<tr>
<td>Subject Alternative Names</td>
<td>GeneralName</td>
<td>PlatformManufacturerStr PlatformModel PlatformVersion PlatformSerial (optional) PlatformManufacturerId (optional)</td>
<td>MUST</td>
</tr>
<tr>
<td></td>
<td>directoryName</td>
<td></td>
<td>non-critical (Must not differ from base Platform Certificate)</td>
</tr>
<tr>
<td>Targeting Information</td>
<td>TargetingInformation</td>
<td>TPM EK Certificates issued and not included in base certificate. Use targetName option.</td>
<td>MAY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>critical</td>
</tr>
<tr>
<td>Authority Key Id</td>
<td>AuthorityKeyIdentifier</td>
<td>Key identifier Issuer name and serial number (optional)</td>
<td>MUST</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>non-critical</td>
</tr>
<tr>
<td>Authority Info Access</td>
<td>AuthorityInfoAccessSyntax</td>
<td>id-ad-caIssuers URI to issuing CA id-ad-ocsp (optional) URI to OCSP responder</td>
<td>SHOULD</td>
</tr>
</tbody>
</table>
3.3.1 Version

This field contains the version of the certificate syntax. The Delta Platform Certificate version number MUST be set to 2 (which is encoded as the value 1 in ASN.1).

3.3.2 Serial Number

The serial number MUST be a positive integer which is uniquely assigned to each certificate by the issuer. The combination of an issuer’s DN and the serial number MUST uniquely describe a single certificate.

Assign a value unique per instance amongst all certificates issued by "issuer".

3.3.3 Signature Algorithm

This OID identifies the algorithm used by the Delta Platform Certificate issuer to sign the certificate. Delta Platform Certificate verifiers MUST support certificates signed with algorithms available in the TCG Algorithm Registry [12].

3.3.4 Holder

This field contains a reference to the base Platform Certificate or base Delta Platform Certificate. The BaseCertificateID choice MUST be used.

3.3.5 Issuer

This field contains the distinguished name of the entity that issued this Delta Platform Certificate. This is the entity that asserts that the changes made to the platform are correctly reflected in this certificate, and that it references the appropriate base Platform or Delta Certificate.

3.3.6 Validity

This field contains the period during which the assertions made by the issuer about the platform are considered valid. Issuers SHOULD assign notBefore to the current time when the certificate is issued and notAfter to the last date that the certificate will be considered valid. The notAfter date SHOULD not precede that of the base certificate. Both notBefore and notAfter MUST use the appropriate time format as indicated by RFC 5755, section 4.2.6.

3.3.7 Certificate Policies

This extension indicates policy terms under which the certificate was issued.

Assign “critical” the value FALSE. Assign policyIdentifier at least one object identifier. Assign the cPSuri policy qualifier the value of an HTTP URL at which a plain language version of the
platform endorsement entity’s certificate policy may be obtained. Assign the explicit text
userNotice policy qualifier the value “TCG Trusted Platform Endorsement”.
During certificate path validation, check that at least one acceptable policyIdentifier value is
present.

3.3.8 Subject Alternative Names
This extension contains the platform name attributes. This extension MUST equal that of the
base Platform or Delta Platform Certificate, the issuer MUST NOT introduce any changes.
Assign “critical” the value FALSE. Include the platform model, using the directory name-form
with RDNs for the platform manufacturer, model, version number, and optionally, the serial
number, and manufacturer ID. The “Platform Manufacturer Identifier” optional field uniquely
identifies the platform’s manufacturer using the IANA Private Enterprise Number OID [8].
During certificate validation, the Privacy-CA MUST check that the platform manufacturer,
model, version, serial numbers, and manufacturer ID are acceptable.

3.3.9 Targeting Information
This extension contains references to additional EK certificates issued by the Delta Platform
Certificate issuer. Refer to section 3.2.9 for details on how to implement this extension.

3.3.10 Attributes
The following attributes SHOULD be included:

- The “TCG Certificate Type” attribute identifies the type of certificate and its format.
- The “TCG Certificate Specification” attribute references the version, level, and revision
  of this specification.

The following attributes MAY be included:

- The “Platform Configuration” attribute describes various assertions of platform
  properties that are not security related, including CPU and motherboard serial
  numbers, and network adapter MAC addresses.
- The “Platform Configuration Uri” attribute which provides the URI to the manufacturer
  published list of valid PCR values.

3.3.11 Authority Key Identifier
This extension identifies the subject public key of the certificate issuer. Assign “critical” the
value FALSE. Assign the value of “subject key identifier” from the issuer’s public-key
certificate, if available, else omit.

3.3.12 Authority Info Access
This extension contains additional information about the issuer. Assign “critical” the value
FALSE. This extension MAY be omitted. If included, then the accessMethod OID SHOULD be
set to id-ad-ocsp (RFC 5755 [11]) and the accessLocation value SHOULD point to the access
value of the OCSP responder (HTTP URI).
The relying party can access the certificate status for this certificate by sending a properly
formatted OCSPRequest to the URI. If both a CRL Distribution Point (CDP) and OCSP AIA
extension are present in the certificate, then the relying parties SHOULD use OCSP as the primary validation mechanism.

### 3.3.13 CRL Distribution

This extension provides the location of the subject’s revocation information. Assign “critical” the value FALSE. The relying party can access the CRL for this certificate from this URI. If both a CDP and OCSP AIA extension are present in the certificate, then relying parties SHOULD use OCSP as the primary validation mechanism.

### 3.3.14 Issuer Unique Id

These fields uniquely identify certificates which share names with other certificates issued by the same issuer. Under this specification these fields MUST be omitted.
4. X.509 ASN.1 Structures and OIDs

TCG has registered an object identifier (OID) namespace as an “international body” in the ISO registration hierarchy. This leads to shorter OIDs and gives TCG the ability to manage its own namespace. The OID namespace is inherited from TCPA specifications. These definitions are intended to be used within the context of an X.509 v3 certificate specifically leveraging the profile described in RFC 5755.

-- TCG specific OIDs

tcg OBJECT IDENTIFIER ::= {
joint-iso-itu-t(2) international-organizations(23) tcg(133) }

tcg-tcpspecVersion OBJECT IDENTIFIER ::= {tcg 1}
tcg-attribute OBJECT IDENTIFIER ::= {tcg 2}
tcg-protocol OBJECT IDENTIFIER ::= {tcg 3}
tcg-algorithm OBJECT IDENTIFIER ::= {tcg 4}
tcg-platformClass OBJECT IDENTIFIER ::= {tcg 5}
tcg-ce OBJECT IDENTIFIER ::= {tcg 6}
tcg-kp OBJECT IDENTIFIER ::= {tcg 8}
tcg-address OBJECT IDENTIFIER ::= {tcg 17}
tcg-registry OBJECT IDENTIFIER ::= {tcg 18}

-- TCG Attribute OIDs

tcg-at-tpmManufacturer OBJECT IDENTIFIER ::= {tcg-attribute 1}
tcg-at-tpmModel OBJECT IDENTIFIER ::= {tcg-attribute 2}
tcg-at-tpmVersion OBJECT IDENTIFIER ::= {tcg-attribute 3}
tcg-at-securityCapabilities OBJECT IDENTIFIER ::= {tcg-attribute 10}
tcg-at-tpmProtectionProfile OBJECT IDENTIFIER ::= {tcg-attribute 11}
tcg-at-tpmSecurityTarget OBJECT IDENTIFIER ::= {tcg-attribute 12}
tcg-at-tbbaProtectionProfile OBJECT IDENTIFIER ::= {tcg-attribute 13}
tcg-at-tbbaSecurityTarget OBJECT IDENTIFIER ::= {tcg-attribute 14}
tcg-at-tpmIdLabel OBJECT IDENTIFIER ::= {tcg-attribute 15}
tcg-at-tpmSpecification OBJECT IDENTIFIER ::= {tcg-attribute 16}
tcg-at-tcgPlatformSpecification OBJECT IDENTIFIER ::= {tcg-attribute 17}
tcg-at-tpmSecurityAssertions OBJECT IDENTIFIER ::= {tcg-attribute 18}
tcg-at-tbbaSecurityAssertions OBJECT IDENTIFIER ::= {tcg-attribute 19}
tcg-at-tcgCredentialSpecification OBJECT IDENTIFIER ::= {tcg-attribute 23}
tcg-at-tcgCredentialType OBJECT IDENTIFIER ::= {tcg-attribute 25}

-- TCG Platform Class Common OIDs

tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 1}

tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 1}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 2}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 3}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 4}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 5}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 6}
tcg-common OBJECT IDENTIFIER ::= {tcg-platformClass 7}

tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 1}
tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 2}

tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 1}
tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 2}

tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 1}
tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 2}

tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 1}
tcg-at-platformConfiguration OBJECT IDENTIFIER ::= {tcg-platformConfiguration 2}

-- TCG Algorithm OIDs

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

tcg-algorithm OBJECT IDENTIFIER ::= {tcg-algorithm 1}

-- TCG Key Purposes OIDs

tcg-kp-EKCertificate OBJECT IDENTIFIER ::= {tcg-kp 1}
tcg-kp-PlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 2}
tcg-kp-AIKCertificate OBJECT IDENTIFIER ::= {tcg-kp 3}
tcg-kp-PlatformKeyCertificate OBJECT IDENTIFIER ::= {tcg-kp 4}
tcg-kp-DeltaPlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 5}

tcg-kp-EKCertificate OBJECT IDENTIFIER ::= {tcg-kp 1}
tcg-kp-PlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 2}
tcg-kp-AIKCertificate OBJECT IDENTIFIER ::= {tcg-kp 3}
tcg-kp-PlatformKeyCertificate OBJECT IDENTIFIER ::= {tcg-kp 4}
tcg-kp-DeltaPlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 5}

tcg-kp-EKCertificate OBJECT IDENTIFIER ::= {tcg-kp 1}
tcg-kp-PlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 2}
tcg-kp-AIKCertificate OBJECT IDENTIFIER ::= {tcg-kp 3}
tcg-kp-PlatformKeyCertificate OBJECT IDENTIFIER ::= {tcg-kp 4}
tcg-kp-DeltaPlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 5}

tcg-kp-EKCertificate OBJECT IDENTIFIER ::= {tcg-kp 1}
tcg-kp-PlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 2}
tcg-kp-AIKCertificate OBJECT IDENTIFIER ::= {tcg-kp 3}
tcg-kp-PlatformKeyCertificate OBJECT IDENTIFIER ::= {tcg-kp 4}
tcg-kp-DeltaPlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 5}

tcg-kp-EKCertificate OBJECT IDENTIFIER ::= {tcg-kp 1}
tcg-kp-PlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 2}
tcg-kp-AIKCertificate OBJECT IDENTIFIER ::= {tcg-kp 3}
tcg-kp-PlatformKeyCertificate OBJECT IDENTIFIER ::= {tcg-kp 4}
tcg-kp-DeltaPlatformAttributeCertificate OBJECT IDENTIFIER ::= {tcg-kp 5}

-- TCG Certificate Extensions

tcg-ce-relevantCredentials OBJECT IDENTIFIER ::= {tcg-ce 2}
tcg-ce-relevantManifests OBJECT IDENTIFIER ::= {tcg-ce 3}
tcg-ce-virtualPlatformAttestationService OBJECT IDENTIFIER ::= {tcg-ce 4}
tcg-ce-migrationControllerAttestationService OBJECT IDENTIFIER ::= {tcg-ce 5}
tcg-ce-migrationControllerRegistrationService OBJECT IDENTIFIER ::= {tcg-ce 6}
tcg-ce-virtualPlatformBackupService OBJECT IDENTIFIER ::= {tcg-ce 7}

-- TCG Protocol OIDs
tcg-prt-tpmIdProtocol OBJECT IDENTIFIER ::= {tcg-protocol 1}

-- TCG Address OIDs
tcg-address-ethernetmac OBJECT IDENTIFIER ::= {tcg-address 1}
tcg-address-wlanmac OBJECT IDENTIFIER ::= {tcg-address 2}
tcg-address-bluetoothmac OBJECT IDENTIFIER ::= {tcg-address 3}

-- TCG Registry OIDs
tcg-registry-componentClass OBJECT IDENTIFIER ::= {tcg-registry 3}
tcg-registry-componentClass-tcg OBJECT IDENTIFIER ::= {tcg-registry-componentClass 1}
tcg-registry-componentClass-ietf OBJECT IDENTIFIER ::= {tcg-registry-componentClass 2}
tcg-registry-componentClass-dmtf OBJECT IDENTIFIER ::= {tcg-registry-componentClass 3}

tCGPlatformSpecification ATTRIBUTE ::= {
  WITH SYNTAX TCGPlatformSpecification
  ID tcg-at-tcgPlatformSpecification }

TPMSpecification ::= SEQUENCE {
  family UTF8String (SIZE (1..STRMAX)),
  level INTEGER,
  revision INTEGER }

tCGCredentialType ATTRIBUTE ::= {
  WITH SYNTAX TCGCredentialType
  ID tcg-at-tcgCredentialType }

CredentialType ::= OBJECT IDENTIFIER (tcg-kp-PlatformAttributeCertificate | tcg-kp-DeltaPlatformAttributeCertificate)

-- manufacturer implementation model and version attributes
TPMManufacturer ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-tpmManufacturer }

TPMModel ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-tpmModel }

TPMVersion ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-tpmVersion }

PlatformManufacturerStr ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-platformManufacturerStr }
PlatformModel ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-platformModel }

PlatformVersion ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-platformVersion }

PlatformSerial ATTRIBUTE ::= {
  WITH SYNTAX UTF8String (SIZE (1..STRMAX))
  ID tcg-at-platformSerial }

PlatformManufacturerId ATTRIBUTE ::= {
  WITH SYNTAX ManufacturerId
  ID tcg-at-platformManufacturerId }

ManufacturerId ::= SEQUENCE {
  manufacturerIdentifier   PrivateEnterpriseNumber
}

enterprise OBJECT IDENTIFIER ::= {
  iso(1) identified-organization(3) dod(6) internet(1) private(4) enterprise(1)}

PrivateEnterpriseNumber OBJECT IDENTIFIER ::= { enterprise private-enterprise-number }

-- tpm and platform tbb security assertions

Version ::= INTEGER { v1(0) }

TPMSecurityAssertions ATTRIBUTE ::= {
  WITH SYNTAX TPSecurityAssertions
  ID tcg-at-tpmSecurityAssertions }

TPMSecurityAssertions ::= SEQUENCE {
  version Version DEFAULT v1,
  fieldUpgradeable BOOLEAN DEFAULT FALSE,
  ekGenerationType [0] IMPLICIT EKGenerationType OPTIONAL,
  ekGenerationLocation [1] IMPLICIT EKGenerationLocation OPTIONAL,
  ekCertificateGenerationLocation [2] IMPLICIT EKCertificateGenerationLocation OPTIONAL,
  ccInfo [3] IMPLICIT CommonCriteriaMeasures OPTIONAL,
  fipsLevel [4] IMPLICIT FIPSLevel OPTIONAL,
  iso9000Certified [5] IMPLICIT BOOLEAN DEFAULT FALSE,
  iso9000Uri IA5STRING (SIZE (1..URIMAX)) OPTIONAL }

TBBSecurityAssertions ATTRIBUTE ::= {
  WITH SYNTAX TBBSecurityAssertions
  ID tcg-at-tbbSecurityAssertions }

TBBSecurityAssertions ::= SEQUENCE {
  version Version DEFAULT v1,
  ccInfo [0] IMPLICIT CommonCriteriaMeasures OPTIONAL,
  fipsLevel [1] IMPLICIT FIPSLevel OPTIONAL,
  rtmType [2] IMPLICIT MeasurementRootType OPTIONAL,
  iso9000Certified BOOLEAN DEFAULT FALSE,
  iso9000Uri IA5STRING (SIZE (1..URIMAX)) OPTIONAL }

EKGenerationType ::= ENUMERATED {
  internal (0),
  injected (1),
  internalRevocable(2),
  injectedRevocable(3) }

EKGenerationLocation ::= ENUMERATED {
  tpmManufacturer (0),
  platformManufacturer (1),
  ekCertSigner (2) }

EKCertificateGenerationLocation ::= ENUMERATED {
  tpmManufacturer (0),
  platformManufacturer (1),
  ekCertSigner (2) }
-- Hybrid means the measurement root is capable of static AND dynamic
-- Physical means that the root is anchored by a physical TPM
-- Virtual means the TPM is virtualized (possibly running in a VMM)
-- TPMs or RTMs might leverage other lower layer RTMs to virtualize the
-- capabilities of the platform.
MeasurementRootType ::= ENUMERATED {
  static (0),
  dynamic (1),
  nonHost (2),
  hybrid (3),
  physical (4),
  virtual (5) }

-- common criteria evaluation
CommonCriteriaMeasures ::= SEQUENCE {
  version IA5STRING (SIZE (1..STRMAX)), -- "2.2" or "3.1"; future syntax defined by CC
  assuranceLevel EvaluationAssuranceLevel,
  evaluationStatus EvaluationStatus,
  plus BOOLEAN DEFAULT FALSE,
  strengthOfFunction [0] IMPLICIT StrengthOfFunction OPTIONAL,
  profileOid [1] IMPLICIT OBJECT IDENTIFIER OPTIONAL,
  profileUri [2] IMPLICIT URIReference OPTIONAL,
  targetOid [3] IMPLICIT OBJECT IDENTIFIER OPTIONAL,
  targetUri [4] IMPLICIT URIReference OPTIONAL }

EvaluationAssuranceLevel ::= ENUMERATED {
  level1 (1),
  level2 (2),
  level3 (3),
  level4 (4),
  level5 (5),
  level6 (6),
  level7 (7) }

StrengthOfFunction ::= ENUMERATED {
  basic (0),
  medium (1),
  high (2) }

URIReference ::= SEQUENCE {
  uniformResourceIdentifier IA5String (SIZE (1..URIMAX)),
  hashAlgorithm AlgorithmIdentifier OPTIONAL,
  hashValue BIT STRING OPTIONAL }

EvaluationStatus ::= ENUMERATED {
  designedToMeet (0),
  evaluationInProgress (1),
  evaluationCompleted (2) }

-- fips evaluation
FIPSLevel ::= SEQUENCE {
  version IA5STRING (SIZE (1..STRMAX)), -- "140-1" or "140-2"
  level SecurityLevel,
  plus BOOLEAN DEFAULT FALSE }

SecurityLevel ::= ENUMERATED {
  level1 (1),
  level2 (2),
  level3 (3),
  level4 (4) }

-- aik certificate label from tpm owner
TPMIdLabel OTHER-NAME ::= (UTF8String IDENTIFIED BY {tcg-at-tpmIdLabel})

-- platform configuration
platformConfiguration ATTRIBUTE ::= {
  WITH SYNTAX PlatformConfiguration
  ID tcg-at-platformConfiguration-v2
}

PlatformConfiguration ::= SEQUENCE {
  componentIdentifiers [0] IMPLICIT SEQUENCE(SIZE(1..MAX)) OF ComponentIdentifier OPTIONAL,
  componentIdentifiersUri [1] IMPLICIT URIReference OPTIONAL,
  platformProperties [2] IMPLICIT SEQUENCE(SIZE(1..MAX)) OF Properties OPTIONAL,
  platformPropertiesUri [3] IMPLICIT URIReference OPTIONAL
}

ComponentIdentifier ::= SEQUENCE {
  componentClass ComponentClass,
  componentManufacturer UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentModel UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentSerial[0] IMPLICIT UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentRevision[1] IMPLICIT UTF8String (SIZE (1..STRMAX)) OPTIONAL,
  componentManufacturerId[2] IMPLICIT PrivateEnterpriseNumber OPTIONAL,
  fieldReplaceable[3] IMPLICIT BOOLEAN OPTIONAL,
  componentAddresses[4] IMPLICIT SEQUENCE(SIZE(1..MAX)) OF ComponentAddress OPTIONAL,
  componentPlatformCert[5] IMPLICIT CertificateIdentifier OPTIONAL,
  componentPlatformCertUri[6] IMPLICIT URIReference OPTIONAL,
  status[7] IMPLICIT AttributeStatus OPTIONAL
}

ComponentClass ::= SEQUENCE {
  componentClassRegistry ComponentClassRegistry,
  componentClassValue OCTET STRING SIZE(4)
}

ComponentClassRegistry ::= OBJECT IDENTIFIER ( tcg-registry-componentClass-tcg | tcg-registry-componentClass-ietf | tcg-registry-componentClass-dmtf )

ComponentAddress ::= SEQUENCE {
  addressType AddressType,
  addressValue UTF8String (SIZE (1..STRMAX))
}

AddressType ::= OBJECT IDENTIFIER (tcg-address-ethernetmac | tcg-address-wlanmac | tcg-address-bluetoothmac)

Properties ::= SEQUENCE {
  propertyName UTF8String (SIZE (1..STRMAX))
}

CertificateIdentifier ::= SEQUENCE {
  attributeCertificateIdentifier[0] AttributeCertificateIdentifier OPTIONAL,
  certificateIssuer[1] GeneralNames OPTIONAL,
  certificateSerialNumber[2] CertificateSerialNumber OPTIONAL
}

AttributeCertificateIdentifier ::= SEQUENCE {
  hashAlgorithm AlgorithmIdentifier,
  hashOverSignatureValue OCTET STRING
}

AttributeStatus ::= ENUMERATED {
  added (0),
  modified (1),
  removed (2)
}

PlatformConfigUri ATTRIBUTE ::= {
  WITH SYNTAX URIReference
  ID tcg-at-platformConfigUri
}

TPMProtectionProfile ATTRIBUTE ::= {
  WITH SYNTAX ProtectionProfile
  ID tcg-at-tpmProtectionProfile
}

TPMSecurityTarget ATTRIBUTE ::= {
  WITH SYNTAX SecurityTarget
}
ID tcg-at-tpmSecurityTarget }

TBBProtectionProfile ATTRIBUTE ::= {
  WITH SYNTAX ProtectionProfile
  ID tcg-at-tbbProtectionProfile }

TBBSecurityTarget ATTRIBUTE ::= {
  WITH SYNTAX SecurityTarget
  ID tcg-at-tbbSecurityTarget }

ProtectionProfile ::= OBJECT IDENTIFIER
SecurityTarget ::= OBJECT IDENTIFIER

-- These data objects are included
-- in X.509 extensions using the new tcg-ce-[relevantCredentials,
-- relevantManifests] OIDs.

HashAlgAndValue ::= SEQUENCE {
  hashAlg AlgorithmIdentifier,
  hashValue OCTET STRING }

HashedSubjectInfoURI ::= SEQUENCE {
  documentURI IA5String (SIZE (1..URIMAX)),
  documentAccessInfo OBJECT IDENTIFIER OPTIONAL,
  documentHashInfo HashAlgAndValue OPTIONAL }

SubjectInfoURIList ::= SEQUENCE SIZE (1..REFMAX) OF HashedSubjectInfoURI

TCGRelevantCredentials ::= SEQUENCE SIZE (1..REFMAX) OF HashedSubjectInfoURI

TCGRelevantManifests ::= SEQUENCE SIZE (1..REFMAX) OF HashedSubjectInfoURI

-- tcpa tpm specification attribute (deprecated)
tCPASpecVersion ATTRIBUTE ::= {
  WITH SYNTAX TCPASpecVersion
  ID tcg-tcpaSpecVersion }

TCPASpecVersion ::= SEQUENCE {
  major INTEGER,
  minor INTEGER }

-- This extension indicates how a remote challenger can contact the (deep) attestation service
below the current certificate holder in order to attest the layer below. Using this model allows
the certificate of each virtualization layer to reference the attestation service for the layer
below it. A remote challenger could traverse the layer hierarchy using this extension until
reaching the physical trusted platform rooted attestation. The following URI is optionally
included in a certificate for a virtual machine associated with the tcg-ce-
[virtualPlatformAttestationService, migrationControllerAttestationService, migrationControllerRegistrationService, virtualPlatformBackupService] OIDs respectively:

VirtualPlatformAttestationServiceURI ::= IA5String (SIZE (1..URIMAX))
MigrationControllerAttestationServiceURI ::= IA5String (SIZE (1..URIMAX))
MigrationControllerRegistrationServiceURI ::= IA5String (SIZE (1..URIMAX))
VirtualPlatformBackupServiceURI ::= SEQUENCE {
  restoreAllowed BOOLEAN DEFAULT FALSE,
  backupServiceURI IA5String }
5. References


A. Certificate Examples

A.1 Example 1 (Platform Certificate in Attribute Certificate Format)

The following section provides an example of a Platform Certificate in Attribute Certificate format (RFC 5755) [11]. The PEM encoded version of the certificate as well as the ASN.1 certificate text are included for convenience. The values used in this example are for illustrative purposes and must be replaced with manufacturer-specific data.

A.1.1 PEM Format

-----BEGIN ATTRIBUTE CERTIFICATE-----
MIIDmDCCCIACAgEw2QEGzg2QwYqkgY0XqyQzAJBgNVBAYTAgUEAgUwEQQJQQ6gQQBQQJ
DAJDQTEUMBIGA1UEBwwLZU2FudGExGjIwNjEwMB4wHAYDVQQDDAJUUmBTMRMwEQQJQQ6g
QQBQQJDAJDQTEUMBIGA1UEBwwLZU2FudGExGjIwNjEwMB4wHAYDVQQDDAJUUmBTMRMwEQQJ
QQ6gQQBQQJDAJDQTEUMBIGA1UEBwwLZU2FudGExGjIwNjEwMB4wHAYDVQQDDAJUUmBTMRMw
-----END ATTRIBUTE CERTIFICATE-----
A.1.2 DER Format

SEQUENCE :
  SEQUENCE :
    INTEGER : 1
    SEQUENCE :
      CONTEXT_SPECIFIC (0) :
        SEQUENCE :
          CONTEXT_SPECIFIC (4) :
            SEQUENCE :
              SET :
                SEQUENCE :
                  OBJECT IDENTIFIER : countryName [2.5.4.6]
                  PRINTABLE STRING : 'US'
              SET :
                SEQUENCE :
                  OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
                  UTF8 STRING : 'CA'
              SET :
                SEQUENCE :
                  OBJECT IDENTIFIER : localityName [2.5.4.7]
                  UTF8 STRING : 'Santa Clara'
              SET :
                SEQUENCE :
                  OBJECT IDENTIFIER : organizationalName [2.5.4.9]
                  UTF8 STRING : 'Santa Clara, CA'
SEQUENCE :
  OBJECT IDENTIFIER : organizationName [2.5.4.10]
  UTF8 STRING : 'Intel Corporation'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
    UTF8 STRING : 'EK Certificate Issuer'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : commonName [2.5.4.3]
    UTF8 STRING : 'www.intel.com'

INTEGER : 926974836
CONTEXT SPECIFIC (0) :
  SEQUENCE :
    CONTEXT SPECIFIC (4) :
      SEQUENCE :
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : countryName [2.5.4.6]
            PRINTABLE STRING : 'US'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
              UTF8 STRING : 'CA'
            SET :
              SEQUENCE :
                OBJECT IDENTIFIER : localityName [2.5.4.7]
                UTF8 STRING : 'Santa Clara'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : organizationName [2.5.4.10]
              UTF8 STRING : 'Intel Corporation'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
              UTF8 STRING : 'Platform Attribute Certificate Issuer'
      SET :
        SEQUENCE :
          OBJECT IDENTIFIER : commonName [2.5.4.3]
          UTF8 STRING : 'www.intel.com'

SEQUENCE :
  OBJECT IDENTIFIER : [1.2.840.113549.1.1.11]
  NULL :
  INTEGER : 602967EA7924FDEE6CC150B91E83777D1F427999
SEQUENCE :
  GENERALIZED TIME : '20170820210748Z'
  GENERALIZED TIME : '20200820210748Z'
SEQUENCE :
  SEQUENCE :
    OCTET STRING : 00000001
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.8.2]
OBJECT IDENTIFIER: [2.23.133.2.23]
set:
  sequence:
    integer: 1
    integer: 1
    integer: 11
sequence:
  object identifier: [2.23.133.2.19]
set:
  sequence:
    integer: 0
    context specific (0):
      ia5 string: '3.1'
      enumerated: '07'
      enumerated: '02'
      boolean: '00'
    context specific (1): 01
    context specific (2):
      ia5 string: 'https://www.intel.com/protectionprofile.pdf'
      context specific (3): 5304050607
      context specific (4): 01
      ia5 string: 'https://www.intel.com/cctarget.pdf'
    context specific (1):
      ia5 string: '140-2'
      enumerated: '04'
      boolean: '00'
      context specific (0): 03
      boolean: '00'
      ia5 string: 'https://www.intel.com/isocertification.pdf'
sequence:
  object identifier: [2.23.133.5.1.7.2]
set:
  sequence:
    context specific (0):
    sequence:
      object identifier: [2.23.133.18.3.1]
      octet string: 0000000A
      utf8 string: 'ABC OEM'
      utf8 string: 'WR06X7871FTL'
      context specific (0): 41353535352D393939
      context specific (1): 312E31
      context specific (2): 2B06010401822C
      context specific (3): FF
      context specific (4):
        sequence:
          object identifier: [1.3.6.1.4.1.22554.1.2.1]
          octet string:
            6003A33432FD914B6003A33432FD914B6003A33432FD914B6003A33432FD914B
          context specific (1):
          sequence:
            object identifier: [1.3.6.1.4.1.22554.1.2.1]
            octet string:
              6003A33432FD914B6003A33432FD914B6003A33432FD914B6003A33432FD914B
              context specific (4):
                sequence:

SEQUENCE :
  OBJECT IDENTIFIER : countryName [2.5.4.6]
  PRINTABLE STRING : 'US'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
    UTF8 STRING : 'FL'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : localityName [2.5.4.7]
    UTF8 STRING : 'Ft. Lauderdale'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationName [2.5.4.10]
    UTF8 STRING : 'ABC Corporation'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
    UTF8 STRING : 'Platform Certificate Issuer'
SEQUENCE :
  OBJECT IDENTIFIER : [2.23.133.18.3.1]
  OCTET STRING : 000002F1
  UTF8 STRING : 'XYZ OEM'
  UTF8 STRING : 'LMBT3904DW1T1G'
  CONTEXT SPECIFIC (0) : 43353535352D3535353535
  CONTEXT SPECIFIC (1) : 332E31
  CONTEXT SPECIFIC (2) : 2B06010401822C
  CONTEXT SPECIFIC (3) : 00
  CONTEXT SPECIFIC (4) :
    SEQUENCE :
      OBJECT IDENTIFIER : [2.23.133.17.1]
      UTF8 STRING : '82:89:FA:D3:61'
    SEQUENCE :
      OBJECT IDENTIFIER : [2.23.133.17.2]
      UTF8 STRING : 'D4:83:B4:F2:78'
    CONTEXT SPECIFIC (5) :
      CONTEXT SPECIFIC (0) :
        SEQUENCE :
          OBJECT IDENTIFIER : [1.3.6.1.4.1.22554.1.2.1]
          OCTET STRING : 3432E1414B60973434323432E1414B6097343432
          CONTEXT SPECIFIC (1) :
          SEQUENCE :
            CONTEXT SPECIFIC (4) :
            SEQUENCE :
              SET :
                SEQUENCE :
                  OBJECT IDENTIFIER : countryName [2.5.4.6]
                  PRINTABLE STRING : 'US'
                SET :
                  SEQUENCE :
                    OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
UTF8 STRING : 'AZ'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : localityName [2.5.4.7]
    UTF8 STRING : 'Phoenix'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationName
    UTF8 STRING : 'XYC Company'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName
    UTF8 STRING : 'Platform Certificate Issuer'

INTEGER : 938928

CONTEXT SPECIFIC (6) :
  IA5 STRING : 'https://www.xyz.com/certs/938928.cer'

CONTEXT SPECIFIC (1) :
  IA5 STRING : 'https://www.intel.com/platformidentifiers.xml'

CONTEXT SPECIFIC (2) :
  SET :
    SEQUENCE :
      UTF8 STRING : 'vPro'
      UTF8 STRING : 'true'

CONTEXT SPECIFIC (3) :
  SET :
    SEQUENCE :
      IA5 STRING : 'https://www.intel.com/platformproperties.xml'

CONTEXT SPECIFIC (4) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : [2.23.133.5.1.1]
      UTF8 STRING : 'Intel'

CONTEXT SPECIFIC (5) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : [2.23.133.5.1.3]
      SET :
        SEQUENCE :
          IA5 STRING : 'https://www.intel.com/PCRs.xml'

CONTEXT SPECIFIC (6) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : certificatePolicies [2.5.29.32]
      OCTET STRING :
        SEQUENCE :
          OBJECT IDENTIFIER : [1.2.840.113741.1.5.2.4]

CONTEXT SPECIFIC (7) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : cps [1.3.6.1.5.5.7.2.1]
      IA5 STRING : 'https://www.intel.com/platcertcps.pdf'

CONTEXT SPECIFIC (8) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : unotice [1.3.6.1.5.5.7.2.2]
      SET :
        SEQUENCE :
          UTF8 STRING : 'TCG Trusted Platform Endorsement'

CONTEXT SPECIFIC (9) :
  SET :
    SEQUENCE :
      OBJECT IDENTIFIER : subjectAltName [2.5.29.17]
      OCTET STRING :
        SEQUENCE :
          CONTEXT SPECIFIC (4) :
            SET :
              SEQUENCE :
                OBJECT IDENTIFIER : [2.23.133.5.1.1]
                UTF8 STRING : 'Intel'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.2]
    SEQUENCE : OBJECT IDENTIFIER : [1.3.6.1.4.1.343]
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.4]
    UTF8 STRING : 'S2600KP'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.5]
    UTF8 STRING : 'H76962-350'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.6]
    UTF8 STRING : 'BQKP99940643'

SEQUENCE :
  OBJECT IDENTIFIER : [2.5.29.55]
  BOOLEAN : 'FF'
  OCTET STRING :
    SEQUENCE :
      CONTEXT SPECIFIC (0) :
      CONTEXT SPECIFIC (4) :
    SEQUENCE :
      SET :
        SEQUENCE :
          OBJECT IDENTIFIER : countryName [2.5.4.6]
          PRINTABLE STRING : 'US'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
            UTF8 STRING : 'CA'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : localityName [2.5.4.7]
            UTF8 STRING : 'Santa Clara'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : organizationName [2.5.4.10]
            UTF8 STRING : 'Intel Corporation'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
            UTF8 STRING : 'EK Certificate Issuer'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : commonName [2.5.4.3]
            UTF8 STRING : 'www.intel.com'
        SET :
          SEQUENCE :
            OBJECT IDENTIFIER : serialNumber [2.5.4.5]
            PRINTABLE STRING : '128943787'
      SEQUENCE :
        OBJECT IDENTIFIER : authorityKeyIdentifier [2.5.29.35]
        OCTET STRING :
          SEQUENCE :
            CONTEXT SPECIFIC (0) : D46990260281D55E834B03976EAB8A9F884C983
        SEQUENCE :
          OBJECT IDENTIFIER : authorityInfoAccess [1.3.6.1.5.5.7.1.1]
          OCTET STRING :
            SEQUENCE :
              SET :
A.2 Example 2 (Delta Platform Certificate in Attribute Certificate Format)

The following section provides an example of a Delta Platform Certificate in Attribute Certificate format (RFC 5755) [11]. The PEM encoded version of the certificate as well as the ASN.1 certificate text are included for convenience. The values used in this example are for illustrative purposes and must be replaced with manufacturer-specific data.

A.2.1 PEM Format

-----BEGIN ATTRIBUTE CERTIFICATE-----
MIIKzCCxXsCAQEwgbaggbMwgZqkgZcwgZQxCzAJBgNVBAYTAlVTMQswCQYDVQQI
DAJDQTEUMBIGA1UEBwwLU2FudGEgQ2xhcmExGjAYBgNVBAoMEUlu
dGVsIENvcnBv
MTQwMgYDVQQDDA13d3cueHl6aW50ZWdyYXRvcnMuY29t
MIIFeDASBgVngQURAgwOQUY6Mzc6MTA6RDI6QTilgc+gMTANBgEEAYGwGgECAQQgYAOjNDL9kUtgA6M0Mv2RS2ADozQy/ZFLYAojNDL9kUuhqZkw
A.2.2 DER Format

SEQUENCE :
  SEQUENCE :
    INTEGER : 1
  SEQUENCE :
    CONTEXT SPECIFIC (0) :
      SEQUENCE :
        CONTEXT SPECIFIC (4) :
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : countryName [2.5.4.6]
              PRINTABLE STRING : 'US'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
              UTF8 STRING : 'CA'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : localityName [2.5.4.7]
              UTF8 STRING : 'Santa Clara'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : organizationName [2.5.4.10]
              UTF8 STRING : 'Intel Corporation'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
              UTF8 STRING : 'Platform Attribute Certificate Issuer'
          SET :
            SEQUENCE :
              OBJECT IDENTIFIER : commonName [2.5.4.3]
              UTF8 STRING : 'www.intel.com'
            INTEGER : 602967EA7924FDEE6CC15083777D1F427999
          CONTEXT SPECIFIC (0) :
            SEQUENCE :
              CONTEXT SPECIFIC (4) :
                SET :
                  SEQUENCE :
                    OBJECT IDENTIFIER : countryName [2.5.4.6]
                    PRINTABLE STRING : 'US'
                  SET :
                    SEQUENCE :
                      OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
                      UTF8 STRING : 'TX'
                    SET :
                      SEQUENCE :
                        OBJECT IDENTIFIER : localityName [2.5.4.7]
                        UTF8 STRING : 'Austin'
                    SET :
                      SEQUENCE :
                        OBJECT IDENTIFIER : organizationName [2.5.4.10]
                        UTF8 STRING : 'XYZ Integrator'
SET :

SEQUENCE :

OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
UTF8 STRING : 'Delta Platform Attribute Certificate Issuer'

SET :

SEQUENCE :

OBJECT IDENTIFIER : commonName [2.5.4.3]
UTF8 STRING : 'www.xyzintegrators.com'

SEQUENCE :

OBJECT IDENTIFIER : [1.2.840.113549.1.1.11]
NULL :
INTEGER : 34928388

SEQUENCE :

GENERALIZED TIME : '20181015210811Z'
GENERALIZED TIME : '20200820210811Z'

SEQUENCE :

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.2.25]
SET :

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.8.5]

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.2.23]
SET :

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.5.1.7.2]
SET :

SEQUENCE :

CONTEXT SPECIFIC (0) :

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.18.3.1]
OCTET STRING : 0000000A
UTF8 STRING : 'ABC OEM'
UTF8 STRING : 'WR06X7871FTL'
CONTEXT SPECIFIC (0) : 41353535352D393939
CONTEXT SPECIFIC (1) : 312E31
CONTEXT SPECIFIC (2) : 2B06010401822C
CONTEXT SPECIFIC (3) : FF
CONTEXT SPECIFIC (4) :

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.17.1]
UTF8 STRING : 'AF:3A:94:10:A5'

SEQUENCE :

OBJECT IDENTIFIER : [2.23.133.17.2]
UTF8 STRING : 'AF:37:10:D2:A8'
CONTEXT SPECIFIC (5) :
CONTEXT SPECIFIC (0) :

SEQUENCE :

OBJECT IDENTIFIER : [1.3.6.1.4.1.22554.1.2.1]
OCTET STRING :

6003A33432FD914B6003A33432FD914B6003A33432FD914B6003A33432FD914B

CONTEXT SPECIFIC (1) :
SEQUENCE :

CONTEXT SPECIFIC (4) :

SEQUENCE :

OBJECT IDENTIFIER : countryName [2.5.4.6]
PRINTABLE STRING : 'US'

SET : SEQUENCE :
  OBJECT IDENTIFIER : stateOrProvinceName

UTF8 STRING : 'FL'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : localityName [2.5.4.7]
    UTF8 STRING : 'Ft. Lauderdale'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationName [2.5.4.10]
    UTF8 STRING : 'ABC Corporation'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]

UTF8 STRING : 'Platform Certificate Issuer'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : commonName [2.5.4.3]
    UTF8 STRING : 'www.abc.com'

INTEGER : 43843898843

CONTEXT SPECIFIC (6) :
IA5 STRING : 'https://www.abc.com/certs/43843898843.cer'

CONTEXT SPECIFIC (7) : 02

CONTEXT SPECIFIC (0) : 463938312D3031
CONTEXT SPECIFIC (1) : 322E31
CONTEXT SPECIFIC (2) : 2B060104018348
CONTEXT SPECIFIC (3) : FF
CONTEXT SPECIFIC (4) :
ｾ ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  ﾆ  

[2.5.4.8]

UTF8 STRING : 'CA'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : localityName [2.5.4.7]
    UTF8 STRING : 'San Jose'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationName [2.5.4.10]
    UTF8 STRING : 'Component Corp'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName
    UTF8 STRING : 'Platform Certificate Issuer'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : commonName [2.5.4.3]
    UTF8 STRING : 'www.component.com'
    INTEGER : 98472878
    CONTEXT SPECIFIC (6) :
      IA5 STRING : 'https://www.component.com/certs/98472878.cer'
    CONTEXT SPECIFIC (7) : 00
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.18.3.1]
    OCTET STRING : 'XYZ OEM'
    UTF8 STRING : 'LMBT3904DW1T1G'
    CONTEXT SPECIFIC (0) : 43353535352D353535
    CONTEXT SPECIFIC (1) : 342E30
    CONTEXT SPECIFIC (2) : 2B06010401822C
    CONTEXT SPECIFIC (3) : 55
    CONTEXT SPECIFIC (4) :
      SEQUENCE :
        OBJECT IDENTIFIER : [2.23.133.17.1]
        UTF8 STRING : '82:89:FA:D3:61'
      SEQUENCE :
        OBJECT IDENTIFIER : [2.23.133.17.2]
        UTF8 STRING : 'D4:83:B4:F2:78'
      CONTEXT SPECIFIC (5) :
        CONTEXT SPECIFIC (0) :
          SEQUENCE :
            OBJECT IDENTIFIER : [1.3.6.1.4.1.22554.1.2.1]
            OCTET STRING : 3432E1414B6097343432E1414B6097343432
          CONTEXT SPECIFIC (1) :
            SEQUENCE :
              CONTEXT SPECIFIC (4) :
                SEQUENCE :
                  SET :
                    SEQUENCE :
                      OBJECT IDENTIFIER : countryName [2.5.4.6]
                      PRINTABLE STRING : 'US'
                    SET :
                      SEQUENCE :
                        OBJECT IDENTIFIER : stateOrProvinceName
                        UTF8 STRING : 'AZ'
                    SET :
                      SEQUENCE :
                        OBJECT IDENTIFIER : localityName [2.5.4.7]
                        UTF8 STRING : 'Phoenix'
                    SET :
                      SEQUENCE :
                        OBJECT IDENTIFIER : organizationName [2.5.4.10]
UTF8 STRING : 'XYC Company'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
    UTF8 STRING : 'Platform Certificate Issuer'

SET :
  SEQUENCE :
    OBJECT IDENTIFIER : commonName [2.5.4.3]
    UTF8 STRING : 'www.xyz.com'

INTEGER : 938928

CONTEXT Specific (6) :
  IA5 STRING : 'https://www.xyz.com/certs/938928.cer'

CONTEXT Specific (7) : 01

CONTEXT Specific (1) :
  IA5 STRING : 'https://www.xyzintegrators.com/platformidentifiers.xml'

CONTEXT Specific (2) :
  SEQUENCE :
    UTF8 STRING : 'TSC Enabled'
    UTF8 STRING : 'true'
    CONTEXT Specific (0) : 00

CONTEXT Specific (3) :
  IA5 STRING : 'https://www.xyzintegrators.com/platformproperties.xml'

SEQUENCE :
  OBJECT IDENTIFIER : [2.23.133.5.1.3]
  SET :
    SEQUENCE :
      IA5 STRING : 'https://www.xyzintegrators.com/PCRs_V2.xml'

SEQUENCE :
  OBJECT IDENTIFIER : certificatePolicies [2.5.29.32]
  OCTET STRING :
    SEQUENCE :
      OBJECT IDENTIFIER : [1.2.840.2983.3.1.2]
      SEQUENCE :
        OBJECT IDENTIFIER : cps [1.3.6.1.5.5.7.2.1]
        IA5 STRING : 'https://www.xyzintegrators.com/platcertcps.pdf'
        SEQUENCE :
          OBJECT IDENTIFIER : unotice [1.3.6.1.5.5.7.2.2]
          SEQUENCE :
            UTF8 STRING : 'TCG Trusted Platform Endorsement'

SEQUENCE :
  OBJECT IDENTIFIER : subjectAltName [2.5.29.17]
  OCTET STRING :
    SEQUENCE :
      CONTEXT Specific (4) :
        SEQUENCE :
          SET :
            OBJECT IDENTIFIER : [2.23.133.5.1.1]
            UTF8 STRING : 'Intel'
          SET :
            OBJECT IDENTIFIER : [2.23.133.5.1.2]
            SEQUENCE :
              OBJECT IDENTIFIER : [1.3.6.1.4.1.343]
              SET :
SEQUENCE :
  OBJECT IDENTIFIER : [2.23.133.5.1.4]
  UTF8 STRING : 'S2600KP'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.5]
    UTF8 STRING : 'H76962-350'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.6]
    UTF8 STRING : 'BQKP99940643'
SEQUENCE :
  OBJECT IDENTIFIER : [2.23.133.5.1.5]
  UTF8 STRING : 'H76962-350'
SET :
  SEQUENCE :
    OBJECT IDENTIFIER : [2.23.133.5.1.6]
    UTF8 STRING : 'BQKP99940643'
SEQUENCE :
  OBJECT IDENTIFIER : [2.5.29.55]
  OCTET STRING :
    SEQUENCE :
      CONTEXT SPECIFIC (0) :
      CONTEXT SPECIFIC (4) :
      SET :
      SET :
        OBJECT IDENTIFIER : countryName [2.5.4.6]
        PRINTABLE STRING : 'US'
      SET :
        OBJECT IDENTIFIER : stateOrProvinceName [2.5.4.8]
        UTF8 STRING : 'TX'
      SET :
        OBJECT IDENTIFIER : localityName [2.5.4.7]
        UTF8 STRING : 'Austin'
      SET :
        OBJECT IDENTIFIER : organizationName [2.5.4.10]
        UTF8 STRING : 'XYZ Integrator'
      SET :
        OBJECT IDENTIFIER : organizationalUnitName [2.5.4.11]
        UTF8 STRING : 'EK Certificate Issuer'
      SET :
        OBJECT IDENTIFIER : commonName [2.5.4.3]
        UTF8 STRING : 'www.xyzintegrators.com'
      SET :
        OBJECT IDENTIFIER : serialNumber [2.5.4.5]
        PRINTABLE STRING : '32873872'
SEQUENCE :
  OBJECT IDENTIFIER : authorityKeyIdentifier [2.5.29.35]
  OCTET STRING :
    SEQUENCE :
      CONTEXT SPECIFIC (0) : D46990260281D55E834B03976EAB8A9F8F84C983
SEQUENCE :
  OBJECT IDENTIFIER : authorityInfoAccess [1.3.6.1.5.5.7.1.1]
  OCTET STRING :
    SEQUENCE :
      OBJECT IDENTIFIER : ocsp [1.3.6.1.5.5.7.48.1]
      CONTEXT SPECIFIC (6) : 'https://www.xyzintegrators.com/ocsp'
SEQUENCE :
  OBJECT IDENTIFIER : cRLDistributionPoints [2.5.29.31]
  OCTET STRING :
SEQUENCE :
  SEQUENCE :
    CONTEXT SPECIFIC (0) :
      CONTEXT SPECIFIC (0) :
        CONTEXT SPECIFIC (6) :
          'https://www.xyzintegrators.com/platformcert.crl'
    SEQUENCE :
      OBJECT IDENTIFIER : [1.2.840.113549.1.1.11]
      NULL :
      BIT STRING UnusedBits:0 :
        6C772B5ED10A2C44DF64CF078BB9D937A843195AF7344ECB04CE01
        50CB6435AE267EA9ADDE64D8B8486409B627617F6CA9AD0A09898
        14D38E33BB2E774E3BB522B10B31F2F2930C3550E84DDEB7179EA9
        D898F20E11BFEB759C2F079DAF9467E2EFFAB5337BF15A3A25C7E2
        B9FA9312BB8EC19EDA55480BBAAF2335A78DC179920C4E4374AA16
        65895455E3D8552A6AE3F859B0D0107FC7F8582BF1053942AFE4EA
        73D95EC421B770A65F7123907AB17B9D63A009D0A560A667D2F8
        F5B3D744566EFC7AB3DF8423EDCACB419742B7EADE499B33AB099
        F82BF56324A07253881471F242BE6CE6DDEC68CD3931AF6EB1D84E
        C956145E5A0C1EFC99DFA327C0
      2249