IMS GLC Common Cartridge Profile: Overview

Version 1.2 Final Specification

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1 Overview

Common Cartridge is a set of open standards, freely available and without royalty, developed by a global industry consortium with over 80 voting members. These standards, if followed by content developers and learning platforms, enable strict interoperability between content and systems. They also support great flexibility in the type of digital content supported (content can actually be applications) and where such content is located (content and applications in a Common Cartridge can be distributed).

Common Cartridge solves two problems. The first is to provide a standard way to represent digital course materials for use in online learning systems so that such content can be developed in one format and used across a wide variety of learning systems (often referred to as course management systems, learning management systems, virtual learning environments, or instructional management systems). The second is to enable new publishing models for online course materials and digital books that are modular, web-distributed, interactive, and customizable. The focus of Common Cartridge is interactive collaborative learning situations, typically with a teacher, professor, or instructor involved in guiding learners. The learning materials can be online, offline, or both - a situation often referred to as hybrid or blended learning. Common Cartridge may be used to facilitate self-paced online learning as well, but Common Cartridge was developed specifically to enable support the online or blended interactive and collaborative courses and seminars that have become mainstream in the last 10 years for various types of education scenarios.

Use of Common Cartridge advances the state of digital content and systems for learning. It supports and enhances the dominant and proven paradigm for quality learning and educational experiences: Internet supported learning. Common Cartridge enhances learning experiences by enabling flexible combinations of learning resources in an assessment-rich and collaboration-rich environment. Common Cartridge also provides standards that are a base platform for interoperability, reusability, and customization of digital learning content, assessments, collaborative discussion forums, and a diverse set of learning applications. These standards support market efficiency and open up the market for greater choice in both content and platforms.

Common Cartridge specifies several things.

- A format for exchange of content between systems so that there is a common way to interpret what the digital learning content is and how it is organized (IMS Common Cartridge). The content is described in a manifest and the components that make up the manifest may be in the exchanged package or external to the package (referenced by URL).

- A standard for the metadata describing the content in the cartridge (IMS Learning Object Metadata) - Common Cartridge is extensible to allow other metadata schemas. New with Common Cartridge v1.2 is support for optional curriculum standards metadata. This metadata associates the cartridge, a resource, or question item with a specific curriculum standard identifier.

- A standard for test items, tests, and assessments (IMS Question and Test Interoperability). This standard allows learning systems to understand imported assessments as natively - so they can be manipulated (such as deciding what items are to be used and where in the flow of a course) as needed in the learning system. Common Cartridge includes a question bank (i.e., a QTI objectbank), offering instructors additional questions to those contained within the pre-configured assessments, which they can configure around the core material.

- A standard for launching and exchanging data with external applications so that they can be part of a single learning experience orchestrated through the learning system (IMS Basic Learning Tools Interoperability). These can be literally any type of application in any location, such as social networking, wiki, external assessment systems, adaptive tutors, varieties of web-based content libraries, or other learning systems.

- A controlled vocabulary to designate the intended use of web content in the cartridge. Web content should be ingested unmodified, but some learning platforms treat content with different intended uses in different ways. Common Cartridge v1.1 introduced the uses: "Lesson Plan" and "Syllabus". Common Cartridge v1.2 introduces the additional use "Assignment".

- A schema for populating online discussion forums for collaboration among students. This allows such forums to be pre-populated with potential exercises, discussion threads, and so forth.

- A schema for populating web links. This allows learning platforms to be pre-populated with links to relevant external resources.

- Authorization support has been optional for some time. As of Common Cartridge v1.2, the support for authorization that appeared in Common Cartridge v1.0 and v1.1 is being deprecated. The former authorization approach is no longer recommended. The current guidance is to use Basic Learning Tools Interopeability (BLTI) links as the method for accessing remote and secure content.

For more information on Common Cartridge, consult the Frequently Asked Questions section of the IMS GLC website: http://www.imsglobal.org/cc/ccfaqs.html.

1.1 References

[BLTI, 10] *IMS Basic Learning Tools Interoperability (BLTI) v1.0*, IMS GLC, May, 2010.

[DC, 03] *Dublin Core Metadata Element Set, Version 1.1* (ISO 15836:2003).

[IEEE LOM, 05] *IEEE LOM Schema Binding* (1484.12.3-2005).

[CC,11b] *IMS Common Cartridge Profile: Use Cases v1.2*, IMS GLC, October 2011.

[CC,11c] *IMS Common Cartridge Profile: Conformance v1.2*, IMS GLC, October 2011.

[CC,11d] *IMS Common Cartridge Profile: Appendices v1.2*, IMS GLC, October 2011.

[CC,11e] *IMS Common Cartridge Profile: Implementation v1.2*, IMS GLC, October 2011.

2 What's New in Common Cartridge 1.2

The Common Cartridge defines an open format for the distribution of rich, web-based content. It is designed to ensure the correct installation and operation of content across any Common Cartridge conformant platforms and tools. Version 1.0 was designed to offer existing implementations a low barrier to adoption of the Common Cartridge. Version 1.1 reflected feedback from market adoption resulting in, most significantly, the inclusion of Basic Learning Tools Interoperability. Version 1.2 focuses on the addition of optional curriculum standards metadata at the cartridge, resource, and question-item levels.

Modifications included in Version 1.2:

- Cartridge manifest metadata must refer to version '1.2.0'.
- Cartridge, Resource, and Item metadata can now include curriculum standards.
- Addition of another optional *intendeduse* attribute for Web Content Resources; initial attribute values introduced in CC v1.1 were: '*lessonplan'*, '*syllabus'* and *'unspecified'*. Version 1.2 addes the value 'assignment'.
- New namespace locations for all schemas.
- QTI items must include the cc_profile metadata.
- QTI Fill-In-The_Blank response processing will allow OR in addition to AND and NOT. This is not strictly something new, but rather OR was omitted incorrectly from CC v1.1.

2.1 Cartridge Metadata Specifying Version 1.2.0

The Common Cartridge must be described at the manifest level using meta-data according to the Common Cartridge profile of the IEEE LOM (loose binding) [IEEE LOM, 05], which describes the range of a mapping from the core elements of the Dublin Core specification v1.1 [DC, 03] to IEEE LOM. This application profile is restrictive. It uses the namespaces:

```
http://ltsc.ieee.org/xsd/imsccv1p1/LOM/manifest
http://ltsc.ieee.org/xsd/imsccv1p1/LOM/resource
```

which differ from the IEEE LOM namespaces. In contrast, metadata for resources (see below) need to use the original IEEE LOM namespace.

The metadata element as well as its schema and schema version element are required at the manifest level. They must be expressed as follows.

```
<metadata>
    <schema>IMS Common Cartridge</schema>
    <schemaversion>1.2.0</schemaversion>
      … metadata according to Common Cartridge profile of IEEE LOM …
</metadata>
```

2.2 Curriculum Standards Metadata

The primary distinguishing feature of Common Cartridge v1.2 is the inclusion of curriculum standards metadata for the cartridge, resource, or question item. The design of this support allows for at least the following:

- Any curriculum standard can be used, as long as it supports unique identifiers. The specific standard is referenced by the string-valued 'provider' element. In order to facilitate interoperability, IMS will maintain a list of registered providers, but custom, i.e. unregistered providers, are premitted.

- Any cartridge, resource, or question item can be associated with 0 or more curriculum standards from 1 or more providers.
- The provider value and GUID should be sufficient to unambiguously identify a standard.
- An optional GUID label is supported as this should make standards more readily appearant when examining the cartridge.

Possible Applications:

- A content creator aligns cartridge, resource, or question item to specific standards.
- An instructor or student seeks a cartridge that has material aligned to a standard with which they need additional sudy. A discovery tool might locate a cartridge that matches a specific standard or a similar one. Such a tool might be able to navigate standards relationships programmatically to suggest more general or more detailed content.
- An instructor or administrator seeks to assess how students performed on a test, broken down by results per standard. A learning platform could use alignment metadata to produce such reports.

An example of the standards metadata is:

```
…
<resource identifier="RES001" type="webcontent">
   <metadata>
      <curriculumStandardsMetadataSet xmlns=http://www.imsglobal.org/xsd/imscsmetadata_v1p0>
         <curriculumStandardsMetadata providerId=”ASN" region=”Georgia” version=”2011”>
            <setOfGUIDs>
               <labelledGUID>
                  <label>ASN PURL for Florida on subject "..." and level "..".</label>
                  <GUID>http://purl_org/ims/cck12ls/usa_florida_LA_4_2_1_5</GUID>
               </labelledGUID>
               <labelledGUID>
                  <label>ASN PURL for Florida on subject "..." and level "..".</label>
                  <GUID>http://purl_org/ims/cck12ls/usa_florida_LA_4_4_1_6</GUID>
               </labelledGUID>
            </setOfGUIDs>
         </curriculumStandardsMetadata>
      </curriculumStandardsMetadataSet>
   </metadata>
...
```

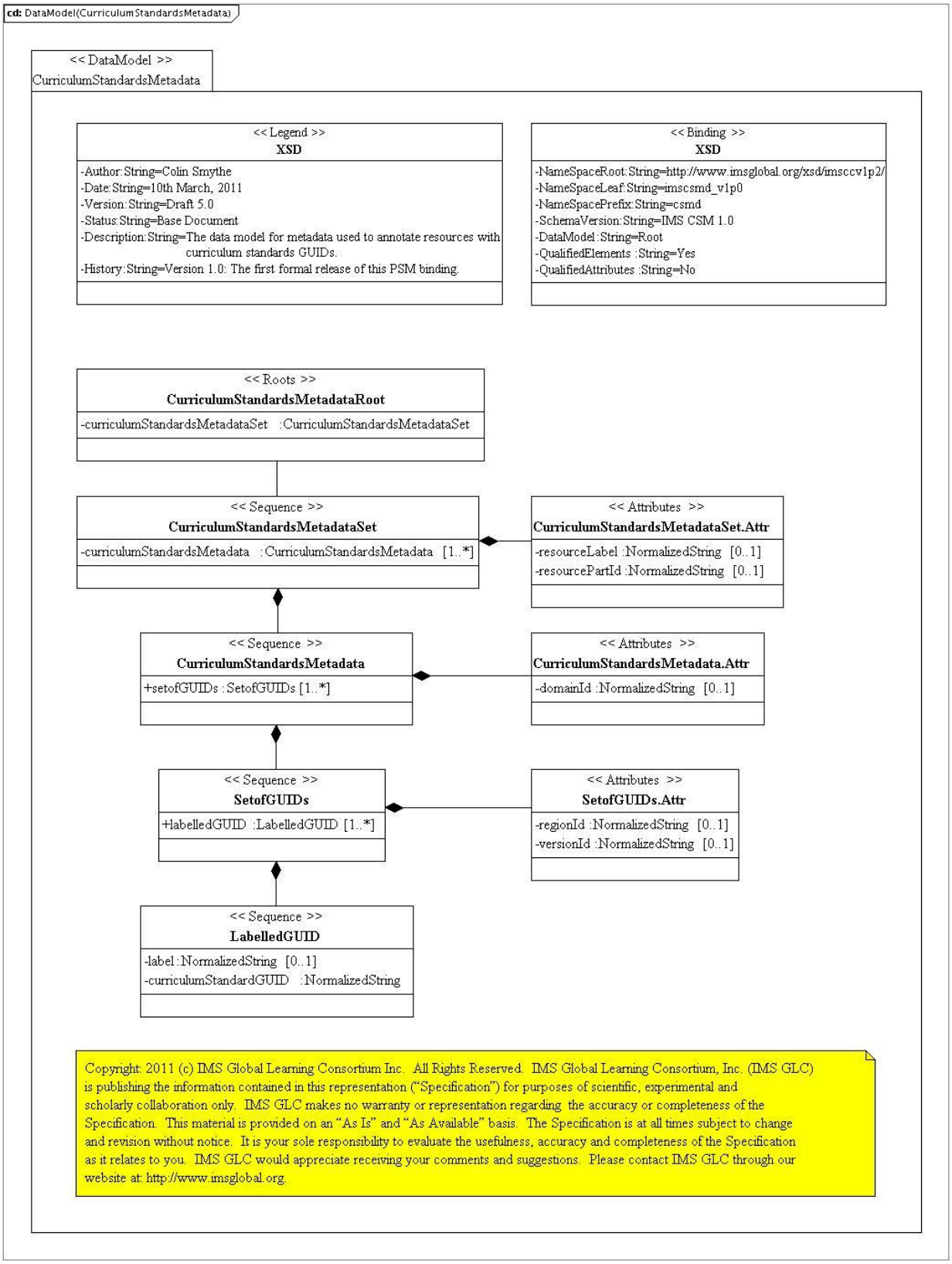

Figure 2.1 Data model representation of curriculm standards metadata.

2.3 Additional 'Assignment' Attribute Value for Cartridge Web Content Type

2.3.1 Cartridge Web Content Type

- Cartridge web content represents web content that may be referenced by any Learning Application Object in the cartridge.
- Cartridge web content is represented as a Resource object.
- It may be directly referenced from a folder Item object.
- The characteristic object Type must be the value 'webcontent'.
- *The characteristic object IntendedUse is optional and must be one of the values: 'assignment', 'lessonplan', 'syllabus', or 'unspecified'.*

About This Document

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List of Contributors

The following individuals contributed to the development of this document:

Name	**Organization**
Thor Anderson	Utah Valley University
David Gappa	Safari Montage
Jeff Kahn	IMS Global Learning Consortium
Lisa Mattson	IMS Global Learning Consortium
Chris Moffatt	Microsoft Inc.
Colin Smythe	IMS Global Learning Consortium
Claude Vervoort	Blackboard Inc.
Jennifer Whiting	Florida Virtual School
Yong-Sang Cho	KERIS

Revision History

Version No.	Release Date	Comments
Final v1.0	29 January 2009	The first formal release of the CC specification.
Public Draft v1.1	9 November 2010	The Public Draft of the CC v1.1 specification.
Revised Draft v1.1	6 December 2010	Revised Public Draft of the CC v1.1 specification.
Revised Draft v1.1	24 December 2010	Overview section added.
Final v1.1	10 January 2011	The Final CC v1.1 specification.
Final v1.2	1 October 2011	The Final CC v1.2 specification.