Sharable Content Object Reference Model (SCORM™) Version 1.2

Conformance Requirements

Version 1.2

February 15, 2002

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Advanced Distributed Learning
Sharable Content Object Reference Model
Version 1.2

Conformance Requirements

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Abstract

The SCORM Version 1.2 contains a great deal of technical information for a variety of audiences, but product vendors need to know which information is germane to making their learning products SCORM Version 1.2 conformant. This document collects and structures that information in a document that product vendors can reference in the creation of their products.

This document provides a summary of the test subjects that can be certified for conformance and the detailed conformance requirements outlined in the Sharable Content Object Reference Model (SCORM™). These requirements must be adhered to in order for Learning Management Systems, Sharable Content Objects (SCOs), Meta-data and/or Content Packages to be recognized as SCORM Version 1.2 Conformant. This document is technical by nature and is meant for LMS Vendors, Content Providers, Meta-data Creators and Content Package Creators.

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1. SECTION I (Page Number Style)

SECTION 1

Introduction

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1.1. Purpose

The Department of Defense (DoD) established the Advanced Distributed Learning (ADL) initiative to develop a DoD-wide strategy for using learning and information technologies to modernize education and training. In order to leverage existing practices, promote the use of technology-based learning and provide a sound economic basis for investment, the ADL initiative has defined high-level requirements for learning content such as content reusability, accessibility, durability and interoperability.

The Sharable Content Object Reference Model (SCORM™) Version 1.2[1], released in October 2001, defines a reference model for sharable learning content objects that meet ADL high-level requirements. The SCORM is an integrated collection of technical specifications that enable conforming Web-based learning products and learning content to interoperate.

It is highly recommended that the reader be familiar with the SCORM Version 1.2 before reading this document.

1.2. Scope

This document defines the requirements put forth by the SCORM Version 1.2 that must be implemented by Learning Management Systems (LMSs) and/or learning content in order to attain conformance with the SCORM Version 1.2.

This document outlines the conformance requirements for the following:

1. Learning Management Systems
2. Sharable Content Objects (SCOs)
3. Meta-data
    a. Asset Meta-data Application Profiles
    b. SCO Meta-data Application Profiles
    c. Content Aggregation Meta-data Application Profiles
4. Content Packages
    a. Resource Packaging Application Profiles
    b. Content Aggregation Packaging Application Profiles

1.3. Conformance Requirements Overview

This section contains tables that provide a high-level summary of the test subjects that can be certified for conformance to the SCORM Version 1.2. These tables list the conformance labels that are used to describe test subjects that are verified to be conformant to a particular feature or capability described in the SCORM along with a brief description of the requirements that must be implemented by the test subject in order to achieve the corresponding conformance label. The detailed requirements for conformance are specified in Section 2.

Learning Management System (LMS) Conformance Categories
SCORM Version 1.2 Run-Time Environment Conformant – Minimum *Conformance Label*: **LMS–RTE1** *Requirements Summary:* The LMS: • Is able to import and process a known conformant Content Aggregation Content Package as defined in Section 2.3 of the SCORM Content Aggregation Model[1], and • Is able to launch a known conformant Sharable Content Object (SCO) as defined in Section 2.1 of the SCORM Content Aggregation Model[1], and • Is able to launch an Asset as defined in Section 2.1 of the Content Aggregation Model[1], and • Provides and exposes an API Adapter as a Document Object Model (DOM) object and correctly implements all of the API functions as described in Section 3.3 of the SCORM Run-Time Environment[1], and • Correctly Implements support for all required SCORM Version 1.2 Run-time Environment Data Model Mandatory Elements as described in Section 3.4 of the SCORM Run-Time Environment[1]. *Note: If the LMS **incorrectly** implements one or more SCORM Version 1.2 Run-Time Environment Data Model Optional Elements, and does not implement any other optional data model elements correctly, then the LMS is still considered to be LMS-RTE1 conformant as long as the criteria above are met.*
SCORM Version 1.2 Run-Time Environment Conformant - Minimum with Some Optional Data Model Elements *Conformance Label*: **LMS–RTE2** *Requirements Summary:* The LMS: • Is "SCORM Version 1.2 Run-Time Environment Conformant – Minimum" and • Correctly implements one or more (not all) of the optional SCORM Version 1.2 Run-time Environment Data Model Optional Elements. *Note: If the LMS **incorrectly** implements one or more SCORM Version 1.2 Run-Time Environment Data Model Optional Elements, the LMS can still be considered LMS-RTE2 conformant as long as one or more other data model elements are implemented correctly.*
SCORM Version 1.2 Run-Time Environment Conformant - Minimum with All Optional Data Model Elements *Conformance Label*: **LMS–RTE3** *Requirements Summary:* The LMS: • Is "SCORM **Version** 1.2 Run-Time Environment Conformant – Minimum", and • Correctly implements **all** of the optional SCORM Version 1.2 Run-Time Environment Data Model Optional Elements.

Table 1.3.3a – Learning Management System Run-Time Environment Conformance Matrix

Sharable Content Object (SCO) Conformance Categories
SCORM Version 1.2 Run-Time Environment Conformant – Minimum *Conformance Label*: **SCO–RTE1** *Requirements Summary:* The SCO: • Can be launched by a known conformant LMS as defined in Section 3.2 of the SCORM Run-Time Environment[1], and • Searches for and finds an API Adapter as a Document Object Model (DOM) object, and • Invokes, at a minimum, the LMSInitialize() and LMSFinish() API functions as described in Section 3.3 of the SCORM Run-Time Environment[1], and • Any additional API functions that are invoked are called correctly.
SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Mandatory Data Model Elements *Conformance Label*: **SCO–RTE1+Mandatory** *Requirements Summary:* The SCO: • Is "SCORM Version 1.2 Run-Time Environment Conformant – Minimum", and • Implements support for correctly getting and/or setting one or more LMS **mandatory** SCORM Version 1.2 Run-Time Environment Data Model Elements. (Note LMS mandatory is defined as those data model elements that are required to be implemented by an LMS.) *Note: If the SCO **incorrectly** implements one or more mandatory SCORM Version 1.2 Run-Time Environment Data Model Elements, the SCO is non-conformant*
SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements *Conformance Label*: **SCO–RTE1+Optional** *Requirements Summary:* The SCO: • Is "SCORM Version 1.2 Run-Time Environment Conformant – Minimum", and • Implements support for correctly getting and/or setting one or more LMS **optional** SCORM Version 1.2 Run-Time Environment Data Model Elements. (Note LMS optional is defined as those data model elements that are optional for implementation by an LMS.) *Note: If the SCO **incorrectly** implements one or more optional SCORM Version 1.2 Run-Time Environment Data Model Elements, the SCO is non-conformant.*
SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional and Some Mandatory Data Model Elements *Conformance Label*: **SCO–RTE1+Mandatory+Optional** *Requirements Summary:* The SCO is: • "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Mandatory Data Model Elements", and • "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements".

Table 1.3.3b – Sharable Content Object Run-Time Environment Conformance Matrix

Content Aggregation, Sharable Content Object (SCO) and Asset Meta-data Conformance Categories

SCORM Version 1.2 Meta-data XML Conformant – Minimum

Conformance Label: **MD-XML1**

Requirements Summary: The Content Aggregation, Sharable Content Object (SCO) or Asset Meta-data XML Instance:

- Is a well formed XML Document, and
- Is valid against the IMS Learning Resource Metadata Version 1.2.1 XML Schema Definition (XSD), and
- Contains elements that conform to their corresponding specified data types, and
- Contains all mandatory document elements for the corresponding meta-data application profile (Content Aggregation, SCO or Asset) as described in Section 2.2 of the Content Aggregation Model[1], and
- Elements defined as having restricted vocabularies adhere to all defined vocabularies as defined in Section 2.2 of the Content Aggregation Model[1].

SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements

Conformance Label: **MD-XML1+Optional**

Requirements Summary: The Content Aggregation, Sharable Content Object (SCO) or Asset Meta-data XML Instance:

- Is "SCORM Version 1.2 Meta-data XML Conformant – Minimum", and
- Contains one or more elements that are designated as optional meta-data elements for the corresponding meta-data application profile (Content Aggregation, SCO or Asset) as described in Section 2.2 of the Content Aggregation Model[1], except for extensions.

*Note: If the Meta-data instance **incorrectly** implements one or more elements that are designated as optional document elements for the corresponding meta-data application profile (Content Aggregation, SCO or Asset) as described in Section 2.2 of the Content Aggregation Model[1], the Meta-data Instance is non-conformant.*

SCORM Version 1.2 Meta-data XML Conformant – Minimum with Extensions

Conformance Label: **MD-XML1+Extensions**

Requirements Summary: The Content Aggregation, Sharable Content Object (SCO) or Asset Meta-data XML Instance:

- Is "SCORM Version 1.2 Meta-data XML Conformant – Minimum", and
- Contains one or more extensions. The extensions used must be well-formed and valid according to the corresponding vendor provided XML Schema Definition (XSD).

Content Aggregation, Sharable Content Object (SCO) and Asset Meta-data Conformance Categories
SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements and Extensions *Conformance Label*: **MD-XML1+Optional+Extensions** *Requirements Summary:* The Content Aggregation, Sharable Content Object (SCO) or Asset Meta-data XML Instance: • Is "SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements", and • Is "SCORM Version 1.2 Meta-data XML Conformant – Minimum with Extensions".

Table 1.3.3c – Meta-Data XML Conformance Matrix

Content Package (Resource Package and Content Aggregation Package) Conformance Categories
SCORM Version 1.2 Content Packaging XML Conformant *Conformance Label*: **ADLCP-PIF1** *Requirements Summary*: The Content Package: • If the Content Package is contained in a Package Interchange File (PIF), the PIF shall be compatible with PKZIP Version 2.04g, and • The Manifest shall be placed at the root of the Package (e.g. ZIP archive or CD-ROM), and • The Manifest shall be named "imsmanifest.xml", and • All supporting control documents shall be placed at the root of the PIF or root directory, and • The "imsmanifest.xml" shall be well-formed XML, and • The "imsmanifest.xml" shall validate against the IMS Content Packaging XML Schema Definition (XSD) Version 1.1.2, and • The "imsmanifest.xml" shall validate against the ADL Content Packaging XML Schema Definition (XSD) Version 1.2, and • The Content Package shall contain at least one Sharable Content Object or Asset (as defined in the SCORM Content Aggregation Model[1], and • All Sharable Content Object (SCO) learning resources identified in the "imsmanifest.xml" shall be at a minimum: SCO-RTE1, and • All Meta-data used with the "imsmanifest.xml" shall adhere to the appropriate SCORM Meta-data Application Profile requirements.

Table 1.3.3d – Content Package Conformance Matrix

1.3.1. Learning Management System Test Overview

The purpose of the LMS Run-Time Environment Test is to verify that a test subject LMS implements the conformance requirements as outlined in Section 2. The LMS Run-Time Environment Test uses a set of two test courses that are to be loaded or imported into the LMS. The Sharable Content Objects (SCOs) that comprise the test course(s) exercise the various aspects of the LMS's implementation of the SCORM Version 1.2 Run-Time Environment. Based on the LMS Run-Time Environment Conformance Requirements, the LMS may or may not be found to be SCORM Version 1.2 Conformant in terms of the conformance categories that are outlined in Table 1.3.3a above.

The ability to import a Content Aggregation Content Package using a SCORM Packaging Interchange File (PIF) is a prerequisite for performing the LMS Run-Time Environment Test. It is necessary that the LMS have the ability to do this using an IMS Manifest in order to attain conformance to any of the LMS Run-Time Environment conformance categories.

1.3.2. Sharable Content Object Test Overview

The purpose of the SCO Run-Time Environment Test is to verify that a test subject SCO implements the conformance requirements as outlined in Section 2. The SCO Run-Time Environment Test software simulates an LMS that is "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with All Optional Data Model Elements" (LMS-RTE3). The test subject SCO is launched by the test software and is expected to search for and find the LMS's API Adapter. The test software then services and audits any API function calls that are made by the SCO. As the test suite operator executes the SCO's functionality (simulates the learner experience), the test software audits the SCORM Version 1.2 Run-Time Environment Data Model elements that are implemented by the SCO.

The conformance category assigned to the SCO is dependent upon the SCO's ability to perform the minimum API interaction with the LMS and then, additionally, whether the SCO implements any mandatory or optional data model elements, where mandatory or optional are defined in terms of the LMS' obligation for implementation (i.e. LMS mandatory or LMS optional). The SCO may or may not be found to be SCORM Version 1.2 Conformant in terms of the conformance categories that are outlined in Table 1.3.3b above.

It is important to recognize that certain SCOs may be very simple in nature, offering a single logical path of execution from start to finish. Other SCOs may be more complex, having several possible paths of execution that are conditional, based on user performance or user personalization variables, for example. For this reason it is not possible to programmatically test all conditional branches of the SCOs using a "black box" testing approach. Furthermore, without placing specific constraints on implementation technologies, it is not feasible to inspect the implementation details of the

SCO to validate conformance, as would be required using a "white box" testing approach.

ADL has chosen a subjective approach that involves a compromise between the "black box" and "white box" approaches. When testing a SCO that contains conditional logic that involves the potential for the SCO to interact with an LMS using data model element sets that vary across the conditional paths, or to execute varying sets of API functions, the path for the test is left to the discretion of the test suite operator. The test suite operator may, if testing multiple SCOs from a single organization, elect to employ different strategies across multiple SCOs, or even within one single SCO.

For this reason, the SCO Run-Time Environment Test does not guarantee that the SCO correctly implements the SCORM Version 1.2 Run-Time Environment in all cases, but only within the bounds of the scenario that was used for an instance of testing.

It is also important to realize that the SCO Run-Time Environment Test does not guarantee that the SCO is without defects. The test software does not validate that all aspects of the SCO implementation are accurate and/or correct. For example, it is quite possible that a SCO can be found SCORM Version 1.2 Conformant within one of the previously mentioned categories and still contain run-time defects (e.g. broken links, JavaScript run-time errors, etc.), and/or not be instructionally sound.

1.3.3. Meta-data Test Overview

The purpose of the Meta-data test is to determine if a test subject Asset, SCO or Content Aggregation Meta-data instance is SCORM Version 1.2 Conformant in terms of the conformance categories that are outlined in Table 1.3.3c above. The test checks the Meta-data instance to determine if it:

1. Validates against the IMS Learning Resource Meta-data Schema Version 1.2.1[2]. Please note that the IMS Learning Resource Meta-data Version 1.2.1 XML Schema (XSD) is used for testing.
2. Implements all mandatory elements.
3. Adheres to specified data types and restricted vocabularies.
4. Does or does not implement any optional elements.
5. Implements any optional elements correctly.
6. Does or does not implement extensions.

1.3.4. Content Packaging Test Overview

The purpose of the SCORM Version 1.2 Content Packaging test is to verify that a test subjects Content Package implements the conformance requirements as outlined in Section 2. The Content Packaging Test Suite verifies both types of the SCORM Version 1.2 Content Packaging Application Profiles:

- Resource Packages
- Content Aggregation Packages

The Content Packaging Test Suite verifies that the Content Package is valid according to the following high-level requirements. All of these aspects will be tested and verified to determine the Conformance Label for the Content Package:

1. Validates against the IMS Content Packaging XML Schema Version 1.1.2[3].
2. Validates against the ADL SCORM XML Schema Version 1.2.
3. Validates that any extensions used by the Content Package are defined and valid according to a vendor supplied XML Schema.
4. Verifies that the IMS Manifest provided with each package is valid according to the requirements outlined in Section 2.1.4.
5. Verifies that all Meta-data identified in the Content Package is valid according to the requirements outlined in Section 2.1.3.
6. Verifies that all SCOs identified in the Content Package are valid according to the requirements outlined in Section 2.1.2.

1.4. Conformance Verification Methodology

Where possible, conformance requirements are validated in an automated fashion, using the SCORM Version 1.2 Conformance Test Suite Version 1.2. It is not feasible to validate the implementation of all detailed conformance requirements using the automated test suite. Some requirements are validated through manual inspection or observation by the test operator (auditor).

2. SECTION II (Page Number Style)

SECTION 2

Conformance Requirements

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2.1. Introduction

This section describes the detailed requirements that must be implemented by a test subject in order to attain conformance with the SCORM Version 1.2. The Conformance Requirements are broken up into following sub-sections:

- Section 2.1.1 Learning Management Systems (LMS) Conformance Requirements
- Section 2.1.2 Sharable Content Object (SCO) Conformance Requirements
- Section 2.1.3 Meta-data Conformance Requirements
- Section 2.1.4 Content Packaging Conformance Requirements

2.1.1. LMS Run-Time Environment Conformance Requirements

In order to become certified as SCORM Version 1.2 Run-Time Environment Conformant, an LMS is required to support the Run-time Environment that is described in the SCORM Run-Time Environment[1]. There are three main components of the SCORM Run-time Environment:

1. Launch
2. Application Program Interface (API)
3. Data Model

The conformance requirements for LMS Run-Time Environment Conformance are broken down into the following sections to address each of the Run-time environment components individually. They are as follows:

- Section 2.1.1.1 describes the Launch related conformance requirements
- Section 2.1.1.2 describes the API related conformance requirements
- Section 2.1.1.3 describes the Data Model related conformance requirements

As described in the Conformance Matrix in Section 1, the LMS Run-Time Environment Conformance requirements are defined in terms of three distinct categories. The three categories are mutually exclusive. An LMS, if conformant, will be designated as conformant within one and only one of these categories. The categories are:

- SCORM Version 1.2 Run-time Environment Conformant – Minimum (LMS–RTE1)
- SCORM Version 1.2 Run-time Environment Conformant – Minimum with Some Optional Data Model Elements (LMS–RTE2)
- SCORM Version 1.2 Run-time Environment Conformant – Minimum with All Optional Data Model Elements (LMS–RTE3)

All three of the above categories of LMS Run-Time Environment Conformance require that the LMS implement all Launch and API requirements described in Section 2.1.1.1 and Section 2.1.1.2 respectively.

The conformance requirements for the Run-time Environment Data Model, described in Section 2.1.1.3, vary across the three conformance categories. The specific requirements for each of the three categories of conformance are described in the table in Section 2.1.1.3.

2.1.1.1 LMS Run-Time Environment Launch Requirements

It is the responsibility of the LMS to determine which learning resource (Asset or SCO) is to be launched. The LMS may launch the learning resource automatically in an adaptive fashion or alternatively, may provide a user driven navigation control such as a menu, a table of contents, or back/next buttons. The only requirement specified in this regard, at this time, is that the LMS be able to launch a learning resource. The LMS must launch the Assets or known conformant SCOs, and do so in the order in which the learning resources are defined within the IMS Manifest (unless prerequisites are defined, which could override the sequential ordering).

The LMS shall adhere to the requirements in the following table in order to be considered LMS Run-Time Environment Conformant in any of the three conformance categories (LMS-RTE1, LMS-RTE2 or LMS-RTE3).

Req. No.	Conformance Requirement
1	The LMS shall be able to launch a known SCORM Run-time Environment conformant learning resource.
1.1	The LMS shall be able to launch a known SCORM Conformant SCO identified in an IMS Manifest.
1.2	The LMS shall be able to launch an Asset identified in an IMS Manifest.
2	The LMS shall launch learning resources using the HTTP protocol.
3	The LMS shall be capable of importing a content aggregation by use of a SCORM Conformant Content Package.
4	The LMS shall launch the learning resources defined in the IMS Manifest (imsmanifest.xml) based on the <resource> referenced by the <item> that is found in the content structure (<organization>).
5	The LMS shall launch a learning resource in a Document Object Model (DOM) frameset child window, or new browser (DOM) window relative to the LMS' controlling browser (DOM) window.
6	The LMS shall launch learning resources that are SCOs such that one and only one SCO is available to the user. There may only be one "currently executing" SCO.

Table 2.1.1.1a LMS Run-Time Environment Launch Conformance Requirements

2.1.1.2 LMS Run-Time Environment API Requirements

The SCORM Run-Time Environment API provides a consistent means by which SCOs can communicate and exchange data with LMSs. The LMS is required to implement an API Adapter that supports the functions defined in the SCORM Run-Time Environment[1].

The LMS shall adhere to the requirements in the following table in order to be considered LMS Run-Time Environment Conformant in any of the three conformance categories (LMS-RTE1, LMS-RTE2 or LMS-RTE3).

Req. No.	Conformance Requirement
1	The LMS shall expose the required API Adapter as a Document Object Model (DOM) Object named "API" (case sensitive) in the DOM parent or opener window or recursively, in the parent window hierarchy of the parent or opener window of the launched SCO.
2	The LMS shall implement the API Adapter such that it's implementation is accessible (by a SCO) using ECMAScript (JavaScript).
3	The LMS shall provide for the ability for a SCO to call the defined, required API Adapter functions using the defined API Adapter object interface convention (e.g. var cmibooleanResult = API.Function (parameters) using JavaScript.
4	The LMS shall provide implementations of each of the required API Adapter functions, according to the following specified function signatures (parameters and return values): • CMIBoolean = API.LMSInitialize("") • CMIBoolean = API.LMSFinish("") • CMIBoolean = API.LMSCommit(""); • CMIBoolean = API.LMSSetValue(parameter, value) • String = API.LMSGetValue(parameter) • String = API.LMSGetLastError() • String = API.LMSGetErrorString(errorString) • String = API.LMSGetDiagnostic(parameter)
5	The LMS shall provide an implementation for the API Adapter function LMSInitialize
5.1	LMSInitialize shall accept only an empty string parameter ("").
5.2	LMSInitialize shall return a CMIBoolean string value: • A value of "true" indicates that the function completed successfully. • A value of "false" indicates that the function did not complete successfully.
5.3	LMSInitialize shall set the API Error Code to "0" (No error) if it completes successfully and return "true".
5.4	LMSInitialize shall set the API Error Code to "101" (General exception) if it does not complete successfully for any reason that is not specified by a more specific or appropriate error code and return "false".
5.5	If LMSInitialize is called with anything other than an empty string ("") parameter, LMSInitialize shall return a value of "false" and set API Error Code to "201" (Invalid

Req. No.	Conformance Requirement
	argument error).
5.6	LMSInitialize() shall return false and set the API Error Code to "101" (General exception) if called more than once by a launched SCO.
6	The LMS shall provide an implementation for the API Adapter function LMSFinish.
6.1	LMSFinish shall accept only an empty string parameter (""").
6.2	LMSFinish shall return a CMIBoolean string value. • A value of "true" shall indicate that the function completed successfully. • A value of "false" shall indicate that the function did not complete successfully. If possible, the LMS shall also set an appropriate API Error Code if LMSFinish does not succeed.
6.3	LMSFinish shall set the API Error Code to "0" (No error) if it completes successfully and return "true".
6.4	LMSFinish shall set the API Error Code to "101" (General exception) if it does not complete successfully for any reason that is not specified by a more specific or appropriate error code and return "false".
6.5	If LMSFinish is called with anything other than an empty string ("") parameter, LMSFinish shall return a value of "false" and set API Error Code to "201" (Invalid argument error).
6.6	The call to LMSFinish by a SCO shall only succeed if the SCO previously called LMSInitialize and the call to LMSInitialize was successful. If the LMS is not initialized, LMSFinish shall fail, returning a value of "false" and setting the API Error Code to "301" (Not initialized).
6.7	LMSFinish shall cause any previously set data model elements that were not persisted by the LMS to be persisted. (This applies to LMS implementations that may cache data model element values, as opposed to implementations that persist data model element values at the time of LMSSetValue execution.)
6.8	The LMS shall ignore any API Function calls made after a LMSFinish() call.
7	The LMS shall provide an implementation for the API Adapter function LMSCommit
7.1	LMSCommit shall accept only an empty string parameter ("").
7.2	LMSCommit shall return a CMIBoolean string value: • A value of "true" shall indicate that the function completed successfully. • A value of "false" shall indicate that the function did not complete successfully. If possible, the LMS shall also set an appropriate API Error Code if LMSCommit does not succeed.
7.3	LMSCommit shall set the API Error Code to "0" (No error) if it completes successfully and return "true".
7.4	LMSCommit shall set the API Error Code to "101" (General exception) if it does not complete successfully for any reason that is not specified by a more specific or appropriate error code and return "false".

Req. No.	Conformance Requirement
7.5	If LMSCommit is called with anything other than an empty string ("") parameter, LMSCommit shall return a value of "false" and set API Error Code to "201" (Invalid argument error).
7.6	The call to LMSCommit by a SCO shall only succeed if the SCO previously called LMSInitialize and the call to LMSInitialize was successful. If the LMS is not initialized, LMSCommit shall fail, returning a value of "false" and setting the API Error Code to "301" (Not initialized).
7.7	LMSCommit shall cause any previously set data model elements that have not been persisted to be persisted. (If the LMS caches data model elements set by the SCO using LMSSetValue, the LMSCommit function shall persist any currently cached data model values.)
8	The LMS shall provide an implementation for the API Adapter function LMSGetValue
8.1	LMSGetValue shall accept a single string parameter containing the name of the data model element requested by the SCO.
8.2	The LMS shall set the API Error Code based on the following scenarios:
8.2.1	If the data model element requested is a valid mandatory SCORM Run-Time Environment Data Model element (e.g. cmi.core.student_name) that is readable, the LMS shall set the API Error Code to "0" (No Error) and return a string containing the appropriate data value. The returned value shall conform to the specifications of its corresponding data type and/or restricted vocabulary list.
8.2.2	If the data model element requested is a valid mandatory SCORM Run-Time Environment Data Model element (e.g. cmi.core.exit) that is write-only, the LMS shall set the API Error Code to "404" (Element is write only) and return an empty string (""). • An error code of "201" (Invalid argument error) is also acceptable in this situation, however "404" is preferred.
8.2.3	If the data model element requested is a valid optional SCORM Run-Time Environment Data Model element (e.g. cmi.core.lesson_mode) that is readable, the LMS shall adhere to the following: • If the LMS supports the optional element, then the LMS shall set the API Error Code to "0" (No Error) and return a string containing the appropriate data value. The returned value shall conform to the specifications of its corresponding data type and/or restricted vocabulary list. • If the LMS does not support the optional element, then the LMS shall set the API Error Code to "401" (Not Implemented) and return an empty string (""). *An error code of "201" (Invalid Argument) is also acceptable in this situation, however "401" is preferred.*
8.2.4	If the data model element requested is a valid optional SCORM Run-Time Environment Data Model element (e.g. cmi.interactions.0.id) that is write-only, the LMS shall adhere to the following: • If the LMS supports the optional element, then the LMS shall set the API Error Code to "404" (Element is write only) and return an empty string ("").

Req. No.	Conformance Requirement
	• If the LMS does not support the optional element, then the LMS shall set the API Error Code to "401" (Not implemented) and return an empty string (""). *An error code of "201" (Invalid argument error) and "404" (Element is write only) are also acceptable in this situation, however "401" is preferred.*
8.2.5	If the data model element requested is a not a member of the SCORM Run-Time Environment Data Model (data model element does not begin with "cmi.") then the LMS shall adhere to the following requirements: • If the LMS supports the requested data model element, then the LMS shall return the requested value and set the API Error Code to "0" (No Error). • If the LMS does not support the requested data model element, then the LMS shall set the API Error Code to "401" (Not implemented error) and return an empty string (""). *An error code of "201" (Invalid argument error) is also acceptable, however "401" is preferred.*
8.2.6	If the data model element requested is a invalid member of the SCORM Run-Time Environment Data Model (data model element begins with "cmi." but is not a member of the CMI data model – e.g. "cmi.core.foo") then the LMS shall adhere to the following requirements: • The LMS shall set the API Error Code to "201" (Invalid argument error) and return an empty string (""). *An error code of "401"(Not implemented error) is also acceptable, however "201" is preferred.*
8.2.7	If LMSGetValue() is called with a SCORM Run-Time Environment Data Model element that is valid, but is also a list element, and the index provided for the element is invalid (element in the position has not be set by the SCO), then LMSGetValue shall return and empty string ("") and set API Error Code "201" (Invalid argument error). • If the SCORM Run-Time Environment Data Model element is optional and not supported by the LMS, then the LMS shall set the API Error Code to "401" (Not implemented error) and return an empty string (""). *An error code of "201" (Invalid argument error) is acceptable in this situation, however "401" is preferred.*
8.3	LMSGetValue shall return a string value.
8.4	If LMSGetValue is called with a parameter that includes a "._children" extension and the SCORM Run-Time Environment Data Model element specified does not support _children, then LMSGetValue shall return an empty string ("") and set API Error Code "202" (Element cannot have children). • An API Error Code of "201" (Invalid argument error) is also acceptable, however "202" is preferred. • If the SCORM Run-Time Environment Data Model element requested is optional and not supported by the LMS, then the API Error Code of "401" (Not implemented) is preferred.
8.5	If LMSGetValue is called with a parameter that includes a "._count" extension, and the SCORM Run-Time Environment Data Model element is not an array, then LMSGetValue shall return an empty string ("") and set API Error Code "203" (Element

Req. No.	Conformance Requirement
	not an array - cannot have count). • An API Error Code "201" (Invalid argument error) is also acceptable, however "203" is preferred. • If the SCORM Run-Time Environment Data Model element requested is optional and not supported by the LMS, then the API Error Code of "401" (Not implemented) is preferred.
8.6	LMSGetValue shall set the API Error Code to "0" (No error) if it completes successfully.
8.7	LMSGetValue shall set the API Error Code to "101" (General Exception) if it does not complete successfully for any reason that is not specified by a more specific or appropriate error code.
8.8	The call to LMSGetValue by a SCO shall only succeed if the SCO previously called LMSInitialize and the call to LMSInitialize was successful. If the LMS is not initialized, LMSGetValue shall fail, returning an empty string ("") and setting the API Error Code to "301" (Not initialized).
9	The LMS shall provide an implementation for the API Adapter function LMSSetValue.
9.1	LMSSetValue shall accept two string parameters (LMSSetValue(parameter, value))
9.1.1	The first string parameter is the fully qualified, case sensitive string containing the name of the data model element requested to be set by the SCO.
9.1.2	The second parameter is the string containing the value of the data model element that the SCO is requesting to be set.
9.2	LMSSetValue shall return a CMIBoolean string value. • A value of "true" shall indicate that the function completed successfully. • A value of "false" shall indicate that the function did not complete successfully.
9.3	LMSSetValue shall function as follows:
9.3.1	If the data model element parameter provided by the SCO corresponds to a valid mandatory SCORM Run-Time Environment data model element that is writeable, and the value provided by the SCO is of the appropriate specified data type, then LMSSetValue shall set (cache in LMS component/service memory or persist to physical storage) the value for the corresponding data model element, set the API Error Code to "0" and return a string containing "true".
9.3.2	If the data model element parameter provided by the SCO corresponds to a valid mandatory SCORM Run-Time Environment data model element that is read-only, then LMSSetValue shall set the API Error Code to "403" (Element is read only) and return a string containing "false". • An error code of "201" (Invalid argument error) is also acceptable in this situation, however "403" is preferred.
9.3.3	If the data model element requesting to be set is a valid optional SCORM Run-Time Environment Data Model element that is writeable, the LMS shall adhere to the

Req. No.	Conformance Requirement
	following: • If the LMS supports the optional element and the value provided by the SCO is of the appropriate specified data type, then the LMS shall set (cache in LMS component/service memory or persist to physical storage) the value for the corresponding data model element, set the API Error Code to "0" and return a string containing "true". • If the LMS does not support the optional element, then the LMS shall set the API Error Code to "401" (Not implemented error) and return a string with a value of "false". *An error code of "201" (Invalid argument error) is also acceptable in this situation, however "401" is preferred.*
9.3.4	If the data model element requested to be set is a valid optional SCORM Run-Time Environment Data Model element that is read-only, then the LMS shall adhere to the following: • If the LMS supports the optional element then the LMS shall set the API Error Code to "403" (Element is read only) and return a string with a value of "false". • If the LMS does not support the optional element, then the LMS shall set the API Error Code to "401" (Not implemented error) and return a string with a value of "false". *An error code of "201" (Invalid argument error) and "403" (Element is read only) are also acceptable in this situation however "401" is preferred.*
9.3.5	If the data model element requested is not a member of the SCORM Run-Time Environment Data Model (data model element does not begin with "cmi"), then the LMS shall adhere to the following requirements: • If the LMS supports the data model element that is being requested to be set, then the LMS shall set (cache in LMS component/service memory or persist to physical storage) the value for the corresponding data model element, set the API Error Code to "0" and return a string containing "true". • If the LMS does not support the data model element being requested to be set, then the LMS shall set the API Error Code to "401" (Not implemented error) and return a string with a value of "false". *An error code of "201" (Invalid argument error) is also acceptable, however "401" is preferred.*
9.3.6	If LMSSetValue is called with a SCORM Run-Time Environment Data model element parameter that includes "._children", "._count", or "._version", then the LMS shall adhere to the following: • The LMS shall set the API Error Code to "402" (Invalid set value, element is a keyword) and return a string with a value of "false". An API Error Code of "201" is also acceptable in this situation, however "402" is preferred. • An API Error Code to "403" (Element is read only) is acceptable in this situation, however a "402" is preferred. • If the data model element is an optional data model element that is not supported by the LMS then the preferred error code shall be set to "401" (Not implemented error). *However an error code of "201" (Invalid argument*

Req. No.	Conformance Requirement
	error) and "402" (Invalid set value, element is a keyword) are also acceptable in this situation, however "401" is preferred.
9.3.7	If LMSSetValue is called with a data model element value that does not conform to the specified data type for the corresponding SCORM Run-Time Environment Data Model element, then the LMS shall adhere to the following: • If the SCORM Run-Time Environment Data Model element is mandatory (must be supported by the LMS) then the LMS shall set the API Error Code to "405" (Incorrect Data Type) and return a string with a value of "false". *An error code of "201" (Invalid argument error) is acceptable in this situation, however "405" is preferred.* • If the SCORM Run-Time Environment Data Model element is optional and supported by the LMS, then the LMS shall set the API Error Code to "405" (Incorrect Data Type) and return a string with a value of "false". *An error code of "201" (Invalid argument error) is acceptable in this situation, however "405" is preferred.* • If the SCORM Run-Time Environment Data Model element is optional and not supported by the LMS, then the LMS shall set the API Error Code to "401" (Not implemented error) and return a string with a value of "false". *An error code of "201" (Invalid argument error) or "405" (Incorrect Data Type) are acceptable in this situation, however "401" is preferred.*
9.3.8	If LMSSetValue() is called with a SCORM Run-Time Environment Data Model element that is valid, but is also a list element, the index provided for the element must be less than or equal to the current number of elements in the list. If the index is greater than the current number of elements, then LMSSetValue shall return false and set API Error Code "201" (Invalid argument error). (List elements are zero based and the list must be sequential. For example, if the "cmi.objectives" list contains 2 elements, an attempt to set cmi.objectives.5.id would result in LMSSetValue returning "false" and setting API Error Code "201" (Invalid argument error). • If the SCORM Run-Time Environment Data Model element is optional and not supported by the LMS, then the LMS shall set the API Error Code to "401" (Not implemented error) and return a string with a value of "false". *An error code of "201" (Invalid argument error) is acceptable in this situation, however "401" is preferred.* *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.3.9	If the data model element requested to be set is an invalid member of the SCORM Run-Time Environment Data Model (data model element begin with "cmi." but is not a member of the CMI data model – e.g. "cmi.core.foo") then the LMS shall adhere to the following requirements: • The LMS shall set the API Error Code to "201" (Invalid argument error) and return a string with a value of "false". *An error code of "401"(Not implemented error) is also acceptable, however "201" is preferred.*
9.3.10	LMSSetValue shall set the API Error Code to "0" (No error) if it completes successfully and return "true".

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>successfully and return “true”.</td></tr>
<tr><td>9.3.11</td><td>LMSSetValue shall set the API Error Code to “101” (General exception) if it does not complete successfully for any reason that is not specified by a more specific or appropriate error code and return “false”.</td></tr>
<tr><td>9.3.12</td><td>The call to LMSSetValue by a SCO shall only succeed if the SCO previously called LMSInitialize and the call to LMSInitialize was successful. If the LMS is not initialized, LMSSetValue shall fail, returning an empty string (“”) and setting the API Error Code to “301” (Not initialized).</td></tr>
<tr><td>10</td><td>The LMS shall provide an implementation for the API Adapter function LMSGetLastError</td></tr>
<tr><td>10.1</td><td>LMSGetLastError shall accept no parameters.</td></tr>
<tr><td>10.2</td><td>LMSGetLastError shall return a string value representing the API Error Code set by the most previously called API Adapter function. The return value shall be one of the following API Error Codes:
“0” (No error)
“101” (General exception)
“201” (Invalid argument error)
“202” (Element cannot have children)
“203” (Element not an array – cannot have count)
“301” (Not initialized)
“401” (Not implemented error)
“402” (Invalid set value, element is a keyword)
“403” (Element is read only)
“404” (Element is write only)
“405” (Incorrect Data Type)</td></tr>
<tr><td>10.3</td><td>The LMS shall not change the current API Error Code when the LMSGetLastError API Adapter function is invoked.</td></tr>
<tr><td>10.4</td><td>If no API Adapter functions are called prior to a call to LMSGetLastError (including LMSInitialize), then LMSGetLastError shall return “0” (No error).

Note that the purpose of LMSGetLastError is to return the error code set by the previously called API Adapter function. If there has been no previous successful call to LMSInitialize, then the error code remains at its initial state value, “0” (No error).</td></tr>
<tr><td>11</td><td>The LMS shall provide an implementation for the API Adapter function LMSGetErrorString.</td></tr>
<tr><td>11.1</td><td>LMSGetErrorString shall accept a string parameter containing a valid API Error Code.</td></tr>
<tr><td>11.2</td><td>LMSGetErrorString shall return a string value representing the string description of the API Error Code parameter provided. The return value shall be the API Error Description that corresponds to the provided API Error Code parameter as follows (not case sensitive):

<table>
<tr><th>Error Code</th><th>Return Value API Error Description String</th></tr>
<tr><td>“0”</td><td>“No error”</td></tr>
<tr><td>“101”</td><td>“General exception”</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>
<table>
<tr><td>“101”</td><td>“General exception”</td></tr>
<tr><td>“201”</td><td>“Invalid argument error”</td></tr>
<tr><td>“202”</td><td>“Element cannot have children”</td></tr>
<tr><td>“203”</td><td>“Element not an array – cannot have count”</td></tr>
<tr><td>“301”</td><td>“Not initialized”</td></tr>
<tr><td>“401”</td><td>“Not implemented error”</td></tr>
<tr><td>“402”</td><td>“Invalid set value, element is a keyword”</td></tr>
<tr><td>“403”</td><td>“Element is read only”</td></tr>
<tr><td>“404”</td><td>“Element is write only”</td></tr>
<tr><td>“405”</td><td>“Incorrect Data Type”</td></tr>
</table>
</td></tr>
<tr><td>11.3</td><td>The LMS shall not change the current API Error Code when the LMSGetErrorString API Adapter function is invoked.</td></tr>
<tr><td>11.4</td><td>If no API Adapter functions are called prior to a call to LMSGetErrorString (including LMSInitialize), then LMSGetErrorString shall return “No error”.

Note that the purpose of LMSGetErrorString is to return the string representation of the error code set by the previously called API Adapter function. If there has been no previous successful call to LMSInitialize, then the error code remains at its initial state value, “0” (No error).</td></tr>
<tr><td>12</td><td>The LMS shall provide an implementation for the API Adapter function LMSGetDiagnostic.</td></tr>
<tr><td>12.1</td><td>LMSGetDiagnostic shall accept a string parameter containing either a valid API Error Code, or an empty string (“”)</td></tr>
<tr><td>12.2</td><td>If LMSGetDiagnostic is called with a string parameter that contains a valid API Error Code, then the LMSGetDiagnostic function shall return a string value representing the LMS specific description corresponding to the API Error Code parameter provided.</td></tr>
<tr><td>12.3</td><td>If LMSGetDiagnostic is called with an empty string parameter (“”), then the LMSGetDiagnostic function shall return a string value representing the LMS specific description corresponding to the API Error Code that is currently set.</td></tr>
<tr><td>12.4</td><td>The LMS shall not change the current API Error Code when the LMSGetDiagnostic API Adapter function is invoked.</td></tr>
<tr><td>12.5</td><td>If no API Adapter functions are called prior to a call to LMSGetDiagnostic (including LMSInitialize), then LMSGetDiagnostic shall return LMS Diagnostic information (if provided by the LMS) associated with the “0”, No Error, API Error Code.

Note that the purpose of LMSGetDiagnostic is to return the LMS proprietary Diagnostic information associated with an error code set by the previously called API Adapter function. If there has been no previous successful call to LMSInitialize, then the error code remains at its initial state value, “0” (No error).</td></tr>
</table>

Table 2.1.1.2a LMS Run-Time Environment API Conformance Requirements

2.1.1.3 LMS Run-Time Environment Data Model Conformance Requirements

The SCORM Version 1.2 Run-Time Environment Data Model is derived from the AICC CMI Data Model[4]. The data model is described in Section 3.4.4 of the SCORM Run-Time Environment[1].

In the SCORM Version 1.2, the Run-time Environment Data Model is tightly coupled to the API. The data model describes the information that may be exchanged between LMSs and SCOs via the API. Future versions of the SCORM may include additional or alternative communication mechanisms and/or data models. For this reason, the following data model conformance requirements are written such that they can stand-alone independently from the communication mechanism.

Conformance to the SCORM Version 1.2 Run-Time Environment API requirements is a prerequisite for conformance to the SCORM Version 1.2 Run-Time Environment Data Model requirements, since there is currently only one communication mechanism supported by the SCORM.

The following list provides a description of the key terms that are used in the requirements tables in this section to describe the LMS Run-time Environment Data Model implementation requirements:

- **Mandatory** – The LMS must implement the data model element. For example, in the requirement: "The LMS shall implement the cmi.core.student_id element (mandatory)", "mandatory" means that the LMS must implement the cmi.core.student_id element in order to be considered "LMS Run-Time Environment Conformant – Minimum" (LMS-RTE1).

- **Optional** – The LMS is not required to implement this element in order to be considered "LMS Run-Time Environment Conformant – Minimum" (LMS-RTE1).

- **Read-only** – The LMS must implement this element such that a SCO may only get (read) the value using the LMSGetValue API Adapter function. If the SCO attempts to set (write) a value for this element using the LMSSetValue API Adapter function, the LMS behaves according to the LMS Run-Time Environment API Conformance requirements and sets the appropriate API Error Code.

- **Write-only** – The LMS must implement this element such that a SCO may only set (write) a value for this element using the LMSSetValue API Adapter function. If the SCO attempts to get (read) the value for this element using the LMSGetValue API Adapter function, the LMS behaves according to the LMS Run-Time Environment API Conformance requirements and sets the appropriate API Error Code.

- **Read/write** – The LMS must implement this element such that a SCO may both set (write) and get (read) a value for this element using the LMSSetValue and LMSGetValue API Adapter functions, respectively.

- **Provide** – This signifies that the LMS must return a value that adheres to the stated requirement to the SCO. For example, the requirement: "Provide the value as a string of type CMIString255" means that when a SCO calls the LMSGetValue API Adapter function for the particular element, that the return value must conform to the CMI data type specified in the requirement.

- **Accept** – This signifies that the LMS must only accept data from the SCO that conforms to the stated requirement. For example, the requirement: "Accept only values for this element that are of type CMIVocabulary (Status)" signifies that the LMS must only accept values for the stated element that belong to the CMIVocabulary (Status) vocabulary. If the SCO attempts to set a value for the element that does not adhere to the CMIVocabulary (Status) vocabulary, then the LMS behaves according to the LMS Run-Time Environment API Conformance requirements and sets the appropriate API Error Code.

- **Initialize** – This signifies that the initial value provided to the SCO by the LMS should be determined based on the stated requirement.

This section contains two requirements tables. The first table, Table 2.1.1.3a, contains the requirements that must be met in order for the LMS to achieve certification to the three different LMS Run-Time Environment Conformance Categories:

- "SCORM Version 1.2 Run-Time Environment Conformant – Minimum" (LMS-RTE1)
- "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements" (LMS-RTE2)
- "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with All Optional" (LMS-RTE3)

The second table, Table 2.1.1.3b, contains the SCORM Run-Time Environment Data Model Conformance requirements for conformant implementation of all of the data model elements. For example, requirement 3 states which data model elements must be implemented correctly by the LMS in order for the LMS to be certified "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with All Optional" (LMS-RTE3). The requirements in Table 2.1.1.3b specify how those data model elements are to be implemented correctly.

Req. No.	Conformance Requirement
1	The LMS shall correctly implement support for all API Adapter functions as well as for **all** of the following mandatory SCORM Run-Time Environment Data Model elements in order to be considered "SCORM Version 1.2 Run-Time Environment Conformant – Minimum" (LMS-RTE1): • cmi.core._children • cmi.core.student_id • cmi.core.student_name • cmi.core.lesson_location • cmi.core.credit

Req. No.	Conformance Requirement
	• cmi.core.lesson_status • cmi.core.entry • cmi.core.score._children • cmi.core.score.raw • cmi.core.total_time • cmi.core.exit • cmi.core.session_time • cmi.suspend_data • cmi.launch_data
2	The LMS shall correctly implement support for all API Adapter functions as well as for all of the mandatory SCORM Run-Time Environment Data Model elements as defined in requirement 1 and in addition, the LMS shall correctly implement support **one or more** of the following optional SCORM Run-Time Environment Data Model elements in order to be considered "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements" (LMS-RTE2): • cmi.core.score.max • cmi.core.score.min • cmi.core.lesson_mode • cmi.comments • cmi.comments_from_lms • cmi.objectives._children • cmi.objectives._count • cmi.objectives.n.id • cmi.objectives.n.score._children • cmi.objectives.n.score.raw • cmi.objectives.n.score.max • cmi.objectives.n.score.min • cmi.objectives.n.status • cmi.student_data._children • cmi.student_data.mastery_score • cmi.student_data.max_time_allowed • cmi.student_data.time_limit_action • cmi.student_preference._children • cmi.student_preference.audio • cmi.student_preference.language • cmi.student_preference.speed • cmi.student_preference.text • cmi.interactions._children • cmi.interactions._count • cmi.interactions.n.id • cmi.interactions.n.objectives._count • cmi.interactions.n.objectives.n.id • cmi.interactions.n.time • cmi.interactions.n.type • cmi.interactions.n.correct_responses._count • cmi.interactions.n.correct_responses.n.pattern

Req. No.	Conformance Requirement
	• cmi.interactions.n.weighting • cmi.interactions.n.student_response • cmi.interactions.n.result • cmi.interactions.n.latency
3	The LMS shall correctly implement support for all API Adapter functions as well as for all of the mandatory SCORM Run-Time Environment Data Model elements as defined in requirement 1 and in addition, the LMS shall implement support for **all** of the following optional SCORM Run-Time Environment Data Model elements in order to be considered "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with All Optional" (LMS-RTE3): • cmi.core.score.max • cmi.core.score.min • cmi.core.lesson_mode • cmi.comments • cmi.comments_from_lms • cmi.objectives._children • cmi.objectives._count • cmi.objectives.n.id • cmi.objectives.n.score._children • cmi.objectives.n.score.raw • cmi.objectives.n.score.max • cmi.objectives.n.score.min • cmi.objectives.n.status • cmi.student_data._children • cmi.student_data.mastery_score • cmi.student_data.max_time_allowed • cmi.student_data.time_limit_action • cmi.student_preference._children • cmi.student_preference.audio • cmi.student_preference.language • cmi.student_preference.speed • cmi.student_preference.text • cmi.interactions._children • cmi.interactions._count • cmi.interactions.n.id • cmi.interactions.n.objectives._count • cmi.interactions.n.objectives.n.id • cmi.interactions.n.time • cmi.interactions.n.type • cmi.interactions.n.correct_responses._count • cmi.interactions.n.correct_responses.n.pattern • cmi.interactions.n.weighting • cmi.interactions.n.student_response • cmi.interactions.n.result • cmi.interactions.n.latency

Table 2.1.1.3a LMS Run-Time Environment Data Model Conformance Requirements by Conformance Category

The following contains the SCORM Run-Time Environment Data Model Conformance requirements for conformant implementation of all of the data model elements.

Req. No.	Conformance Requirement
1	The LMS shall implement the ***cmi.core*** category
1.1	The LMS shall implement the ***cmi.core._children*** element (**mandatory**). The LMS shall:
1.1.1	Implement this element as a **read-only** element.
1.1.2	Provide the value as a string of type **CMIString255**.
1.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
1.2	The LMS shall implement the ***cmi.core.student_id*** element (**mandatory**). The LMS shall:
1.2.1	Implement this element as a **read-only** element.
1.2.2	Provide the value as a string of type **CMIIdentifier**.
1.2.3	Initialize this element as the value that is used by the LMS to uniquely identify the student, based on the student registration information within the LMS.
1.2.4	Provide the value that is used by the LMS to uniquely identify the student.
1.3	The LMS shall implement the ***cmi.core.student_name*** element (**mandatory**). The LMS shall:
1.3.1	Implement this element as a **read-only** element.
1.3.2	Initialize this element using the name of the student, based on the student registration information within the LMS.
1.3.3	Provide the value as a string of type **CMIString255**.
1.3.4	Provide the value of the name of the student, based on the student registration information within the LMS.
1.3.5	Provide the student name in the following format: Last name, first name and middle initial and where the last name and first name are separated by a comma. Spaces in the name must be honored.
1.4	The LMS shall implement the ***cmi.core.lesson_location*** element (**mandatory**). The LMS shall:
1.4.1	Implement this element as a **read/write** element.

Req. No.	Conformance Requirement
1.4.2	Initialize this element to an empty string (“”).
1.4.3	Provide the value as a string of type **CMIString255**.
1.4.4	Accept values for this element that are of type **CMIString255**.
1.5	The LMS shall implement the ***cmi.core.credit*** element (**mandatory**). The LMS shall:
1.5.1	Implement this element as a **read-only** element.
1.5.2	Initialize the value of this element to: • “credit” if the student is taking the SCO for credit. • “no-credit” if the student is not taking the SCO for credit.
1.5.3	Provide the value as a string of type **CMIVocabulary (Credit)**.
1.5.4	Determine whether or not the student is taking the course for credit or no-credit based on the student registration process and/or data managed by the LMS.
1.6	The LMS shall implement the ***cmi.core.lesson_status*** element (**mandatory**). The LMS shall:
1.6.1	Implement this element as a **read/write** element.
1.6.2	Initialize this element to “not attempted”.
1.6.3	Provide the value as a **CMIVocabulary (Status)**.
1.6.4	Accept only values for this element that are of type **CMIVocabulary (Status)**.
1.6.5	Not accept **CMIVocabulary (Status)** value of “not attempted” for this element from a SCO. (This value can only be set by the LMS).
1.6.6	If the value for this element is not set to “incomplete” by the SCO, then the LMS shall re-evaluate and change the value based on the following: • If there is a mastery score in the Manifest, the LMS can change the status to either passed or failed depending on the student's score (cmi.core.score.raw) compared to the mastery score. • If there is no mastery score in the Manifest, and the SCO sets a score (cmi.core.score.raw) and the lesson_status (cmi.core.lesson_status) then the LMS shall not override the SCO determined status. • If the student is taking the SCO for no-credit, (cmi.core.credit = “no-credit”) there is no change to the lesson_status, with one exception. If the lesson_mode (cmi.core.lesson_mode) is "browse", the lesson_status may change to "browsed" even if the cmi.core.credit is set to no-credit.
1.7	The LMS shall implement the ***cmi.core.entry*** element (**mandatory**).

Req. No.	Conformance Requirement
	The LMS shall:
1.7.1	Implement this element as a **read-only** element.
1.7.2	Initialize the value of this element to: • "ab-initio" upon the first launch of the SCO. • "resume" upon subsequent launches of the SCO, if the SCO set the cmi.core.exit data model element to "suspend". • "" (empty string) if the SCO set the cmi.core.exit to anything other than "suspend" or did not set the value at all.
1.7.3	Provide the value as a string of type **CMIVocabulary (Entry)**.
1.8	The LMS shall implement the ***cmi.core.score*** category (**mandatory**).
1.8.1	The LMS shall implement the ***cmi.core.score._children*** element (**mandatory**). The LMS shall:
1.8.1.1	Implement this element as a **read-only** element.
1.8.1.2	Provide the value as a string of type **CMIString255**.
1.8.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
1.8.2	The LMS shall implement the ***cmi.core.score.raw*** element (**mandatory**). The LMS shall:
1.8.2.1	Implement this element as a **read/write** element.
1.8.2.2	Initialize this element to an empty string ("").
1.8.2.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).
1.8.2.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank.**
1.8.2.4.1	Accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with a value of "false".*
1.8.3	The LMS shall implement the ***cmi.core.score.max*** element **(optional)**. The LMS shall:
1.8.3.1	Implement this element as a **read/write** element.
1.8.3.2	Initialize this element to an empty string ("").
1.8.3.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).

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1.8.3.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank**.
1.8.3.4.1	If implemented, accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with a value of "false".*
1.8.4	The LMS shall implement the ***cmi.core.score.min*** element **(optional)**. The LMS shall:
1.8.4.1	Implement this element as a **read/write** element.
1.8.4.2	Initialize this element to an empty string ("").
1.8.4.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).
1.8.4.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank**.
1.8.4.4.1	If implemented, accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with a value of "false".*
1.9	The LMS shall implement the ***cmi.core.total_time*** element (**mandatory**). The LMS shall:
1.9.1	Implement this element as a **read-only** element.
1.9.2	Initialize this element to a string containing ("0000:00:00.00")
1.9.3	Provide the value as a string of type **CMITimespan**.
1.9.4	Provide this value as the accumulation of time spent by the student in the SCO by adding the value of the cmi.core.session_time element set by the SCO during each access of the SCO to the value of this element, if provided by the SCO.
1.9.5	Upon processing an LMSFinish("") call, the LMS shall take the last cmi.core.session_time that the SCO set (if there was a set) and accumulate this time to the cmi.core.total_time.
1.10	The LMS shall implement the ***cmi.core.lesson_mode*** element **(optional)**. The LMS shall:
1.10.1	Implement this element as a **read-only** element
1.10.2	Initialize the value of this element to one of the following values, based on the capabilities of the LMS: • "browse" • "normal"

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	• "review"
1.10.3	Provide the value as a string of type **CMIVocabulary (Mode)**.
1.11	The LMS shall implement the ***cmi.core.exit*** element (**mandatory**). The LMS shall:
1.11.1	Implement this element as a **write-only** element.
1.11.2	Accept the value only as a string of type **CMIVocabulary (Exit)**
1.12	The LMS shall implement the ***cmi.core.session_time*** element (**mandatory**). The LMS shall:
1.12.1	Implement this element as a **write-only** element.
1.12.2	Accept the value only as a string of type **CMITimespan**.
1.12.3	Accumulate the last provided LMSSetValue() call to the cmi.core.total_time, upon receiving an LMSFinish("") call. For example, if a SCO calls LMSSetValue() multiple times for the cmi.core.session_time, the LMS shall only add the last value sent from the SCO to the cmi.core.total_time.
2	The LMS shall implement the ***cmi.suspend_data*** element (**mandatory**). The LMS shall:
2.1	Implement this element as a **read/write** element.
2.2	Initialize this element to an empty string ("").
2.3	Provide the value as a string of type **CMIString4096**.
2.4	Accept values for this element that are of type **CMIString4096**.
3	The LMS shall implement the ***cmi.launch_data*** element (**mandatory**). The LMS shall:
3.1	Implement this element as a **read-only** element.
3.2	Initialize the value of this element as follows: • The LMS shall use the Manifest element <adlcp:datafromlms> for initialization of the cmi.launch_data element. The <adlcp:datafromlms> element is a child element of an <item>. If the <item> references a SCO leaning resource, the LMS shall initialize the cmi.launch_data data model element with the value provided in the <adlcp:datafromlms>. • If no value is provided for the <adlcp:datafromlms> in the Manifest, then the LMS shall initialize the cmi.launch_data to an empty string ("").
3.3	Provide the value as a string of type **CMIString4096**.
4	The LMS shall implement the ***cmi.comments*** element **(optional)**.

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	The LMS shall:
4.1	Implement this element as a **read/write** element.
4.2	Initialize this element to an empty string ("") prior to the first entry into the SCO. (Note: first entry is defined as the first entry by a single student, including all sessions.)
4.3	Provide the value as a string of type **CMIString4096**.
4.4	Accept values for this element that are of type **CMIString4096**.
4.5	Append each valid value set by the SCO to the values previously set by the SCO. (This data model element accumulates the comments set by the SCO, as opposed to overwriting previously set values).
5	The LMS shall implement the ***cmi.comments_from_lms*** element **(optional)**. The LMS shall:
5.1	Implement this element as a **read-only** element.
5.2	Initialize this element using the value entered into the LMS (if supported by the LMS).
5.3	Provide the value as a string of type **CMIString4096**.
6	The LMS shall implement the ***cmi.objectives*** category **(optional)**.
6.1	The LMS shall implement the ***cmi.objectives._children*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
6.1.1	Implement this element as a **read-only** element.
6.1.2	Provide the value as a string of type **CMIString255**.
6.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
6.2	The LMS shall implement the ***cmi.objectives._count*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
6.2.1	Implement this element as a **read-only** element.
6.2.2	Provide the value as a string of type **CMIInteger**.
6.2.3	Provide the number of entries in the cmi.objectives list that is maintained by the LMS for the corresponding SCO.
6.3	The LMS shall implement the ***cmi.objectives.n.id*** element **(optional)**. The LMS shall:
6.3.1	Implement this element as a **read/write** element.

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6.3.2	Initialize this element to an empty string (“”) prior to the first entry into the SCO.
6.3.3	Provide the value as a string of type **CMIIdentifier**
6.3.4	Accept values for this element that are of type **CMIIdentifier**
6.3.5	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
6.4	The LMS shall implement the ***cmi.objectives.n.score*** category **(optional)**.
6.4.1	The LMS shall implement the ***cmi.objectives.n.score._children*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
6.4.1.1	Implement this element as a **read-only** element.
6.4.1.2	Provide the value as a string of type **CMIString255**.
6.4.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
6.4.1.4	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
6.4.2	The LMS shall implement the ***cmi.objectives.n.score.raw*** element **(optional)**. The LMS shall:
6.4.2.1	Implement this element as a **read/write** element.
6.4.2.2	Initialize this element to an empty string (“”).
6.4.2.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).
6.4.2.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank**.
6.4.2.4.1	If implemented, accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to “405” (Incorrect Data Type) and return a CMIBoolean with a value of “false”.*
6.4.2.5	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based.*

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	Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.
6.4.3	The LMS shall implement the ***cmi.objectives.n.score.max*** element **(optional)**. The LMS shall:
6.4.3.1	Implement this element as a **read/write** element.
6.4.3.2	Initialize this element to an empty string ("").
6.4.3.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).
6.4.3.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank**.
6.4.3.4.1	If implemented, accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with a value of "false".*
6.4.3.5	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
6.4.4	The LMS shall implement the ***cmi.objectives.n.score.min*** element **(optional)**. The LMS shall:
6.4.4.1	Implement this element as a **read/write** element.
6.4.4.2	Initialize this element to an empty string ("").
6.4.4.3	Provide the value as a string of type **CMIDecimal or CMIBlank** (if no value is set).
6.4.4.4	Accept values for this element that are of type **CMIDecimal** or **CMIBlank**.
6.4.4.4.1	If implemented, accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with a value of "false".*
6.4.4.5	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
6.5	The LMS shall implement the ***cmi.objectives.n.status*** element **(optional)**.

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	The LMS shall:
6.5.1	Implement this element as a **read/write** element.
6.5.2	Initialize this element to "not attempted".
6.5.3	Provide the value as a **CMIVocabulary (Status)**.
6.5.4	Accept only values for this element that are of type **CMIVocabulary (Status)**.
6.5.5	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
7	The LMS shall implement the ***cmi.student_data*** category **(optional)**.
7.1	The LMS shall implement the ***cmi.student_data._children*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
7.1.1	Implement this element as a **read-only** element.
7.1.2	Provide the value as a string of type **CMIString255**.
7.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
7.2	The LMS shall implement the ***cmi.student_data.mastery_score*** element **(optional)**. The LMS shall:
7.2.1	Implement this element as a **read-only** element.
7.2.2	Initialize the value of this element as follows: • The LMS shall use the Manifest element <adlcp:masteryscore> to initialization of the cmi.student_data.mastery_score element. The <adlcp:masteryscore> element is a child element of an <item>. If the <item> references a SCO leaning resource, the LMS shall initialize the cmi.student_data.mastery_score data model element (if implemented by the LMS) with the value provided in the <adlcp:masteryscore>. • If no value is provided for the <adlcp:masteryscore> in the Manifest, then the LMS shall initialize the cmi.student_data.mastery_score, if implemented by the LMS, to an empty string ("").
7.2.3	Provide the value as a string of type **CMIDecimal** or **CMIBlank**.
7.2.3.1	Accept only values, of type CMIDecimal, that are normalized between 0 and 100. *If an LMS receives a value that is not normalized between 0 and 100, the LMS should set the API Error Code to "405" (Incorrect Data Type) and return a CMIBoolean with*

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	a value of "false".
7.3	The LMS shall implement the ***cmi.student_data.max_time_allowed*** element **(optional)**. The LMS shall:
7.3.1	Implement this element as a **read-only** element.
7.3.2	Initialize the value of this element as follows: • The LMS shall use the Manifest element <adlcp:maxtimeallowed> to initialization of the cmi.student_data.max_time_allowed element. The <adlcp:maxtimeallowed> element is a child element of an <item>. If the <item> references a SCO leaning resource, the LMS shall initialize the cmi.student_data.max_time_allowed data model element (if implemented by the LMS) with the value provided in the <adlcp:maxtimeallowed>. • If no value is provided for the <adlcp:maxtimeallowed> in the Manifest, then the LMS shall initialize the cmi.student_data.max_time_allowed, if implemented by the LMS, to an empty string (“”).
7.3.3	Provide the value as a string of type **CMITimespan** or **CMIBlank**.
7.4	The LMS shall implement the ***cmi.student_data.time_limit_action*** element **(optional)**. The LMS shall:
7.4.1	Implement this element as a **read-only** element.
7.4.2	Initialize the value of this element as follows: • The LMS shall use the Manifest element <adlcp:timelimitaction> to initialization of the cmi.student_data.time_limit_action element. The <adlcp:timelimitaction> element is a child element of an <item>. If the <item> references a SCO leaning resource, the LMS shall initialize the cmi.student_data.time_limit_action data model element (if implemented by the LMS) with the value provided in the <adlcp:timelimitaction>. • If no value is provided for the <adlcp:timelimitaction> in the Manifest, then the LMS shall initialize the cmi.student_data.time_limit_action to an empty string (“continue,no message”).
7.4.3	Provide the value as a string of type **CMIVocabulary (Time Limit Action)** or **CMIBlank**.
8	The LMS shall implement the ***cmi.student_preference*** category **(optional)**.
8.1	The LMS shall implement the ***cmi.student_preference._children*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
8.1.1	Implement this element as a **read-only** element.
8.1.2	Provide the value as a string of type **CMIString255**.

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8.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
8.2	The LMS shall implement the ***cmi.student_preference.audio*** element **(optional)**. The LMS shall:
8.2.1	Implement this element as a **read/write** element.
8.2.2	Initialize this element to "0" (zero) prior to the first entry into the SCO.
8.2.3	Provide the value as a string of type **CMISInteger**.
8.2.4	Accept values for this element that are of type **CMISInteger** between the range of –1 to 100.
8.3	The LMS shall implement the ***cmi.student_preference.language*** element **(optional)**. The LMS shall:
8.3.1	Implement this element as a **read/write** element.
8.3.2	Initialize this element to an empty string ("") prior to the first entry into the SCO.
8.3.3	Provide the value as a string of type **CMIString255**.
8.3.4	Accept values for this element that are of type **CMIString255**.
8.4	The LMS shall implement the ***cmi.student_preference.speed*** element **(optional)**. The LMS shall:
8.4.1	Implement this element as a **read/write** element.
8.4.2	Initialize this element to "0" (zero) prior to the first entry into the SCO.
8.4.3	Provide the value as a string of type **CMISInteger**.
8.4.4	Accept values for this element that are of type **CMISInteger** between the range of –100 to 100.
8.5	The LMS shall implement the ***cmi.student_preference.text*** element **(optional)**. The LMS shall:
8.5.1	Implement this element as a **read/write** element.
8.5.2	Initialize this element to "0" (zero) prior to the first entry into the SCO.
8.5.3	Provide the value as a string of type **CMISInteger**.
8.5.4	Accept values for this element that are of type **CMISInteger** of –1, 0, or 1.
9	The LMS shall implement the ***cmi.interactions*** category **(optional)**.
9.1	The LMS shall implement the ***cmi.interactions._children*** element (**mandatory** if any of the defined elements of the category are supported by the LMS).

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	The LMS shall:
9.1.1	Implement this element as a **read-only** element.
9.1.2	Provide the value as a string of type **CMIString255**.
9.1.3	Provide the value as a comma-separated list of all element names in this category that are supported by the LMS.
9.2	The LMS shall implement the ***cmi.interactions._count*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
9.2.1	Implement this element as a **read-only** element.
9.2.2	Provide the value as a string of type **CMIInteger**.
9.2.3	Provide the number of entries in the cmi.interactions list that is maintained by the LMS for the corresponding SCO.
9.3	The LMS shall implement the ***cmi.interactions.n.id*** element **(optional)**. The LMS shall:
9.3.1	Implement this element as a **write-only** element.
9.3.2	Provide the value as a string of type **CMIIdentifier**.
9.3.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.4	The LMS shall implement the ***cmi.interactions.n.objectives*** element **(optional)**. The LMS shall:
9.4.1	The LMS shall implement the ***cmi.interactions.n.objectives._count*** element **(optional)**. The LMS shall:
9.4.1.1	Implement this element as a **read-only** element.
9.4.1.2	Provide the value as a string of type **CMIInteger**.
9.4.1.3	Provide the number of entries in the cmi.interactions.n.objectives list that is maintained by the LMS for the corresponding SCO.
9.4.2	The LMS shall implement the ***cmi.interactions.n.objectives.n.id*** element **(optional)**. The LMS shall:
9.4.2.1	Implement this element as a **write-only** element.

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9.4.2.2	Accept values for this element that are of type **CMIIdentifier.**
9.4.2.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.5	The LMS shall implement the ***cmi.interactions.n.time*** element **(optional)**. The LMS shall:
9.5.1	Implement this element as a **write-only** element.
9.5.2	Accept values for this element that are of type **CMITime.**
9.5.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.6	The LMS shall implement the ***cmi.interactions.n.type*** element **(optional)**. The LMS shall:
9.6.1	Implement this element as a **write-only** element.
9.6.2	Accept values for this element that are of type **CMIVocabulary (Interaction)**
9.6.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.7	The LMS shall implement the ***cmi.interactions.n.correct_responses*** element **(optional)**. The LMS shall:
9.7.1	The LMS shall implement the ***cmi.interactions.n.correct_responses._count*** element (**mandatory** if any of the defined elements of the category are supported by the LMS). The LMS shall:
9.7.1.1	Implement this element as a **read-only** element.
9.7.1.2	Provide the value as a string of type **CMIInteger**.
9.7.1.3	Provide the number of entries in the cmi.interactions.n.correct_responses list that is maintained by the LMS for the corresponding SCO.
9.7.1.4	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list.

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	elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.7.2	The LMS shall implement the ***cmi.interactions.n.correct_responses.n.pattern*** element **(optional)**. The LMS shall:
9.7.2.1	Implement this element as a **write-only** element.
9.7.2.2	Provide the value as a string of type **CMIFeedback**.
9.7.2.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.8	The LMS shall implement the ***cmi.interactions.n.weighting*** element **(optional)**. The LMS shall:
9.8.1	Implement this element as a **write-only** element.
9.8.2	Accept values for this element that are of type **CMIDecimal.**
9.8.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.9	The LMS shall implement the ***cmi.interactions.n.student_response*** element **(optional)**. The LMS shall:
9.9.1	Implement this element as a **write-only** element.
9.9.2	Accept values for this element that are of type **CMIFeedback.**
9.9.3	Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list. *ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.*
9.10	The LMS shall implement the ***cmi.interactions.n.result*** element **(optional)**. The LMS shall:

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td>9.10.1</td><td>Implement this element as a write-only element.</td></tr>
<tr><td>9.10.2</td><td>Accept values for this element that are of type CMIVocabulary (Result).</td></tr>
<tr><td>9.10.3</td><td>Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list.

ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.</td></tr>
<tr><td>9.11</td><td>The LMS shall implement the cmi.interactions.n.latency element (optional).

The LMS shall:</td></tr>
<tr><td>9.11.1</td><td>Implement this element as a write-only element.</td></tr>
<tr><td>9.11.2</td><td>Accept values for this element that are of type CMITimespan.</td></tr>
<tr><td>9.11.3</td><td>Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list.

ADL Note: Lists in the SCORM Run-Time Environment Data Model are 0-based. Therefore, if the list contains 4 items the last position in the list has the index of 3. The total size of the list is therefore the index of the first/next available empty position.</td></tr>
<tr><td>10</td><td>The LMS shall implement the defined SCORM Run-time Environment Data Model data types and restricted vocabularies as follows:</td></tr>
<tr><td>10.1</td><td>CMIBlank: Value shall hold an empty string (“”).</td></tr>
<tr><td>10.2</td><td>CMIBoolean: Value shall contain a restricted vocabulary of two words – “true” and “false”.</td></tr>
<tr><td>10.3</td><td>CMIDecimal: Value shall contain a decimal number. The decimal may have a decimal point.</td></tr>
<tr><td>10.4</td><td>CMIFeedback: Value shall contain data corresponding to the specific CMIVocabulary Interaction type defined for the interaction (i.e. cmi.interactions.n.type) as follows:
<table>
<tr><th>Type</th><th>Description</th></tr>
<tr><td>true-false</td><td>Feedback is one of the following single characters: “0”,”1”,”t”, or “f”.</td></tr>
<tr><td>choice</td><td>Feedback is one or more single characters separated by a comma. Legal characters are “0” to “9” and “a” to “z”. If all the characters must be chosen to assume the feedback is correct, then the comma-separated list must be surrounded by curly brackets: { }</td></tr>
<tr><td>fill-in</td><td>Any alphanumeric string up to 255 characters in length. After the first letter spaces are significant.</td></tr>
<tr><td>numeric</td><td>CMIDecimal</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>
<table>
<tr><td>likert</td><td>Single character. Legal characters are 0 to 9 and a to z.</td></tr>
<tr><td>matching</td><td>One or more pairs of identifiers. Each identifier is a single letter or number (0 to 9 and a to z). The identifiers in a pair are separated by a period. Commas separate the pairs. If all pairs must be matched correctly to consider the interaction correct, then the comma separated list of pairs are surrounded by curly brackets: { }.</td></tr>
<tr><td>performance</td><td>This is a very flexible format. Essentially an alphanumeric string of 255 characters or less.</td></tr>
<tr><td>sequencing</td><td>A series of single characters separated by commas. Legal characters are 0 to 9 and a to z. The order of the characters determines the correctness of the feedback.</td></tr>
</table>
</td></tr>
<tr><td>10.5</td><td>CMIIdentifier:
Value shall contain an alphanumeric group of characters
Value shall contain no white space
Value shall contain no unprintable characters
Value’s length shall not exceed 255 characters</td></tr>
<tr><td>10.6</td><td>CMISInteger: Value shall contain a signed integer number between –32768 and 32768</td></tr>
<tr><td>10.7</td><td>CMIString255: Value shall contain a set of ASCII characters
Value’s maximum length shall not exceed 255 characters</td></tr>
<tr><td>10.8</td><td>CMIString4096: Value shall contain a set of ASCII characters
Value’s maximum length shall not exceed 4096 characters</td></tr>
<tr><td>10.9</td><td>CMITime: Value is a chronological point in a 24 hour clock
Value shall be represented in the format HH:MM:SS.SS where HH signifies hours, MM signifies minutes and SS.SS signifies seconds.
Value’s hours shall contain exactly 2 digits between 00 – 23
Value’s minutes shall contain exactly 2 digits between 00 – 59
Value’s seconds shall contain at least 2 digits between 00 – 59 and may additionally (optionally) contain a decimal point and 1 or 2 additional digits after the decimal</td></tr>
<tr><td>10.10</td><td>CMITimespan: Value is a length of time
Value shall be represented in the format HHHH:MM:SS.SS where HHHH signifies hours, MM signifies minutes and SS.SS signifies seconds.
Value’s hours shall contain:
A minimum of 2 digits
A maximum of 4 digits
A value between 0000 – 9999
Value’s minutes shall contain:
Exactly 2 digits
A value between 00 – 99
Value’s seconds shall contain:
A minimum of 2 digits
Value may (optionally) contain a decimal point and 1 or 2 additional digits after the decimal</td></tr>
</table>

Req. No.	Conformance Requirement
	○ Value between 00 - 99
10.11	CMIVocabulary: Value shall contain a list of restricted vocabulary word/phrases, depending on the defined vocabulary type as follows:
10.11.1	CMIVocabulary **Mode** shall contain the following values: • "normal" • "review" • "browse"
10.11.2	CMIVocabulary **Status** shall contain the following values: • "passed" • "completed" • "failed" • "incomplete" • "browsed" • "not attempted"
10.11.3	CMIVocabulary **Exit** shall contain the following values: • "time-out" • "suspend" • "logout" • "" (empty string)
10.11.4	CMIVocabulary **Credit** shall contain the following values: • "credit" • "no-credit"
10.11.5	CMIVocabulary **Entry** shall contain the following values: • "ab-initio" • "resume" • "" (empty string)
10.11.6	CMIVocabulary **Interaction** shall contain the following values: • "true-false" • "choice" • "fill-in" • "matching" • "performance" • "likert" • "sequencing" • "numeric"
10.11.7	CMIVocabulary **Result** shall contain the following values: • "correct" • "wrong" • "unanticipated" • "neutral" • X.X – (CMIDecimal)
10.11.8	CMIVocabulary **Time Limit Action** shall contain the following values: • "exit,message" • "exit,no message"

Req. No.	Conformance Requirement
	• "continue,message" • "continue,no message"
11	The LMS shall maintain separate instances of the data model element values for each SCO.

Table 2.1.1.3b LMS Run-Time Environment Data Model Conformance Requirements

2.1.2. SCO Run-Time Environment Conformance Requirements

In order to become certified as SCORM Run-Time Environment Conformant, a SCO is required to support the Run-Time Environment that is described in The SCORM Run-Time Environment[1]. There are three main components of the SCORM Run-time Environment:

1. Launch
2. Application Program Interface (API)
3. Data Model

The conformance requirements for SCO Run-Time Environment Conformance are broken down into the following sections to address each of the Run-time environment components. They are as follows:

- Section 2.1.2.1 describes the Launch and API related conformance requirements
- Section 2.1.2.2 describes the Data Model related conformance requirements

As described in the Conformance Matrix in Section 1, the SCO Run-Time Environment Conformance requirements are defined in terms of four categories. The four categories are mutually exclusive. A SCO, if conformant, will be designated as conformant within one and only one of these categories. The categories are:

- SCORM Version 1.2 Run-Time Environment Conformant – Minimum (SCO-RTE1)
- SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Mandatory Data Model Elements(SCO-RTE1+Mandatory)
- SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements(SCO-RTE1+Optional)
- SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Mandatory and Some Optional Data Model Elements(SCO-RTE1+Mandatory+Optional)

2.1.2.1 SCO Run-Time Environment Launch and API Conformance Requirements

Once launched by an LMS, the SCO is responsible for finding the API Adapter and correctly issuing the following API function calls:

- LMSInitalize("") to indicate that the SCO is ready to communicate with the LMS.
- LMSFinish("") to indicated that the SCO is done communicating with the LMS.

All API function calls that a SCO invokes must be conformant with the requirements outlined in the following table.

Req. No.	Conformance Requirement
1	When launched by a known conformant LMS, the SCO shall find the LMS API Adapter DOM object named "API" by searching the parent and opener DOM window hierarchy.
2	The SCO shall be implemented such that it does not require that it be the top-level window in the DOM window hierarchy upon launch. The SCO must not contain DOM documents that reference relative documents within the SCO using the window.top DOM object.
3	The SCO shall invoke the LMSInitialize API Adapter function in accordance to the following requirements:
3.1	The SCO shall call the LMSInitialize API Adapter function upon launch of the SCO and before calling any other API Adapter function, except for LMSGetLastError, LMSGetErrorString and/or LMSGetDiagnostic.
3.2	The SCO shall call the LMSInitialize API Adapter function with a single string parameter that contains an empty string value (i.e. "").
3.3	***(Not tested)*** The SCO shall accept a CMIBoolean string return value when calling the LMSInitialize API Adapter function.
3.4	The SCO shall call LMSInitialize one and only one time per launch of the SCO.
4	The SCO shall invoke the LMSFinish API Adapter function in accordance to the following requirements:
4.1	The SCO shall call the LMSFinish API Adapter function when it is finished communicating with the LMS.
4.2	The SCO shall call the LMSFinish API Adapter function with a single string parameter that contains an empty string value (i.e. "").
4.3	***(Not tested)*** The SCO shall accept a CMIBoolean string return value when calling the LMSFinish API Adapter function.
5	If the SCO has a need to set data to the LMS the SCO shall invoke the LMSSetValue() API Adapter function in accordance to the following requirements:
5.1	The SCO shall use the LMS provided API Adapter function LMSSetValue to set (write) values for SCORM Run-Time Environment data model elements to the LMS (as opposed to HACP or other communication mechanisms).
5.2	The SCO shall call the LMSSetValue API Adapter function with two string parameters.
5.3	The first string parameter is the fully qualified, case sensitive string containing the name of the data model element requested to be set by the SCO.
5.4	The second parameter is the string containing the value of the data model element that the SCO is requesting to be set.
5.5	***(Not tested)*** The SCO shall accept a CMIBoolean string return value when calling the LMSSetValue

Req. No.	Conformance Requirement
	API Adapter function.
6	If the SCO has a need to get data to the LMS the SCO shall invoke the LMSGetValue() API Adapter function in accordance to the following requirements:
6.1	The SCO shall use the LMS provided API Adapter function LMSGetValue to get (read) values for SCORM Run-Time Environment data model elements from the LMS (as opposed to HACP or other communication mechanisms).
6.2	The SCO shall call the LMSGetValue API Adapter function with one string parameters that contains the fully qualified, case sensitive name of the data model element requested to be gotten (read) by the SCO.
6.3	***(Not tested)*** The SCO shall accept a string return value when calling the LMSGetValue API Adapter function.
7	If the SCO has a need to determine error codes set by LMS provided API Adapter functions that are called by the SCO, then, the SCO shall use the LMS provided API Adapter function LMSGetLastError.
7.1	The SCO shall call the LMSGetLastError API Adapter function with no parameters.
7.2	***(Not tested)*** The SCO shall accept a string return value that contains a valid API Error Code string when calling the LMSGetLastError API Adapter function.
8	If the SCO has a need to determine error code description that corresponds to valid API Error Code then, the SCO shall use the LMS provided API Adapter function LMSGetErrorString.
8.1	The SCO shall call the LMSGetErrorString API Adapter function with one string parameter that contains a valid API Error Code.
8.2	***(Not tested)*** The SCO shall accept a string return value that contains a valid API Error Code Description string when calling the LMSGetErrorString API Adapter function.
9	If the SCO has a need to determine LMS specific diagnostic information related to a valid API Error Code then, the SCO shall use the LMS provided API Adapter function LMSGetDiagnostic.
9.1	The SCO shall call the LMSGetDiagnostic API Adapter function with one string parameter that contains either a valid API Error Code or an empty string (“”). (Note: If an empty string is passed to the function, then the diagnostic text associated to the currently set API Error Code is returned.)
9.2	***(Not tested)*** The SCO shall accept a string return value that contains an LMS specific description string when calling the LMSGetDiagnostic API Adapter function.
10	If the SCO has a need to assure that data model element values set by the SCO are persisted, without calling LMSFinish, then the SCO shall call LMSCommit API

Req. No.	Conformance Requirement
	Adapter function. (Note: The LMS may persist data model element state automatically, but this is a way for the SCO to be assured that data model element state is persisted without having to exit the SCO/call LMSFinish.)
10.1	The SCO shall call the LMSCommit API Adapter function with one string parameter that contains an empty string (“”).
10.2	***(Not tested)*** The SCO shall accept a CMIBoolean string return value when calling the LMSCommit API Adapter function.

Table 2.1.2.1a SCO Run-Time Environment API Conformance Requirements

2.1.2.2 SCO Run-Time Environment Data Model Conformance Requirements

LMSs are required to implement all mandatory SCORM Run-Time Environment data model elements in order to be considered SCORM Run-Time Environment Conformant. It should also be noted that LMSs are NOT required to implement the optional data model elements. SCOs that exchange data with LMSs should take this into account and downgrade gracefully if a requested data model element is not implemented by the LMS. This is not a requirement for conformance on the part of the SCO and will not be tested.

A SCO is not required to exchange data with an LMS in order to achieve “SCORM Version 1.2 Run-Time Environment Conformant – Minimum” status. Additionally, a SCO may attempt to exchange data with LMSs using elements that are not part of the SCORM Run-Time Environment Data Model. Doing so is not recommended because interoperability is hindered, however this will not prevent the SCO from achieving “SCORM Version 1.2 Run-Time Environment Conformant – Minimum” status.

If the SCO does implement the ability to exchange data with an LMS, it must use the defined SCORM Run-Time Environment data model elements, within the bounds of the requirements as defined in the following table (Table 2.1.2.2a) in order to achieve “SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Mandatory Data Model Elements” and/or “SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional Data Model Elements” status.

The mandatory and/or optional data model elements that are correctly implemented, if any, will determine the SCO conformance status. If the SCO, through its correct usage of the Run-Time Environment API has achieved “SCORM Version 1.2 Run-Time Environment Conformant – Minimum”(SCO-RTE1) status, then, as defined in requirements 2 and 3, the SCO may also achieve SCO-RTE+Mandatory and/or SCO-RTE+Optional conformance status.

Please note that the SCO is determined to be SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Some Optional and Some Mandatory Elements” (SCO-RTE1+Mandatory+Optional) if it satisfies the requirements for both SCO-RTE1+Mandatory and SCO-RTE1+Optional.

Req. No.	Conformance Requirement
1	If the SCO, through it's correct usage of the Run-Time Environment API, has achieved "SCORM Version 1.2 Run-Time Environment Conformant – Minimum"(SCO-RTE1) status, then in order to also be considered "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Mandatory" (SCO–RTE1+Mandatory), the SCO shall correctly set or get one or more of the following LMS Mandatory data model elements: • cmi.core._children • cmi.core.student_id • cmi.core.student_name • cmi.core.lesson_location • cmi.core.credit • cmi.core.lesson_status • cmi.core.entry • cmi.core.score._children • cmi.core.score.raw • cmi.core.total_time • cmi.core.exit • cmi.core.session_time • cmi.suspend_data • cmi.launch_data
2	If the SCO, through it's correct usage of the Run-Time Environment API, has achieved "SCORM Version 1.2 Run-Time Environment Conformant – Minimum"(SCO-RTE1) status, then in order to also be considered "SCORM Version 1.2 Run-Time Environment Conformant – Minimum with Optional" (SCO–RTE1+Optional), the SCO shall correctly set or get one or more of the following LMS Optional data model elements: • cmi.core.score.max • cmi.core.score.min • cmi.core.lesson_mode • cmi.comments • cmi.comments_from_lms • cmi.objectives._children • cmi.objectives._count • cmi.objectives.n.id • cmi.objectives.n.score._children • cmi.objectives.n.score.raw • cmi.objectives.n.score.max • cmi.objectives.n.score.min • cmi.objectives.n.status • cmi.student_data._children • cmi.student_data.mastery_score • cmi.student_data.max_time_allowed • cmi.student_data.time_limit_action • cmi.student_preference._children • cmi.student_preference.audio • cmi.student_preference.language • cmi.student_preference.speed • cmi.student_preference.text • cmi.interactions._children • cmi.interactions._count

Req. No.	Conformance Requirement
	• cmi.interactions.n.id • cmi.interactions.n.objectives._count • cmi.interactions.n.objectives.n.id • cmi.interactions.n.time • cmi.interactions.n.type • cmi.interactions.n.correct_responses._count • cmi.interactions.n.correct_responses.n.pattern • cmi.interactions.n.weighting • cmi.interactions.n.student_response • cmi.interactions.n.result • cmi.interactions.n.latency
3	The SCO shall only attempt to set or get CMI data model elements that are supported by the SCORM Run-Time Environment Data Model.
3.1	The SCO shall only attempt to get (read) data model elements that are defined as "read-write" or "read-only". These elements are: • cmi.core._children (read-only) • cmi.core.student_id (read-only) • cmi.core.student_name (read-only) • cmi.core.lesson_location (read/write) • cmi.core.credit (read-only) • cmi.core.lesson_status (read/write) • cmi.core.entry (read-only) • cmi.core.score._children (read-only) • cmi.core.score.raw (read/write) • cmi.core.score.max (read/write) • cmi.core.score.min (read/write) • cmi.core.total_time (read-only) • cmi.core.lesson_mode (read-only) • cmi.suspend_data (read/write) • cmi.launch_data (read-only) • cmi.comments (read/write) • cmi.comments_from_lms (read-only) • cmi.objectives._children (read-only) • cmi.objectives._count (read-only) • cmi.objectives.n.id (read/write) • cmi.objectives.n.score._children (read-only) • cmi.objectives.n.score.raw (read/write) • cmi.objectives.n.score.max (read/write) • cmi.objectives.n.score.min (read/write) • cmi.objectives.n.status (read/write) • cmi.student_data._children (read-only) • cmi.student_data.mastery_score (read-only) • cmi.student_data.max_time_allowed (read-only) • cmi.student_data.time_limit_action (read-only) • cmi.student_preference._children (read-only) • cmi.student_preference.audio (read/write) • cmi.student_preference.language (read/write) • cmi.student_preference.speed (read/write)

Req. No.	Conformance Requirement
	• cmi.student_preference.text (read/write) • cmi.interactions._children (read-only) • cmi.interactions._count (read-only) • cmi.interactions.n.objectives._count (read-only) • cmi.interactions.n.correct_responses._count (read-only)
3.2	The SCO shall only attempt to set (write) CMI data model elements that are defined as "read-write" or "write-only". These elements are: • cmi.core.lesson_location (read/write) • cmi.core.lesson_status (read/write) • cmi.core.score.raw (read/write) • cmi.core.score.max (read/write) • cmi.core.score.min (read/write) • cmi.core.exit (write-only) • cmi.core.session_time (write-only) • cmi.suspend_data (read/write) • cmi.comments (read/write) • cmi.objectives.n.id (read/write) • cmi.objectives.n.score.raw (read/write) • cmi.objectives.n.score.max (read/write) • cmi.objectives.n.score.min (read/write) • cmi.objectives.n.status (read/write) • cmi.student_preference.audio (read/write) • cmi.student_preference.language (read/write) • cmi.student_preference.speed (read/write) • cmi.student_preference.text (read/write) • cmi.interactions.n.id (write-only) • cmi.interactions.n.objectives.n.id (write-only) • cmi.interactions.n.time (write-only) • cmi.interactions.n.type (write-only) • cmi.interactions.n.correct_responses.n.pattern (write-only) • cmi.interactions.n.weighting (write-only) • cmi.interactions.n.student_response (write-only) • cmi.interactions.n.result (write-only) • cmi.interactions.n.latency (write-only)
4	When setting (writing) data model element values, the SCO shall provide the value for the element according to the data model data type and vocabulary definition (if any) for the corresponding data model element as follows: • cmi.core.lesson_location - CMIString255 • cmi.core.lesson_status - CMIVocabulary (Status) • cmi.core.score.raw - CMIDecimal or CMIBlank • cmi.core.score.max - CMIDecimal or CMIBlank • cmi.core.score.min - CMIDecimal or CMIBlank • cmi.core.exit - CMIVocabulary (Exit) • cmi.core.session_time - CMITimespan • cmi.suspend_data - CMIString4096 • cmi.comments - CMIString4096 • cmi.objectives.n.id - CMIIdentifier

Req. No.	Conformance Requirement
	• cmi.objectives.n.score.raw - CMIDecimal or CMIBlank • cmi.objectives.n.score.max - CMIDecimal or CMIBlank • cmi.objectives.n.score.min - CMIDecimal or CMIBlank • cmi.objectives.n.status - CMIVocabulary (Status) • cmi.student_preference.audio - CMISInteger • cmi.student_preference.language - CMIString255 • cmi.student_preference.speed - CMISInteger • cmi.student_preference.text - CMISInteger • cmi.interactions.n.id - CMIIdentifier • cmi.interactions.n.objectives.n.id - CMIIdentifier • cmi.interactions.n.time - CMITime • cmi.interactions.n.type - CMIVocabulary (Interaction) • cmi.interactions.n.correct_responses.n.pattern - CMIFeedback • cmi.interactions.n.weighting - CMIDecimal • cmi.interactions.n.student_response - CMIFeedback • cmi.interactions.n.result - Vocabulary (Result) • cmi.interactions.n.latency - CMITimespan
5	***(Not tested)*** When setting (writing) the cmi.core.exit element, the SCO shall set the value according to the following: • "time-out" - This indicates that the SCO ended because the SCO has determined an excessive amount of time has elapsed, or the cmi.student_data.max_time_allowed has been exceeded. The max_time_allowed can be found in the Content Packaging Manifest (adlcp:maxtimeallowed). • "suspend" - This indicates that the student left the SCO with the intent of returning to it later at the point where he/she left. • "logout" - This indicates that the student logged out from within the SCO instead of returning to the LMS system to log out. This implies that the SCO passed control to the LMS system, and the LMS system automatically logged the student out of the course -- after updating the appropriate data model elements. • "" - The empty string shall be used to represent a normal exit state.
6	***(Not tested)*** When setting (writing) the cmi.core.lesson_status element, the SCO shall set the value according to the following: • "passed" – This value is used when the SCO is taken for credit (i.e. cmi.core.credit is "credit"). • "failed" – This value is used when the SCO is taken for credit (i.e. cmi.core.credit is "credit"). • "completed" – This value is used when the SCO is taken for no-credit (i.e. cmi.core.credit is "no-credit"). • "incomplete" – This value is used when the SCO is taken for no-credit or credit, when the SCO is exited prematurely (before a passed/failed/completed status can be determined). • "browsed" – This value is used when the cmi.core.lesson_mode is "browse". Note: If the SCO attempts to get the value of cmi.core.lesson_mode, and the

Req. No.	Conformance Requirement
	LMS returns an empty string and sets the API Error Code to “401” (not implemented), the SCO shall assume a mode of “normal”.

Table 2.1.2.2a SCO Run-Time Environment Data Model Conformance Requirements

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2.1.3. Meta-Data Conformance Requirements

This section defines the conformance requirements for Asset, SCO, and Content Aggregation Meta-data XML documents as defined in Section 2.2 of the SCORM Version 1.2 Content Aggregation Model[1].

This section contains several requirements tables. The first table, Table 2.1.3a, contains the requirements that must be met in order for a meta-data instance to achieve certification to the four different meta-data conformance categories:

1. "SCORM Version 1. 2 Meta-data XML Conformant – Minimum" (MD-XML1)
2. "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Optional Elements" (MD-XML1+Optional)
3. "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Extensions" (MD-XML1+Extensions)
4. "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Optional Elements and Extensions" (MD-XML1+Optional+Extensions)

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td>1</td><td>In order to be "Meta-data XML Conformant – Minimum" (MD–XML1):</td></tr>
<tr><td>1.1</td><td>A Content Aggregation meta-data instance shall contain the following mandatory elements:
<table>
<tr><th>LOM Element Number</th><th>Element</th></tr>
<tr><td>1</td><td>general</td></tr>
<tr><td>1.2</td><td>title</td></tr>
<tr><td>1.3</td><td>catalogentry</td></tr>
<tr><td>1.3.1</td><td>catalog</td></tr>
<tr><td>1.3.2</td><td>entry</td></tr>
<tr><td>1.5</td><td>description</td></tr>
<tr><td>1.6</td><td>keyword</td></tr>
<tr><td>2</td><td>lifecycle</td></tr>
<tr><td>2.1</td><td>version</td></tr>
<tr><td>2.2</td><td>status</td></tr>
<tr><td>3</td><td>metametadata</td></tr>
<tr><td>3.4</td><td>metadatascheme</td></tr>
<tr><td>4</td><td>technical</td></tr>
<tr><td>4.1</td><td>format</td></tr>
<tr><td>4.3</td><td>location</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>
<table>
<tr><td>6</td><td>rights</td></tr>
<tr><td>6.1</td><td>cost</td></tr>
<tr><td>6.2</td><td>copyrightandotherrestrictions</td></tr>
<tr><td>9</td><td>classification</td></tr>
<tr><td>9.1</td><td>purpose</td></tr>
<tr><td>9.3</td><td>description</td></tr>
<tr><td>9.4</td><td>keyword</td></tr>
</table>
</td></tr>
<tr><td>1.2</td><td>A Sharable Content Object (SCO) meta-data instance shall contain the following mandatory elements:
<table>
<tr><th>LOM Element Number</th><th>Element</th></tr>
<tr><td>1</td><td>general</td></tr>
<tr><td>1.2</td><td>title</td></tr>
<tr><td>1.3</td><td>catalogentry</td></tr>
<tr><td>1.3.1</td><td>catalog</td></tr>
<tr><td>1.3.2</td><td>entry</td></tr>
<tr><td>1.5</td><td>description</td></tr>
<tr><td>1.6</td><td>keyword</td></tr>
<tr><td>2</td><td>lifecycle</td></tr>
<tr><td>2.1</td><td>version</td></tr>
<tr><td>2.2</td><td>status</td></tr>
<tr><td>3</td><td>metametadata</td></tr>
<tr><td>3.4</td><td>metadatascheme</td></tr>
<tr><td>4</td><td>technical</td></tr>
<tr><td>4.1</td><td>format</td></tr>
<tr><td>4.3</td><td>location</td></tr>
<tr><td>6</td><td>rights</td></tr>
<tr><td>6.1</td><td>cost</td></tr>
<tr><td>6.2</td><td>copyrightandotherrestrictions</td></tr>
<tr><td>9</td><td>classification</td></tr>
<tr><td>9.1</td><td>purpose</td></tr>
<tr><td>9.3</td><td>description</td></tr>
<tr><td>9.4</td><td>keyword</td></tr>
</table>
</td></tr>
<tr><td>1.3</td><td>An Asset meta-data instance shall contain the following mandatory elements:
<table>
<tr><th>LOM Element</th><th>Element</th></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>
<table>
<tr><th>Number</th><th></th></tr>
<tr><td>1</td><td>general</td></tr>
<tr><td>1.2</td><td>title</td></tr>
<tr><td>1.5</td><td>description</td></tr>
<tr><td>3</td><td>metametadata</td></tr>
<tr><td>3.4</td><td>metadatascheme</td></tr>
<tr><td>4</td><td>technical</td></tr>
<tr><td>4.1</td><td>format</td></tr>
<tr><td>4.3</td><td>location</td></tr>
<tr><td>6</td><td>rights</td></tr>
<tr><td>6.1</td><td>cost</td></tr>
<tr><td>6.2</td><td>copyrightandotherrestrictions</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>In order to be “Meta-data XML Conformant – Minimum with Optional Elements” (MD–XML1+Optional):</td></tr>
<tr><td>2.1</td><td>A Content Aggregation meta-data instance shall be MD-XML1 and contain one or more of the following elements:
<table>
<tr><th>LOM</th><th>Element</th></tr>
<tr><td>1.4</td><td>language</td></tr>
<tr><td>1.7</td><td>coverage</td></tr>
<tr><td>1.9</td><td>aggregationlevel</td></tr>
<tr><td>2.3</td><td>contribute</td></tr>
<tr><td>2.3.1</td><td>role</td></tr>
<tr><td>2.3.2</td><td>centity</td></tr>
<tr><td>2.3.3</td><td>date</td></tr>
<tr><td>3.2</td><td>catalogentry</td></tr>
<tr><td>3.2.1</td><td>catalog</td></tr>
<tr><td>3.2.2</td><td>entry</td></tr>
<tr><td>3.3</td><td>contribute</td></tr>
<tr><td>3.3.1</td><td>role</td></tr>
<tr><td>3.3.2</td><td>centity</td></tr>
<tr><td>3.3.3</td><td>date</td></tr>
<tr><td>3.5</td><td>language</td></tr>
<tr><td>4.2</td><td>size</td></tr>
<tr><td>4.4</td><td>requirement</td></tr>
<tr><td>4.4.1</td><td>type</td></tr>
<tr><td>4.4.2</td><td>name</td></tr>
</table>
</td></tr>
</table>

Req. No.	Conformance Requirement			
		4.4.2	name	
		4.4.3	minimumversion	
		4.4.4	maximumversion	
		4.5	installationremarks	
		4.6	otherplatformrequirements	
		4.7	duration	
		5	educational	
		5.1	interactivitytype	
		5.2	learningresourcetype	
		5.3	interactivitylevel	
		5.4	semanticdensity	
		5.5	intendedenduserrole	
		5.6	context	
		5.7	typicalagerange	
		5.8	difficulty	
		5.9	typicallearningtime	
		5.10	description	
		5.11	language	
		6.3	description	
		7	relation	
		7.1	kind	
		7.2	resource	
		7.2.2	description	
		7.2.3	catalogentry	
		7.2.3.1	catalog	
		7.2.3.2	entry	
		8	annotation	
		8.1	person	
		8.2	date	
		8.3	description	
		9.2	taxonpath	
		9.2.1	source	
		9.2.2	taxon	
		9.2.2.1	id	
		9.2.2.2	entry	
		9.2.2.3	taxon	
2.2	A SCO meta-data instance shall be MD-XML1 Conformant and contain one or more of the following elements:			

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>the following elements:
<table>
<tr><th>LOM</th><th>Element</th></tr>
<tr><td>1.4</td><td>language</td></tr>
<tr><td>1.7</td><td>coverage</td></tr>
<tr><td>1.9</td><td>aggregationlevel</td></tr>
<tr><td>2.3</td><td>contribute</td></tr>
<tr><td>2.3.1</td><td>role</td></tr>
<tr><td>2.3.2</td><td>centity</td></tr>
<tr><td>2.3.3</td><td>date</td></tr>
<tr><td>3.2</td><td>catalogentry</td></tr>
<tr><td>3.2.1</td><td>catalog</td></tr>
<tr><td>3.2.2</td><td>entry</td></tr>
<tr><td>3.3</td><td>contribute</td></tr>
<tr><td>3.3.1</td><td>role</td></tr>
<tr><td>3.3.2</td><td>centity</td></tr>
<tr><td>3.3.3</td><td>date</td></tr>
<tr><td>3.5</td><td>language</td></tr>
<tr><td>4.2</td><td>size</td></tr>
<tr><td>4.4</td><td>requirement</td></tr>
<tr><td>4.4.1</td><td>type</td></tr>
<tr><td>4.4.2</td><td>name</td></tr>
<tr><td>4.4.3</td><td>minimumversion</td></tr>
<tr><td>4.4.4</td><td>maximumversion</td></tr>
<tr><td>4.5</td><td>installationremarks</td></tr>
<tr><td>4.6</td><td>otherplatformrequirements</td></tr>
<tr><td>4.7</td><td>duration</td></tr>
<tr><td>5</td><td>educational</td></tr>
<tr><td>5.1</td><td>interactivitytype</td></tr>
<tr><td>5.2</td><td>learningresourcetype</td></tr>
<tr><td>5.3</td><td>interactivitylevel</td></tr>
<tr><td>5.4</td><td>semanticdensity</td></tr>
<tr><td>5.5</td><td>intendedenduserrole</td></tr>
<tr><td>5.6</td><td>context</td></tr>
<tr><td>5.7</td><td>typicalagerange</td></tr>
<tr><td>5.8</td><td>difficulty</td></tr>
<tr><td>5.9</td><td>typicallearningtime</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Req. No.</th><th>Conformance Requirement</th></tr>
<tr><td></td><td>
<table>
<tr><td>5.9</td><td>typicallearningtime</td></tr>
<tr><td>5.10</td><td>description</td></tr>
<tr><td>5.11</td><td>language</td></tr>
<tr><td>6.3</td><td>description</td></tr>
<tr><td>7</td><td>relation</td></tr>
<tr><td>7.1</td><td>kind</td></tr>
<tr><td>7.2</td><td>resource</td></tr>
<tr><td>7.2.2</td><td>description</td></tr>
<tr><td>7.2.3</td><td>catalogentry</td></tr>
<tr><td>7.2.3.1</td><td>catalog</td></tr>
<tr><td>7.2.3.2</td><td>entry</td></tr>
<tr><td>8</td><td>annotation</td></tr>
<tr><td>8.1</td><td>person</td></tr>
<tr><td>8.2</td><td>date</td></tr>
<tr><td>8.3</td><td>description</td></tr>
<tr><td>9.2</td><td>taxonpath</td></tr>
<tr><td>9.2.1</td><td>source</td></tr>
<tr><td>9.2.2</td><td>taxon</td></tr>
<tr><td>9.2.2.1</td><td>id</td></tr>
<tr><td>9.2.2.2</td><td>entry</td></tr>
<tr><td>9.2.2.3</td><td>taxon</td></tr>
</table>
</td></tr>
<tr><td>2.3</td><td>An Asset meta-data instance shall be MD-XML1 Conformant and contain one or more of the following elements:
<table>
<tr><th>LOM</th><th>Element</th></tr>
<tr><td>1.3</td><td>catalogentry</td></tr>
<tr><td>1.3.1</td><td>catalog</td></tr>
<tr><td>1.3.2</td><td>entry</td></tr>
<tr><td>1.4</td><td>language</td></tr>
<tr><td>1.6</td><td>keyword</td></tr>
<tr><td>1.7</td><td>coverage</td></tr>
<tr><td>1.8</td><td>structure</td></tr>
<tr><td>1.9</td><td>aggregationlevel</td></tr>
<tr><td>2</td><td>lifecycle</td></tr>
<tr><td>2.1</td><td>version</td></tr>
<tr><td>2.2</td><td>status</td></tr>
<tr><td>2.3</td><td>contribute</td></tr>
<tr><td>2.3.1</td><td>role</td></tr>
</table>
</td></tr>
</table>

Req. No.	Conformance Requirement			
		2.3.1	role	
		2.3.2	centity	
		2.3.3	date	
		3.2	catalogentry	
		3.2.1	catalog	
		3.2.2	entry	
		3.3	contribute	
		3.3.1	role	
		3.3.2	centity	
		3.3.3	date	
		3.5	language	
		4.2	size	
		4.4	requirement	
		4.4.1	type	
		4.4.2	name	
		4.4.3	minimumversion	
		4.4.4	maximumversion	
		4.5	installationremarks	
		4.6	otherplatformrequirements	
		4.7	duration	
		5	educational	
		5.1	interactivitytype	
		5.2	learningresourcetype	
		5.3	interactivitylevel	
		5.4	semanticdensity	
		5.5	intendedenduserrole	
		5.6	context	
		5.7	typicalagerange	
		5.8	difficulty	
		5.9	typicallearningtime	
		5.10	description	
		5.11	language	
		6.3	description	
		7	relation	
		7.1	kind	
		7.2	resource	
		7.2.2	description	

Req. No.	Conformance Requirement			
		7.2.3	catalogentry	
		7.2.3.1	catalog	
		7.2.3.2	entry	
		8	annotation	
		8.1	person	
		8.2	date	
		8.3	description	
		9	classification	
		9.1	purpose	
		9.2	taxonpath	
		9.2.1	source	
		9.2.2	taxon	
		9.2.2.1	id	
		9.2.2.2	entry	
		9.2.2.3	taxon	
		9.3	description	
		9.4	keyword	
3	In order to be "SCORM Version 1.2 Meta-data XML Conformant – Minimum with Extensions" (MD–XML1+Extensions) An Asset, SCO, or Content Aggregation meta-data instance shall be MD-XML1 Conformant and contain one or more valid extension elements.			
3.1	All extension elements shall be valid and well formed according to a vendor provided XML Schema Definition (XSD) or the IMS Learning Resource Meta-Data Schema[10].			

Table 2.1.3a – Meta-Data Conformance Requirements by Conformance Category

Meta-data Elements are designated as mandatory or optional for implementation within a given Meta-data Application Profile (i.e. Content Aggregation, SCO or Asset). If an element is designated as mandatory, it must appear within the test subject XML meta-data instance and contain valid data. If a document is optional, it may or may not appear in the test subject meta-data instance. If the optional element does appear, it must contain valid data.

Meta-data elements are mandatory for the corresponding meta-data type if the minimum cardinality for the element is specified to be one (1). For example, requirement 1.1.5 in table 2.1.3.2a states that SCO meta-data instances shall contain one (1) or more (many) <catalogentry> element tags. This indicates that the minimum cardinality is one (1) and therefore, this element is mandatory for SCO meta-data.

Elements are optional if the specified minimum cardinality for an element is 0. For example, in requirement 1.1.5 in table 2.1.3.1a states that Asset meta-data has zero (0) or more <catalogentry> elements. The minimum cardinality in this case is zero therefore

indicating that this element is optional for Asset meta-data. It should also be noted that the scope of the mandatory/optional implementation for a particular element is defined as the parent element.

The following conformance requirements tables contain several "best practice" requirements. Failure to implement these "best practice" requirements within a meta-data instance does not, by itself, prevent the meta-data instance from achieving conformance. Failure to adhere to a "best practice" requirement results in a warning message being generated during the conformance testing process.

"Best practice" requirements are noted as such in the following conformance requirements tables. For example, requirement 1.1.5 includes the statement for the <catalogentry> element: "Smallest Permitted Maximum: 10 items – Not a conformance check, warning only". If the test subject meta-data document contains more than 10 <catalogentry> elements (within a single <general> element) then the document will not be deemed to be non-conformant for this reason.

Note that the following requirement tables specifically address requirements for achieving SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements and Extensions" (MD-XML1+Optional+Extensions). A meta-data instance is determined to be SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements and Extensions" (MD-XML1+Optional+Extensions) if it correctly implements the requirements for SCORM Version 1.2 Meta-data XML Conformant – Minimum with Optional Elements" (MD-XML1+Optional) and the requirements for SCORM Version 1.2 Meta-data XML Conformant – Minimum with Extensions" (MD-XML1+Extensions).

Each requirement that deals with specific meta-data elements, where appropriate, references the element number as it appears in the SCORM Version 1.2 and in the IEEE Learning Technology Standards Committee (LTSC) Learning Objects Metadata (LOM) Specification[5]. This is referred to in the following tables as the LOM Element Number.

2.1.3.1 Asset Meta-data Conformance Requirements

The requirements in the following table apply to Asset Meta-data instances as specified within the table entries. For example, requirement 2.3 in table 2.1.3a states which meta-data elements must be implemented correctly in order for the meta-data instance to be certified "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Optional Elements" (MD-XML1+Optional). Table 2.3.1a contains the conformance requirements for implementation of Asset Meta-data.

Req. No.	Conformance Requirement
1	The Asset Meta-data XML record must adhere to the following requirements.
1.1	The Asset Meta-data XML record shall contain a **<general>** element that adheres to the following requirements:

Req. No.	Conformance Requirement
1.1.1	The **<general>** element shall occur 1 and only 1 time.
1.1.2	The **<general>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <title> - mandatory • <catalogenty> - optional • <language> - optional • <description> - mandatory • <keyword> - optional • <coverage> - optional • <structure> - optional • <aggregationlevel> - optional
1.1.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.1.4	The **<title>** element shall adhere to the following: • The **<title>** shall appear 1 and only 1 time. • The **<title>** shall be represented as a LangStringType. • The **<title>** element's values length shall have a smallest permitted maximum of 1000 characters - *Not a conformance check, warning only.*
1.1.5	The **<catalogentry>** element shall occur 0 or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.1.5.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.1.5.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.1.5.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.6	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.*

Req. No.	Conformance Requirement
	• The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.1.7	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 1 or More times. • The **<description>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, only a warning.*
1.1.8	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 0 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.9	The **<coverage>** element shall adhere to the following requirements: • The **<coverage>** shall appear 0 or More times. • The **<coverage>** element shall be repeated with a smallest permitted maximum of 10 items, *Not a conformance check, warning only.* • The **<coverage>** element shall be represented as a LangStringType. • The **<coverage>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.1.10	The **<structure>** element shall adhere to the following requirements:
	• The **<structure>** element shall appear 0 or 1 time.
	• The **<structure>** element shall be represented as a VocabularyType.
	• The **<structure>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Collection
	  ○ Mixed
	  ○ Linear
	  ○ Hierarchical
	  ○ Networked
	  ○ Branched
	  ○ Parceled
	  ○ Atomic

1.1.11	The **<aggregationlevel>** element shall adhere to the following requirements:
	• The **<aggregationlevel>** shall appear 0 or 1 time.
	• The **<aggregationlevel>** shall be represented as a VocabularyType.
	• The **<aggregationlevel>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ 1
	  ○ 2
	  ○ 3
	  ○ 4

1.2	The Asset Meta-data XML record's **<lifecycle>** element shall adhere to the following requirements:

Req. No.	Conformance Requirement
1.2.1	The **<lifecycle>** element shall occur 0 or 1 time.
1.2.2	The **<lifecycle>** element shall contain the following sub-elements that adhere to the following requirements: • <version> - optional • <status> - optional • <contribute> - optional
1.2.3	The **<version>** element shall adhere to the following requirements: • The **<version>** element shall appear 0 or 1 time. • The **<version>** element shall be represented as a LangStringType. • The **<version>** element's values length shall have a smallest permitted maximum of 50 characters – *Not a conformance check, warning only.*

1.2.4	The **<status>** element shall adhere to the following requirements:
	• The **<status>** element shall appear 0 or 1 time.
	• The **<status>** element shall be represented as a VocabularyType.
	• The **<status>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Draft
	  ○ Final
	  ○ Revised
	  ○ Unavailable

1.2.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.2.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional • <date> - optional

1.2.5.2	The **<role>** element shall adhere to the following requirements:
	• The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used).
	• The **<role>** shall be represented by as a VocabularyType.
	• Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Author (Recommended that exactly 1 Author exists)
	  ○ Publisher
	  ○ Unknown
	  ○ Initiator
	  ○ Terminator
	  ○ Validator
	  ○ Editor
	  ○ Graphical Designer
	  ○ Technical Implementer
	  ○ Content Provider
	  ○ Technical Validator

Req. No.	Conformance Requirement
	○ Educational Validator ○ Script Writer ○ Instructional Designer
1.2.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times. • The **<centity>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's values length shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a <vcard> element. • The elements value shall be required to follow the Vcard Specification[6].
1.2.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3	The Asset Meta-data XML record's **<metametadata>** element shall adhere to the following requirements:
1.3.1	The **<metametadata>** element shall occur 1 and only 1 time.
1.3.2	The **<metametadata>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <catalogentry> - optional • <contribute> - optional • <metadatascheme> - mandatory • <language> - optional
1.3.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.3.4	The **<catalogentry>** element shall occur 0 or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.3.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.3.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.3.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<entry>** shall be represented as a LangStringType.

Req. No.	Conformance Requirement
	• The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.3.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 10 items – Not a conformance check, warning only.
1.3.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional • <date> - optional

1.3.5.2	The **<role>** element shall adhere to the following requirements:
	• The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used).
	• The **<role>** shall be represented by as a VocabularyType.
	• Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is representing using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following
	  o Creator (Recommended that exactly 1 Creator exist)
	  o Validator

1.3.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times. • The **<centity>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.3.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3.6	The **<metadatascheme>** element shall adhere to the following requirements: • The **<metadatascheme>** shall appear 1 or More times. • The **<metadatascheme>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<metadatascheme>** shall be represented as a character string. • The **<metadatascheme>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.3.7	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or 1 time. • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, only a warning*

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	• The **<language>** shall be expressed as per ISO 639 and ISO 3166. •
1.4	The Asset Meta-data XML record's **<technical>** element shall adhere to the following requirements:
1.4.1	The **<technical>** element shall occur 1 and only 1 time.
1.4.2	The **<technical>** element shall contain the following sub-elements that adhere to the following requirements: • <format> - mandatory • <size> - optional • <location> - mandatory • <requirement> - optional • <installationremarks> - optional • <otherplatformrequirements> - optional • <duration> - optional

1.4.3	The **<format>** element shall adhere to the following requirements:
	• The **<format>** element shall appear 0 or More times.
	• The **<format>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
	• The **<format>** element shall be represented as a character string.
	• The **<format>** element's value shall be a member of a Restricted Vocabulary:
	  ○ A valid MIME type
	  ○ non-digital
	• The **<format>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*

1.4.4	The **<size>** element shall adhere to the following requirements: • The **<size>** element shall appear 0 or 1 time. • The **<size>** element shall be represented as a character string. • The **<size>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.* • The **<size>** element shall be expressed as an integer number of bytes.
1.4.5	The **<location>** element shall adhere to the following requirements: • The **<location>** element shall appear 1 or More times. • The **<location>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<location>** element shall be represented as a character string. • The **<location>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.4.5.1	The **<location>** element shall have an ***type*** attribute the adheres to the following requirements:
	• 1 and only 1 attribute ***type***.
	• The ***type*** attribute shall be represented as a character string that has the following set of restricted values:
	  ○ URI
	  ○ TEXT

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1.4.6	The **<requirement>** element shall occur 0 or More times. • The **<requirement>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
1.4.6.1	If used the **<requirement>** element shall contain the following sub-elements that adhere to the following requirements: • <type> - optional • <name> - optional • <minimumversion> - optional • <maximumversion> - optional
1.4.6.2	The **<type>** element shall adhere to the following requirements: • The **<type>** element shall appear 0 or 1 time. • The **<type>** shall be represented by as a VocabularyType. • Since the **<type>** element is a Best Practice vocabulary, if the **<type>** element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following o Operating System o Browser It is considered Best Practice to include a <name> element and value if the <type> element is used.
1.4.6.3	The **<name>** element shall adhere to the following requirements: • The **<name>** element shall appear 0 or 1 time. • The **<name>** shall be represented as a VocabularyType. • Since the **<name>** element is a Best Practice vocabulary, if the **<name>** element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: o If the **<type**> element is used and is set to "Operating System" ▪ PC-DOS ▪ MS-Windows ▪ MacOS ▪ Unix ▪ Multi-OS ▪ Other ▪ None o If the **<type>** element is used and is set to "Browser" ▪ Any ▪ Netscape Communicator ▪ Microsoft Internet Explorer ▪ Opera o If the **<type>** element is used and set to something else ▪ Open Vocabulary It is considered Best Practice to include a <name> element and value if the <type> element is used.
1.4.6.4	The **<minimumversion>** element shall adhere to the following requirements: • The **<minimumversion>** element shall appear 0 or 1 time. • The **<minimumversion>** element shall be represented as a character string. • The **<minimumversion>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning*

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	only.
1.4.6.5	The **<maximumversion>** element shall adhere to the following requirements: • The **<maximumversion>** element shall appear 0 or 1 time. • The **<maximumversion>** element shall be represented as a character string. • The **<maximumversion>** elements value shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.4.7	The **<installationremarks>** element shall adhere to the following requirements: • The **<installationremarks>** element shall appear 0 or 1 time. • The **<installationremarks>** element shall be represented as a LangStringType. • The **<installationremarks>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check , warning only.*
1.4.8	The **<otherplatformrequirements>** element shall adhere to the following requirements: • The **<otherplatformrequirements>** element shall appear 0 or 1 time. • The **<otherplatformrequirements>** element shall be represented as a LangStringType. • The **<otherplatformrequirements>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check , warning only.*
1.4.9	The **<duration>** element shall adhere to the following requirements: • The **<duration>** element shall appear 0 or 1 time. • The **<duration>** element shall be represented as a DateType.
1.5	The Asset Meta-data XML record's **<educational>** element shall adhere to the following requirements:
1.5.1	The **<educational>** element shall occur 0 or 1 time.
1.5.2	The **<educational>** element shall contain the following sub-elements that adhere to the following requirements: • <interactivitytype> - optional • <learningresourcetype> - optional • <interactivitylevel> - optional • <semanticdensity> - optional • <intendedenduserrole> - optional • <context> - optional • <typicalagerange> - optional • <difficulty> - optional • <typicallearningtime> - optional • <description> - optional • <language> - optional
1.5.3	The **<interactivitytype>** element shall adhere to the following requirements • The **<interactivitytype>** element shall appear 0 or 1 time. • The **<interactivitytype>** element shall be represented as a VocabularyType.

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	• The **<interactivitytype>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Active
	  ○ Expositive
	  ○ Mixed
	  ○ Undefined

1.5.4	The **<learningresourcetype>** element shall adhere to the following requirements:
	• The **<learningresourcetype>** element shall appear 0 or More times.
	• The **<learningresourcetype>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
	• The **<learningresourcetype>** shall be represented as a VocabularyType.
	• Since the **<learningresourcetype>** element is a Best Practice vocabulary, if the **<learningresourcetype>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Exercise
	  ○ Simulation
	  ○ Questionnaire
	  ○ Diagram
	  ○ Figure
	  ○ Graph
	  ○ Index
	  ○ Slide
	  ○ Table
	  ○ Narrative Text
	  ○ Exam
	  ○ Experiment
	  ○ Problem Statement
	  ○ Self Assessment

1.5.5	The **<interactivitylevel>** element shall adhere to the following requirements
	• The **<interactivitylevel>** element shall appear 0 or 1 time.
	• The **<interactivitylevel>** element shall be represented as a VocabularyType.
	• The **<interactivitylevel>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ very low
	  ○ low
	  ○ medium
	  ○ high
	  ○ very high

1.5.6	The **<semanticdensity>** element shall adhere to the following requirements
	• The **<semanticdensity>** element shall appear 0 or 1 time.
	• The **<semanticdensity>** element shall be represented as a VocabularyType.
	• The **<semanticdensity>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ very low
	  ○ low
	  ○ medium
	  ○ high

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	○ very high
1.5.7	The **<intendedenduserrole>** element shall adhere to the following requirements • The **<intendedenduserrole>** element shall appear 0 or More times. • The **<intendedenduserrole>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<intendedenduserrole>** element shall be represented as a VocabularyType. • The **<intendedenduserrole>** element's value shall be a member of the following Restricted Vocabulary: ○ Teacher ○ Author ○ Learner ○ Manager
1.5.8	The **<context>** element shall adhere to the following requirements: • The **<context>** element shall appear 0 or More times. • The **<context>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<context>** shall be represented as a VocabularyType. • Since the **<context>** element is a Best Practice vocabulary, if the **<context>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: ○ Primary Education ○ Secondary Education ○ Higher Education ○ University First Cycle ○ University Second Cycle ○ University Postgrade ○ Technical School First Cycle ○ Technical School Second Cycle ○ Professional Formation ○ Continuous Formation ○ Vocational Training
1.5.9	The **<typicalagerange>** element shall adhere to the following requirements: • The **<typicalagerange>** element shall appear 0 or More times. • The **<typicalagerange>** element shall be repeatable with a smallest permitted maximum of 5 items – *Not a conformance check, warning only.* • The **<typicalagerange>** element shall be represented as a LangStringType • The **<typicalagerange>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.5.10	The **<difficulty>** element shall adhere to the following requirements: • The **<difficulty>** element shall appear 0 or 1 time • The **<difficulty>** element shall be represented as a VocabularyType • The **<difficulty>** element's value shall be a member of the following Restricted Vocabulary: ○ very easy ○ easy ○ medium

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	○ difficult ○ very difficult
1.5.11	The **<typicallearningtime>** element shall adhere to the following requirements: • The **<typicallearningtime>** shall appear 0 or 1 time. • The **<typicallearningtime>** shall be represented as a DateType.
1.5.12	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.5.13	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element shall have a smallest permitted maximum of 100 characters – Not a conformance check, warning only • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.6	The Asset Meta-data XML record's **<rights>** element shall adhere to the following requirements:
1.6.1	The **<rights>** element shall occur 1 and only 1 time.
1.6.2	The **<rights>** element shall contain the following sub-elements that adhere to the following requirements: • <cost> - mandatory • **<**copyrightandotherrestrictions> - mandatory • <description> - optional
1.6.3	The **<cost>** element shall adhere to the following requirements: • The **<cost>** element shall appear 1 and only 1 time. • The **<cost>** element shall be represented as a VocabularyType. • The **<cost>** element's value shall be a member of the following Restricted Vocabulary: ○ yes ○ no
1.6.4	The **<copyrightandotherrestrictions>** element shall adhere to the following requirements: • The **<copyrightandotherrestrictions>** element shall appear 1 and only 1 time. • The **<copyrightandotherrestrictions>** element shall be represented as a VocabularyType. • The **<copyrightandotherrestrictions>** element's value shall be a member of the following Restricted Vocabulary: ○ yes ○ no
1.6.5	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 0 or 1 time.

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	• The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, only a warning.*
1.7	The Asset Meta-data XML record's **<relation>** element shall adhere to the following requirements:
1.7.1	The **<relation>** element shall contain the following sub-elements that adhere to the following requirements: • <kind> - optional • <resource> - optional
1.7.2	The **<relation>** element shall occur 0 or More times. • The **<relation>** shall be repeated with a smallest permitted maximum of 100 items – *Not a conformance check, warning only.*

1.7.3	The **<kind>** element shall adhere to the following requirements:
	• The **<kind>** element shall appear 0 or 1 time.
	• The **<kind>** shall be represented as a VocabularyType.
	• Since the **<kind>** element is a Best Practice vocabulary, if the **<kind>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ IsPartOf
	  ○ HasPart
	  ○ IsVersionOf
	  ○ HasVersion
	  ○ IsFormatOf
	  ○ HasFormat
	  ○ References
	  ○ IsReferencedBy
	  ○ IsBasedOn
	  ○ IsBasisFor
	  ○ Requires
	  ○ IsRequiredBy

1.7.4	The **<resource>** element shall occur 0 or 1 time.
1.7.4.1	The **<resource>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <description> - optional • <catalogentry> - optional
1.7.4.2	The **<identifier>** element is RESERVED and shall not be used at this time.
1.7.4.3	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.7.4.4	The **<catalogentry>** element shall occur 0 or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum

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	of 10 items – *Not a conformance check, warning only.*
1.7.4.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.7.4.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.7.4.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.8	The Asset Meta-data XML record's **<annotation>** element shall adhere to the following requirements:
1.8.1	The **<annotation>** element shall contain the following sub-elements that adhere to the following requirements: • <person> - optional • <date> - optional • <description> - optional
1.8.2	The **<annotation>** element shall occur 0 or More times. • The **<annotation>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.8.3	The **<person>** element shall adhere to the following requirements: • The **<person>** shall appear 0 or 1 time. • The **<person>** shall be represented as a character string. • The **<person>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<person>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.8.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** element shall be represented as a DateType.
1.8.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.9	The Asset Meta-data XML record's **<classification>** element shall adhere to the following requirements:

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	following requirements:
1.9.1	The **<classification>** element shall contain the following sub-elements that adhere to the following requirements: • <purpose> - optional • <taxonpath> - optional • <description> - optional • <keyword> - optional
1.9.2	The **<classification>** element shall occur 0 or More times. • The **<classification>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*

1.9.3	The **<purpose>** element shall adhere to the following requirements:
	• The **<purpose>** element shall appear 0 or 1 time.
	• The **<purpose>** shall be represented as a VocabularyType.
	• Since the **<purpose>** element is a Best Practice vocabulary, if the **<purpose>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Discipline
	  ○ Idea
	  ○ Prerequisite
	  ○ Educational Objective
	  ○ Accessibility Restrictions
	  ○ Educational Level
	  ○ Skill Level
	  ○ Security Level

1.9.4	The **<taxonpath>** element shall occur 0 or More times. • The **<taxonpath>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.1	If used the **<taxonpath>** element shall contain the following sub-elements that adhere to the following requirements: • <source> - optional • <taxon> - optional
1.9.4.2	The **<source>** element shall adhere to the following requirements: • The **<source>** shall appear 0 or 1 time. • The **<source>** shall be represented as a character string. • The **<source>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.9.4.3	The **<taxon>** element shall occur 0 or More times. • The **<taxon>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.3.1	If used the **<taxon>** element shall contain the following sub-elements that adhere to the following requirements: • **<id>** - optional • **<entry>** - optional • **<taxon>** - optional

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1.9.4.3.2	The **<id>** element shall adhere to the following requirements: • The **<id>** element shall appear 0 or 1 time. • The **<id>** element shall be represented as a character string. • The **<id>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.*
1.9.4.3.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** element shall appear 0 or 1 time. • The **<entry>** element shall be represented as a LangStringType. • The **<entry>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*
1.9.4.3.4	The **<taxon>** element shall adhere to the requirements in 1.9.4.3.
1.9.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.*
1.9.6	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 0 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

Table 2.1.3.1a: Asset Meta-data Application Profile Conformance Requirements

2.1.3.2 Sharable Content Object (SCO) Conformance Requirements

The requirements in the following table apply to Sharable Content Object (SCO) Meta-data instances as specified within the table entries. For example, requirement 2.2 in Table 2.1.3a states which meta-data elements must be implemented correctly in order for the meta-data instance to be certified "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Optional Elements" (MD-XML1+Optional). Table 2.1.3.2a contains the conformance requirements for implementation of SCO Meta-data.

Req. No.	Conformance Requirement
1	The SCO Meta-data XML record must adhere to the following requirements.
1.1	The SCO Meta-data XML record shall contain a **<general>** element that adheres to the following requirements:
1.1.1	The **<general>** element shall occur 1 and only 1 time.
1.1.2	The **<general>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED

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	• <title> - mandatory • <catalogenty> - mandatory • <language> - optional • <description> - mandatory • <keyword> - mandatory • <coverage> - optional • <structure> - optional • <aggregationlevel> - optional
1.1.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.1.4	The **<title>** element shall adhere to the following: • The **<title>** shall appear 1 and only 1 time. • The **<title>** shall be represented as a LangStringType. • The **<title>** element's values length shall have a smallest permitted maximum of 1000 characters - *Not a conformance check, warning only.*
1.1.5	The **<catalogentry>** element shall occur 1or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.1.5.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.1.5.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.1.5.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.6	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.1.7	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 1 or More times. • The **<description>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*

Req. No.	Conformance Requirement
	• The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, only a warning.*
1.1.8	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 1 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.9	The **<coverage>** element shall adhere to the following requirements: • The **<coverage>** shall appear 0 or More times. • The **<coverage>** element shall be repeated with a smallest permitted maximum of 10 items, *Not a conformance check, warning only.* • The **<coverage>** element shall be represented as a LangStringType. • The **<coverage>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.1.10	The **<structure>** element shall adhere to the following requirements:
	• The **<structure>** element shall appear 0 or 1 time.
	• The **<structure>** element shall be represented as a VocabularyType.
	• The **<structure>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Collection
	  ○ Mixed
	  ○ Linear
	  ○ Hierarchical
	  ○ Networked
	  ○ Branched
	  ○ Parceled
	  ○ Atomic

1.1.11	The **<aggregationlevel>** element shall adhere to the following requirements:
	• The **<aggregationlevel>** shall appear 0 or 1 time.
	• The **<aggregationlevel>** shall be represented as a VocabularyType.
	• The **<aggregationlevel>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ 1
	  ○ 2
	  ○ 3
	  ○ 4

1.2	The SCO Meta-data XML record's **<lifecycle>** element shall adhere to the following requirements:
1.2.1	The **<lifecycle>** element shall occur 1 and only 1 time.
1.2.2	The **<lifecycle>** element shall contain the following sub-elements that adhere to the following requirements: • <version> - mandatory • <status> - mandatory

Req. No.	Conformance Requirement
	• <contribute> - optional
1.2.3	The **<version>** element shall adhere to the following requirements: • The **<version>** element shall appear 1 and only 1 time. • The **<version>** element shall be represented as a LangStringType. • The **<version>** element's values length shall have a smallest permitted maximum of 50 characters – *Not a conformance check, warning only.*

1.2.4	The **<status>** element shall adhere to the following requirements:
	• The **<status>** element shall appear 1 and only 1 time.
	• The **<status>** element shall be represented as a VocabularyType.
	• The **<status>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Draft
	  ○ Final
	  ○ Revised
	  ○ Unavailable

1.2.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.2.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional • <date> - optional

1.2.5.2	The **<role>** element shall adhere to the following requirements:
	• The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used).
	• The **<role>** shall be represented by as a VocabularyType.
	• Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Author (Recommended that exactly 1 Author exists)
	  ○ Publisher
	  ○ Unknown
	  ○ Initiator
	  ○ Terminator
	  ○ Validator
	  ○ Editor
	  ○ Graphical Designer
	  ○ Technical Implementer
	  ○ Content Provider
	  ○ Technical Validator
	  ○ Educational Validator
	  ○ Script Writer
	  ○ Instructional Designer

1.2.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times.

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	• The **<centity>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's values length shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a <vcard> element. • The elements value shall be required to follow the Vcard Specification[6].
1.2.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3	The SCO Meta-data XML record's **<metametadata>** element shall adhere to the following requirements:
1.3.1	The **<metametadata>** element shall occur 1 and only 1 time.
1.3.2	The **<metametadata>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <catalogentry> - optional • <contribute> - optional • <metadatascheme> - mandatory • <language> - optional
1.3.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.3.4	The **<catalogentry>** element shall occur 0 or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.3.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.3.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.3.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.3.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 10 items – Not a conformance check, warning only.

Req. No.	Conformance Requirement
1.3.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional • <date> - optional

1.3.5.2	The **<role>** element shall adhere to the following requirements:
	• The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used).
	• The **<role>** shall be represented by as a VocabularyType.
	• Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is representing using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following
	  ○ Creator (Recommended that exactly 1 Creator exist)
	  ○ Validator

1.3.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times. • The **<centity>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.3.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3.6	The **<metadatascheme>** element shall adhere to the following requirements: • The **<metadatascheme>** shall appear 1 or More times. • The **<metadatascheme>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<metadatascheme>** shall be represented as a character string. • The **<metadatascheme>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.3.7	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or 1 time. • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, only a warning*. • The **<language>** shall be expressed as per ISO 639 and ISO 3166.
1.4	The SCO Meta-data XML record's **<technical>** element shall adhere to the following requirements:
1.4.1	The **<technical>** element shall occur 1 and only 1 time.
1.4.2	The **<technical>** element shall contain the following sub-elements that adhere to the following requirements:

Req. No.	Conformance Requirement
	• <format> - mandatory • <size> - optional • <location> - mandatory • <requirement> - optional • <installationremarks> - optional • <otherplatformrequirements> - optional • <duration> - optional

1.4.3	The **<format>** element shall adhere to the following requirements:
	• The **<format>** element shall appear 0 or More times.
	• The **<format>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
	• The **<format>** element shall be represented as a character string.
	• The **<format>** element's value shall be a member of a Restricted Vocabulary:
	  ○ A valid MIME type
	  ○ non-digital
	• The **<format>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*

1.4.4	The **<size>** element shall adhere to the following requirements: • The **<size>** element shall appear 0 or 1 time. • The **<size>** element shall be represented as a character string. • The **<size>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.* • The **<size>** element shall be expressed as an integer number of bytes.
1.4.5	The **<location>** element shall adhere to the following requirements: • The **<location>** element shall appear 1 or More times. • The **<location>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<location>** element shall be represented as a character string. • The **<location>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.4.5.1	The **<location>** element shall have an ***type*** attribute the adheres to the following requirements:
	• 1 and only 1 attribute ***type***.
	• The ***type*** attribute shall be represented as a character string that has the following set of restricted values:
	  ○ URI
	  ○ TEXT

1.4.6	The **<requirement>** element shall occur 0 or More times. • The **<requirement>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
1.4.6.1	If used the **<requirement>** element shall contain the following sub-elements that adhere to the following requirements: • <type> - optional • <name> - optional • <minimumversion> - optional • <maximumversion> - optional

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1.4.6.2	The **<type>** element shall adhere to the following requirements:
	• The **<type>** element shall appear 0 or 1 time.
	• The **<type>** shall be represented by as a VocabularyType.
	• Since the **<type>** element is a Best Practice vocabulary, if the **<type>** element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following
	  o Operating System
	  o Browser
	
	It is considered Best Practice to include a <name> element and value if the <type> element is used.

1.4.6.3	The **<name>** element shall adhere to the following requirements:
	• The **<name>** element shall appear 0 or 1 time.
	• The **<name>** shall be represented as a VocabularyType.
	• Since the **<name>** element is a Best Practice vocabulary, if the **<name>** element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  o If the **<type**> element is used and is set to "Operating System"
	  ▪ PC-DOS
	  ▪ MS-Windows
	  ▪ MacOS
	  ▪ Unix
	  ▪ Multi-OS
	  ▪ Other
	  ▪ None
	  o If the **<type>** element is used and is set to "Browser"
	  ▪ Any
	  ▪ Netscape Communicator
	  ▪ Microsoft Internet Explorer
	  ▪ Opera
	  o If the **<type>** element is used and set to something else
	  ▪ Open Vocabulary
	
	It is considered Best Practice to include a <name> element and value if the <type> element is used.

1.4.6.4	The **<minimumversion>** element shall adhere to the following requirements: • The **<minimumversion>** element shall appear 0 or 1 time. • The **<minimumversion>** element shall be represented as a character string. • The **<minimumversion>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.4.6.5	The **<maximumversion>** element shall adhere to the following requirements: • The **<maximumversion>** element shall appear 0 or 1 time. • The **<maximumversion>** element shall be represented as a character string. • The **<maximumversion>** elements value shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.4.7	The **<installationremarks>** element shall adhere to the following requirements: • The **<installationremarks>** element shall appear 0 or 1 time.

Req. No.	Conformance Requirement
	• The **<installationremarks>** element shall be represented as a LangStringType. • The **<installationremarks>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check , warning only.*
1.4.8	The **<otherplatformrequirements>** element shall adhere to the following requirements: • The **<otherplatformrequirements>** element shall appear 0 or 1 time. • The **<otherplatformrequirements>** element shall be represented as a LangStringType. • The **<otherplatformrequirements>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check , warning only.*
1.4.9	The **<duration>** element shall adhere to the following requirements: • The **<duration>** element shall appear 0 or 1 time. • The **<duration>** element shall be represented as a DateType.
1.5	The SCO Meta-data XML record's **<educational>** element shall adhere to the following requirements:
1.5.1	The **<educational>** element shall occur 0 or 1 time.
1.5.2	The **<educational>** element shall contain the following sub-elements that adhere to the following requirements: • <interactivitytype> - optional • <learningresourcetype> - optional • <interactivitylevel> - optional • <semanticdensity> - optional • <intendedenduserrole> - optional • <context> - optional • <typicalagerange> - optional • <difficulty> - optional • <typicallearningtime> - optional • <description> - optional • <language> - optional

1.5.3	The **<interactivitytype>** element shall adhere to the following requirements
	• The **<interactivitytype>** element shall appear 0 or 1 time.
	• The **<interactivitytype>** element shall be represented as a VocabularyType.
	• The **<interactivitytype>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Active
	  ○ Expositive
	  ○ Mixed
	  ○ Undefined

1.5.4	The **<learningresourcetype>** element shall adhere to the following requirements: • The **<learningresourcetype>** element shall appear 0 or More times. • The **<learningresourcetype>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*

Req. No.	Conformance Requirement
	• The **<learningresourcetype>** shall be represented as a VocabularyType. • Since the **<learningresourcetype>** element is a Best Practice vocabulary, if the **<learningresourcetype>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: o Exercise o Simulation o Questionnaire o Diagram o Figure o Graph o Index o Slide o Table o Narrative Text o Exam o Experiment o Problem Statement o Self Assessment
1.5.5	The **<interactivitylevel>** element shall adhere to the following requirements • The **<interactivitylevel>** element shall appear 0 or 1 time. • The **<interactivitylevel>** element shall be represented as a VocabularyType. • The **<interactivitylevel>** element's value shall be a member of the following Restricted Vocabulary: o very low o low o medium o high o very high
1.5.6	The **<semanticdensity>** element shall adhere to the following requirements • The **<semanticdensity>** element shall appear 0 or 1 time. • The **<semanticdensity>** element shall be represented as a VocabularyType. • The **<semanticdensity>** element's value shall be a member of the following Restricted Vocabulary: o very low o low o medium o high o very high
1.5.7	The **<intendedenduserrole>** element shall adhere to the following requirements • The **<intendedenduserrole>** element shall appear 0 or More times. • The **<intendedenduserrole>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<intendedenduserrole>** element shall be represented as a VocabularyType. • The **<intendedenduserrole>** element's value shall be a member of the following Restricted Vocabulary: o Teacher o Author

Req. No.	Conformance Requirement
	○ Learner ○ Manager
1.5.8	The **<context>** element shall adhere to the following requirements: • The **<context>** element shall appear 0 or More times. • The **<context>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<context>** shall be represented as a VocabularyType. • Since the **<context>** element is a Best Practice vocabulary, if the **<context>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: ○ Primary Education ○ Secondary Education ○ Higher Education ○ University First Cycle ○ University Second Cycle ○ University Postgrade ○ Technical School First Cycle ○ Technical School Second Cycle ○ Professional Formation ○ Continuous Formation ○ Vocational Training
1.5.9	The **<typicalagerange>** element shall adhere to the following requirements: • The **<typicalagerange>** element shall appear 0 or More times. • The **<typicalagerange>** element shall be repeatable with a smallest permitted maximum of 5 items – *Not a conformance check, warning only.* • The **<typicalagerange>** element shall be represented as a LangStringType • The **<typicalagerange>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.5.10	The **<difficulty>** element shall adhere to the following requirements: • The **<difficulty>** element shall appear 0 or 1 time • The **<difficulty>** element shall be represented as a VocabularyType • The **<difficulty>** element's value shall be a member of the following Restricted Vocabulary: ○ very easy ○ easy ○ medium ○ difficult ○ very difficult
1.5.11	The **<typicallearningtime>** element shall adhere to the following requirements: • The **<typicallearningtime>** shall appear 0 or 1 time. • The **<typicallearningtime>** shall be represented as a DateType.
1.5.12	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted

Req. No.	Conformance Requirement
	maximum of 1000 characters – *Not a conformance check, warning only.*
1.5.13	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element shall have a smallest permitted maximum of 100 characters – Not a conformance check, warning only • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.6	The SCO Meta-data XML record's **<rights>** element shall adhere to the following requirements:
1.6.1	The **<rights>** element shall occur 1 and only 1 time.
1.6.2	The **<rights>** element shall contain the following sub-elements that adhere to the following requirements: • <cost> - mandatory • **<**copyrightandotherrestrictions> - mandatory • <description> - optional

1.6.3	The **<cost>** element shall adhere to the following requirements:
	• The **<cost>** element shall appear 1 and only 1 time.
	• The **<cost>** element shall be represented as a VocabularyType.
	• The **<cost>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ yes
	  ○ no

1.6.4	The **<copyrightandotherrestrictions>** element shall adhere to the following requirements:
	• The **<copyrightandotherrestrictions>** element shall appear 1 and only 1 time.
	• The **<copyrightandotherrestrictions>** element shall be represented as a VocabularyType.
	• The **<copyrightandotherrestrictions>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ yes
	  ○ no

1.6.5	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, only a warning.*
1.7	The SCO Meta-data XML record's **<relation>** element shall adhere to the following requirements:
1.7.1	The **<relation>** element shall contain the following sub-elements that adhere to the following requirements: • <kind> - optional

Req. No.	Conformance Requirement
	• <resource> - optional
1.7.2	The **<relation>** element shall occur 0 or More times. • The **<relation>** shall be repeated with a smallest permitted maximum of 100 items – *Not a conformance check, warning only.*

1.7.3	The **<kind>** element shall adhere to the following requirements:
	• The **<kind>** element shall appear 0 or 1 time.
	• The **<kind>** shall be represented as a VocabularyType.
	• Since the **<kind>** element is a Best Practice vocabulary, if the **<kind>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ IsPartOf
	  ○ HasPart
	  ○ IsVersionOf
	  ○ HasVersion
	  ○ IsFormatOf
	  ○ HasFormat
	  ○ References
	  ○ IsReferencedBy
	  ○ IsBasedOn
	  ○ IsBasisFor
	  ○ Requires
	  ○ IsRequiredBy

1.7.4	The **<resource>** element shall occur 0 or 1 time.
1.7.4.1	The **<resource>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <description> - optional • <catalogentry> - optional
1.7.4.2	The **<identifier>** element is RESERVED and shall not be used at this time.
1.7.4.3	The **<description>** element shall adhere to the following requirements: • The <description> element shall appear 0 or 1 time. • The <description> element shall be represented as a LangStringType. • The <description> element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.7.4.4	The **<catalogentry>** element shall occur 0 or More times. • The <catalogentry> shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.7.4.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.7.4.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used).

Req. No.	Conformance Requirement
	• The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.7.4.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.8	following requirements:
1.8.1	The **<annotation>** element shall contain the following sub-elements that adhere to the following requirements: • <person> - optional • <date> - optional • <description> - optional
1.8.2	The **<annotation>** element shall occur 0 or More times. • The **<annotation>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.8.3	The **<person>** element shall adhere to the following requirements: • The **<person>** shall appear 0 or 1 time. • The **<person>** shall be represented as a character string. • The **<person>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<person>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.8.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** element shall be represented as a DateType.
1.8.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.9	The SCO Meta-data XML record's **<classification>** element shall adhere to the following requirements:
1.9.1	The **<classification>** element shall contain the following sub-elements that adhere to the following requirements: • <purpose> - mandatory • <taxonpath> - optional • <description> - mandatory • <keyword> - mandatory
1.9.2	The **<classification>** element shall occur 1 or More times.

Req. No.	Conformance Requirement
	• The **<classification>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
1.9.3	The **<purpose>** element shall adhere to the following requirements: • The **<purpose>** element shall appear 1 and only 1 time. • The **<purpose>** shall be represented as a VocabularyType. • Since the **<purpose>** element is a Best Practice vocabulary, if the **<purpose>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: o Discipline o Idea o Prerequisite o Educational Objective o Accessibility Restrictions o Educational Level o Skill Level o Security Level
1.9.4	The **<taxonpath>** element shall occur 0 or More times. • The **<taxonpath>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.1	If used the **<taxonpath>** element shall contain the following sub-elements that adhere to the following requirements: • <source> - optional • <taxon> - optional
1.9.4.2	The **<source>** element shall adhere to the following requirements: • The **<source>** shall appear 0 or 1 time. • The **<source>** shall be represented as a character string. • The **<source>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.9.4.3	The **<taxon>** element shall occur 0 or More times. • The **<taxon>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.3.1	If used the **<taxon>** element shall contain the following sub-elements that adhere to the following requirements: • **<id>** - optional • **<entry>** - optional • **<taxon>** - optional
1.9.4.3.2	The **<id>** element shall adhere to the following requirements: • The **<id>** element shall appear 0 or 1 time. • The **<id>** element shall be represented as a character string. • The **<id>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.*
1.9.4.3.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** element shall appear 0 or 1 time. • The **<entry>** element shall be represented as a LangStringType.

Req. No.	Conformance Requirement
	• The **<entry>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*
1.9.4.3.4	The **<taxon>** element shall adhere to the requirements in 1.9.4.3
1.9.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 1 and only 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.*
1.9.6	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 1 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

Table 2.1.3.2a: Sharable Content Object (SCO) Meta-data Application Profile Conformance Requirements

2.1.3.3 Content Aggregation Conformance Requirements

The requirements in the following table apply to Content Aggregation Meta-data instances as specified within the table entries. For example, requirement 2.1 in Table 2.1.3a states which meta-data elements must be implemented correctly in order for the meta-data instance to be certified "SCORM Version 1. 2 Meta-data XML Conformant – Minimum with Optional Elements" (MD-XML1+Optional). Table 2.1.3.3a contains the conformance requirements for implementation of Content Aggregation Meta-data.

	Conformance Requirement
1	The Content Aggregation Meta-data XML record must adhere to the following requirements.
1.1	that adheres to the following requirements:
1.1.1	The **<general>** element shall occur 1 and only 1 time.
1.1.2	The **<general>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <title> - mandatory • <catalogenty> - mandatory • <language> - optional • <description> - mandatory • <keyword> - mandatory • <coverage> - optional • <structure> - optional

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	• <aggregationlevel> - optional
1.1.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.1.4	The **<title>** element shall adhere to the following: • The **<title>** shall appear 1 and only 1 time. • The **<title>** shall be represented as a LangStringType. • The **<title>** element's values length shall have a smallest permitted maximum of 1000 characters - *Not a conformance check, warning only.*
1.1.5	The **<catalogentry>** element shall occur 1or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.1.5.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.1.5.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.1.5.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.6	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.1.7	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 1 or More times. • The **<description>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, only a warning.*

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1.1.8	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 1 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.1.9	The **<coverage>** element shall adhere to the following requirements: • The **<coverage>** shall appear 0 or More times. • The **<coverage>** element shall be repeated with a smallest permitted maximum of 10 items, *Not a conformance check, warning only.* • The **<coverage>** element shall be represented as a LangStringType. • The **<coverage>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.1.10	The **<structure>** element shall adhere to the following requirements:
	• The **<structure>** element shall appear 0 or 1 time.
	• The **<structure>** element shall be represented as a VocabularyType.
	• The **<structure>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Collection
	  ○ Mixed
	  ○ Linear
	  ○ Hierarchical
	  ○ Networked
	  ○ Branched
	  ○ Parceled
	  ○ Atomic

1.1.11	The **<aggregationlevel>** element shall adhere to the following requirements:
	• The **<aggregationlevel>** shall appear 0 or 1 time.
	• The **<aggregationlevel>** shall be represented as a VocabularyType.
	• The **<aggregationlevel>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ 1
	  ○ 2
	  ○ 3
	  ○ 4

1.2	The Content Aggregation Meta-data XML record's **<lifecycle>** element shall adhere to the following requirements:
1.2.1	The **<lifecycle>** element shall occur 1 and only 1 time.
1.2.2	The **<lifecycle>** element shall contain the following sub-elements that adhere to the following requirements: • <version> - mandatory • <status> - mandatory • <contribute> - optional
1.2.3	The **<version>** element shall adhere to the following requirements: • The **<version>** element shall appear 1 and only 1 time.

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	• The **<version>** element shall be represented as a LangStringType. • The **<version>** element's values length shall have a smallest permitted maximum of 50 characters – *Not a conformance check, warning only.*

1.2.4	The **<status>** element shall adhere to the following requirements:
	• The **<status>** element shall appear 1 and only 1 time.
	• The **<status>** element shall be represented as a VocabularyType.
	• The **<status>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Draft
	  ○ Final
	  ○ Revised
	  ○ Unavailable

1.2.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.2.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional • <date> - optional

1.2.5.2	The **<role>** element shall adhere to the following requirements:
	• The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used).
	• The **<role>** shall be represented by as a VocabularyType.
	• Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Author (Recommended that exactly 1 Author exists)
	  ○ Publisher
	  ○ Unknown
	  ○ Initiator
	  ○ Terminator
	  ○ Validator
	  ○ Editor
	  ○ Graphical Designer
	  ○ Technical Implementer
	  ○ Content Provider
	  ○ Technical Validator
	  ○ Educational Validator
	  ○ Script Writer
	  ○ Instructional Designer

1.2.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times. • The **<centity>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's values length shall have a smallest permitted

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	maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a <vcard> element. • The elements value shall be required to follow the Vcard Specification[6].
1.2.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3	The Content Aggregation Meta-data XML record's **<metametadata>** element shall adhere to the following requirements:
1.3.1	The **<metametadata>** element shall occur 1 and only 1 time.
1.3.2	The **<metametadata>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <catalogentry> - optional • <contribute> - optional • <metadatascheme> - mandatory • <language> - optional
1.3.3	The **<identifier>** element is RESERVED and shall not be used at this time.
1.3.4	The **<catalogentry>** element shall occur 0 or More times. • The **<catalogentry>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.3.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.3.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.3.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the **<catalogentry>** element is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.3.5	The **<contribute>** element shall occur 0 or More times. • The **<contribute>** shall be repeated with a smallest permitted maximum of 10 items – Not a conformance check, warning only.
1.3.5.1	If used the **<contribute>** element shall contain the following sub-elements that adhere to the following requirements: • <role> - optional • <centity> - optional

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	• <date> - optional
1.3.5.2	The **<role>** element shall adhere to the following requirements: • The **<role>** shall appear 1 and only 1 time (if the <contribute> element is used). • The **<role>** shall be represented by as a VocabularyType. • Since the **<role>** element is a Best Practice vocabulary, if the **<role>** element is representing using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following o Creator (Recommended that exactly 1 Creator exist) o Validator
1.3.5.3	The **<centity>** element shall adhere to the following requirements: • The **<centity>** shall appear 0 or More times. • The **<centity>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<centity>** shall be represented as a character string. • The **<centity>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<centity>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.3.5.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** shall be represented as a DateType.
1.3.6	The **<metadatascheme>** element shall adhere to the following requirements: • The **<metadatascheme>** shall appear 1 or More times. • The **<metadatascheme>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<metadatascheme>** shall be represented as a character string. • The **<metadatascheme>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.3.7	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or 1 time. • The **<language>** element shall be represented as a character string. • The **<language>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, only a warning.* • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.4	The Content Aggregation Meta-data XML record's **<technical>** element shall adhere to the following requirements:
1.4.1	The **<technical>** element shall occur 1 and only 1 time.
1.4.2	The **<technical>** element shall contain the following sub-elements that adhere to the following requirements: • <format> - mandatory • <size> - optional • <location> - mandatory • <requirement> - optional

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	• <installationremarks> - optional • <otherplatformrequirements> - optional • <duration> - optional

1.4.3	The **<format>** element shall adhere to the following requirements:
	• The **<format>** element shall appear 0 or More times.
	• The **<format>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
	• The **<format>** element shall be represented as a character string.
	• The **<format>** element's value shall be a member of a Restricted Vocabulary:
	  o A valid MIME type
	  o non-digital
	• The **<format>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*

1.4.4	The **<size>** element shall adhere to the following requirements: • The **<size>** element shall appear 0 or 1 time. • The **<size>** element shall be represented as a character string. • The **<size>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.* • The **<size>** element shall be expressed as an integer number of bytes.
1.4.5	The **<location>** element shall adhere to the following requirements: • The **<location>** element shall appear 1 or More times. • The **<location>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<location>** element shall be represented as a character string. • The **<location>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.4.5.1	The **<location>** element shall have an ***type*** attribute the adheres to the following requirements:
	• 1 and only 1 attribute ***type***.
	• The ***type*** attribute shall be represented as a character string that has the following set of restricted values:
	  o URI
	  o TEXT

1.4.6	The **<requirement>** element shall occur 0 or More times. • The **<requirement>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
1.4.6.1	If used the **<requirement>** element shall contain the following sub-elements that adhere to the following requirements: • <type> - optional • <name> - optional • <minimumversion> - optional • <maximumversion> - optional
1.4.6.2	The **<type>** element shall adhere to the following requirements: • The **<type>** element shall appear 0 or 1 time. • The **<type>** shall be represented by as a VocabularyType. • Since the **<type>** element is a Best Practice vocabulary, if the **<type>**

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	element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following o Operating System o Browser It is considered Best Practice to include a <name> element and value if the <type> element is used.
1.4.6.3	The **<name>** element shall adhere to the following requirements: • The **<name>** element shall appear 0 or 1 time. • The **<name>** shall be represented as a VocabularyType. • Since the **<name>** element is a Best Practice vocabulary, if the **<name>** element is represented using the Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: o If the **<type**> element is used and set to "Operating System" ▪ PC-DOS ▪ MS-Windows ▪ MacOS ▪ Unix ▪ Multi-OS ▪ Other ▪ None o If the **<type>** element is used and set to "Browser" ▪ Any ▪ Netscape Communicator ▪ Microsoft Internet Explorer ▪ Opera o If the **<type>** element is used and set to something else ▪ Open Vocabulary It is considered Best Practice to include a <name> element and value if the <type> element is used.
1.4.6.4	The **<minimumversion>** element shall adhere to the following requirements: • The **<minimumversion>** element shall appear 0 or 1 time. • The **<minimumversion>** element shall be represented as a character string. • The **<minimumversion>** element's values length shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.4.6.5	The **<maximumversion>** element shall adhere to the following requirements: • The **<maximumversion>** element shall appear 0 or 1 time. • The **<maximumversion>** element shall be represented as a character string. • The **<maximumversion>** elements value shall have a smallest permitted maximum of 30 characters – *Not a conformance check, warning only.*
1.4.7	The **<installationremarks>** element shall adhere to the following requirements: • The **<installationremarks>** element shall appear 0 or 1 time. • The **<installationremarks>** element shall be represented as a LangStringType. • The **<installationremarks>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check ,*

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	warning only.
1.4.8	The **<otherplatformrequirements>** element shall adhere to the following requirements: • The **<otherplatformrequirements>** element shall appear 0 or 1 time. • The **<otherplatformrequirements>** element shall be represented as a LangStringType. • The **<otherplatformrequirements>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check , warning only.*
1.4.9	The **<duration>** element shall adhere to the following requirements: • The **<duration>** element shall appear 0 or 1 time. • The **<duration>** element shall be represented as a DateType.
1.5	The Content Aggregation Meta-data XML record's **<educational>** element shall adhere to the following requirements:
1.5.1	The **<educational>** element shall occur 0 or 1 time.
1.5.2	The **<educational>** element shall contain the following sub-elements that adhere to the following requirements: • <interactivitytype> - optional • <learningresourcetype> - optional • <interactivitylevel> - optional • <semanticdensity> - optional • <intendedenduserrole> - optional • <context> - optional • <typicalagerange> - optional • <difficulty> - optional • <typicallearningtime> - optional • <description> - optional • <language> - optional

1.5.3	The **<interactivitytype>** element shall adhere to the following requirements
	• The **<interactivitytype>** element shall appear 0 or 1 time.
	• The **<interactivitytype>** element shall be represented as a VocabularyType.
	• The **<interactivitytype>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ Active
	  ○ Expositive
	  ○ Mixed
	  ○ Undefined

1.5.4	The **<learningresourcetype>** element shall adhere to the following requirements: • The **<learningresourcetype>** element shall appear 0 or More times. • The **<learningresourcetype>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<learningresourcetype>** shall be represented as a VocabularyType. • Since the **<learningresourcetype>** element is a Best Practice vocabulary, if the **<learningresourcetype>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is

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	not a member of the following: o Exercise o Simulation o Questionnaire o Diagram o Figure o Graph o Index o Slide o Table o Narrative Text o Exam o Experiment o Problem Statement o Self Assessment
1.5.5	The **<interactivitylevel>** element shall adhere to the following requirements • The **<interactivitylevel>** element shall appear 0 or 1 time. • The **<interactivitylevel>** element shall be represented as a VocabularyType. • The **<interactivitylevel>** element's value shall be a member of the following Restricted Vocabulary: o very low o low o medium o high o very high
1.5.6	The **<semanticdensity>** element shall adhere to the following requirements • The **<semanticdensity>** element shall appear 0 or 1 time. • The **<semanticdensity>** element shall be represented as a VocabularyType. • The **<semanticdensity>** element's value shall be a member of the following Restricted Vocabulary: o very low o low o medium o high o very high
1.5.7	The **<intendedenduserrole>** element shall adhere to the following requirements • The **<intendedenduserrole>** element shall appear 0 or More times. • The **<intendedenduserrole>** shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.* • The **<intendedenduserrole>** element shall be represented as a VocabularyType. • The **<intendedenduserrole>** element's value shall be a member of the following Restricted Vocabulary: o Teacher o Author o Learner o Manager
1.5.8	The **<context>** element shall adhere to the following requirements:

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	• The **<context>** element shall appear 0 or More times.
	• The **<context>** element shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
	• The **<context>** shall be represented as a VocabularyType.
	• Since the **<context>** element is a Best Practice vocabulary, if the **<context>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Primary Education
	  ○ Secondary Education
	  ○ Higher Education
	  ○ University First Cycle
	  ○ University Second Cycle
	  ○ University Postgrade
	  ○ Technical School First Cycle
	  ○ Technical School Second Cycle
	  ○ Professional Formation
	  ○ Continuous Formation
	  ○ Vocational Training

1.5.9	The **<typicalagerange>** element shall adhere to the following requirements: • The **<typicalagerange>** element shall appear 0 or More times. • The **<typicalagerange>** element shall be repeatable with a smallest permitted maximum of 5 items – *Not a conformance check, warning only.* • The **<typicalagerange>** element shall be represented as a LangStringType • The **<typicalagerange>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

1.5.10	The **<difficulty>** element shall adhere to the following requirements:
	• The **<difficulty>** element shall appear 0 or 1 time
	• The **<difficulty>** element shall be represented as a VocabularyType
	• The **<difficulty>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ very easy
	  ○ easy
	  ○ medium
	  ○ difficult
	  ○ very difficult

1.5.11	The **<typicallearningtime>** element shall adhere to the following requirements: • The **<typicallearningtime>** shall appear 0 or 1 time. • The **<typicallearningtime>** shall be represented as a DateType.
1.5.12	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.5.13	The **<language>** element shall adhere to the following requirements: • The **<language>** element shall appear 0 or More times. • The **<language>** element shall be repeated with a smallest permitted

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	maximum of 10 items – *Not a conformance check, warning only.* • The **<language>** element shall be represented as a character string. • The **<language>** element shall have a smallest permitted maximum of 100 characters – Not a conformance check, warning only • The **<language>** shall be expressed as per ISO 639 and ISO 3166
1.6	The Content Aggregation Meta-data XML record's **<rights>** element shall adhere to the following requirements:
1.6.1	The **<rights>** element shall occur 1 and only 1 time.
1.6.2	The **<rights>** element shall contain the following sub-elements that adhere to the following requirements: • <cost> - mandatory • <copyrightandotherrestrictions> - mandatory • <description> - optional

1.6.3	The **<cost>** element shall adhere to the following requirements:
	• The **<cost>** element shall appear 1 and only 1 time.
	• The **<cost>** element shall be represented as a VocabularyType.
	• The **<cost>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ yes
	  ○ no

1.6.4	The **<copyrightandotherrestrictions>** element shall adhere to the following requirements:
	• The **<copyrightandotherrestrictions>** element shall appear 1 and only 1 time.
	• The **<copyrightandotherrestrictions>** element shall be represented as a VocabularyType.
	• The **<copyrightandotherrestrictions>** element's value shall be a member of the following Restricted Vocabulary:
	  ○ yes
	  ○ no

1.6.5	The **<description>** element shall adhere to the following requirements: • The **<description>** shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, only a warning.*
1.7	The Content Aggregation Meta-data XML record's **<relation>** element shall adhere to the following requirements:
1.7.1	The **<relation>** element shall contain the following sub-elements that adhere to the following requirements: • <kind> - optional • <resource> - optional
1.7.2	The **<relation>** element shall occur 0 or More times. • The **<relation>** shall be repeated with a smallest permitted maximum of 100 items – *Not a conformance check, warning only.*

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1.7.3	The **<kind>** element shall adhere to the following requirements: • The **<kind>** element shall appear 0 or 1 time. • The **<kind>** shall be represented as a VocabularyType. • Since the **<kind>** element is a Best Practice vocabulary, if the **<kind>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following: o IsPartOf o HasPart o IsVersionOf o HasVersion o IsFormatOf o HasFormat o References o IsReferencedBy o IsBasedOn o IsBasisFor o Requires o IsRequiredBy
1.7.4	The **<resource>** element shall occur 0 or 1 time.
1.7.4.1	The **<resource>** element shall contain the following sub-elements that adhere to the following requirements: • <identifier> - RESERVED • <description> - optional • <catalogentry> - optional
1.7.4.2	The **<identifier>** element is RESERVED and shall not be used at this time.
1.7.4.3	The **<description>** element shall adhere to the following requirements: • The <description> element shall appear 0 or 1 time. • The <description> element shall be represented as a LangStringType. • The <description> element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.7.4.4	The **<catalogentry>** element shall occur 0 or More times. • The <catalogentry> shall be repeated with a smallest permitted maximum of 10 items – *Not a conformance check, warning only.*
1.7.4.4.1	If used the **<catalogentry>** element shall contain the following sub-elements that adhere to the following requirements: • <catalog> - optional • <entry> - optional
1.7.4.4.2	The **<catalog>** element shall adhere to the following requirements: • The **<catalog>** shall appear 1 and only 1 time (if the <catalogentry> element is used). • The **<catalog>** shall be represented as a character string. • The **<catalog>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.7.4.4.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** shall appear 1 and only 1 time (if the <catalogentry> element

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	is used). • The **<entry>** shall be represented as a LangStringType. • The **<entry>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.8	The Content Aggregation Meta-data XML record's **<annotation>** element shall adhere to the following requirements:
1.8.1	The **<annotation>** element shall contain the following sub-elements that adhere to the following requirements: • <person> - optional • <date> - optional • <description> - optional
1.8.2	The **<annotation>** element shall occur 0 or More times. • The **<annotation>** shall be repeated with a smallest permitted maximum of 30 items – *Not a conformance check, warning only.*
1.8.3	The **<person>** element shall adhere to the following requirements: • The **<person>** shall appear 0 or 1 time. • The **<person>** shall be represented as a character string. • The **<person>** element's value shall have a smallest permitted maximum length of 1000 characters – *Not a conformance check, warning only.* • The **<person>** shall be bound within a **<vcard>** element. • The elements value shall be required to follow the Vcard Specification[6].
1.8.4	The **<date>** element shall adhere to the following requirements: • The **<date>** element shall appear 0 or 1 time. • The **<date>** element shall be represented as a DateType.
1.8.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.9	The Content Aggregation Meta-data XML record's **<classification>** element shall adhere to the following requirements:
1.9.1	The **<classification>** element shall contain the following sub-elements that adhere to the following requirements: • <purpose> - mandatory • <taxonpath> - optional • <description> - mandatory • <keyword> - mandatory
1.9.2	The **<classification>** element shall occur 1 or More times. • The **<classification>** shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.*
1.9.3	The **<purpose>** element shall adhere to the following requirements: • The **<purpose>** element shall appear 1 and only 1 time. • The **<purpose>** shall be represented as a VocabularyType.

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	• Since the **<purpose>** element is a Best Practice vocabulary, if the **<purpose>** element is represented using the SCORM Best Practice vocabulary a warning will be issued if the elements values is not a member of the following:
	  ○ Discipline
	  ○ Idea
	  ○ Prerequisite
	  ○ Educational Objective
	  ○ Accessibility Restrictions
	  ○ Educational Level
	  ○ Skill Level
	  ○ Security Level

1.9.4	The **<taxonpath>** element shall occur 0 or More times. • The **<taxonpath>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.1	If used the **<taxonpath>** element shall contain the following sub-elements that adhere to the following requirements: • <source> - optional • <taxon> - optional
1.9.4.2	The **<source>** element shall adhere to the following requirements: • The **<source>** shall appear 0 or 1 time. • The **<source>** shall be represented as a character string. • The **<source>** length shall have a smallest permitted maximum of 1000 characters – *Not a conformance test, warning only.*
1.9.4.3	The **<taxon>** element shall occur 0 or More times. • The **<taxon>** shall be repeated with a smallest permitted maximum of 15 items – *Not a conformance check, warning only.*
1.9.4.3.1	If used the **<taxon>** element shall contain the following sub-elements that adhere to the following requirements: • <id> - optional • <entry> - optional • <taxon> - optional
1.9.4.3.2	The **<id>** element shall adhere to the following requirements: • The **<id>** element shall appear 0 or 1 time. • The **<id>** element shall be represented as a character string. • The **<id>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.*
1.9.4.3.3	The **<entry>** element shall adhere to the following requirements: • The **<entry>** element shall appear 0 or 1 time. • The **<entry>** element shall be represented as a LangStringType. • The **<entry>** element's values length shall have a smallest permitted maximum of 500 characters – *Not a conformance check, warning only.*
1.9.4.3.4	The **<taxon>** element shall adhere to the requirements in 1.9.4.3
1.9.5	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 1 and only 1 time.

Req. No.	Conformance Requirement
	• The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.*
1.9.6	The **<keyword>** element shall adhere to the following requirements: • The **<keyword>** shall appear 1 or More times. • The **<keyword>** element shall be repeated with a smallest permitted maximum of 40 items – *Not a conformance check, warning only.* • The **<keyword>** element shall be represented as a LangStringType. • The **<keyword>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

Table 2.1.3.3a: Content Aggregation Meta-data Application Profile Conformance Requirements

2.1.3.4 Data Type Conformance Requirements

Table 2.1.3.4a, contains the conformance requirements for implementation of all the meta-data element types. This table describes three data types: DateType, LangStringType, and VocabularyType, all of which are used to describe the meta-data elements defined in the SCORM Meta-data Application Profiles.

Req. No.	Conformance Requirement
1	All elements that are represented by the **DateType** shall adhere to the following requirements:
1.1	The **DateType** shall contain the following sub-elements that adhere to the following requirements: • <datetime> - mandatory • <description> - optional
1.1.1	The **<datetime>** element shall adhere to the following requirements: • The **<datetime>** element shall appear 1 and only 1 time. • The **<datetime>** element shall be represented as a character string. • The **<datetime>** element's values length shall have a smallest permitted maximum of 200 characters. • The **<datetime>** element shall be expressed as per ISO 8601. • The **<datetime>** element shall adhere to the best practice of being represented as a Universal date/time format – *Not a conformance check, warning only.*
1.1.2	The **<description>** element shall adhere to the following requirements: • The **<description>** element shall appear 0 or 1 time. • The **<description>** element shall be represented as a LangStringType. • The **<description>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.2	All elements that are represented by the **LangStringType** shall adhere to the following requirements:

Req. No.	Conformance Requirement
1.2.1	The **LangStringType** shall be represented by a **<langstring>** element that adheres to the following requirements: • The **<langstring>** element's values length shall adhere to the smallest permitted maximum number of characters as defined by its parent element – *Not a conformance check, warning only.* • The **<langstring>** element shall appear 0 or More times • The **<langstring>** element's values length shall have a smallest permitted maximum of 1000 characters - *Not a conformance check, warning only.* • The **<langstring>** element shall repeat and adhere to the smallest permitted maximum of 10 items. • If the **<langstring>** is repeated, the ***xml:lang*** attribute must be set to a different language.
1.2.1.1	The **<langstring>** element shall contain an ***xml:lang*** attribute that adhere to the following requirements: • The ***xml:lang*** attribute shall appear 0 or 1 time. • If the **<langstring>** element is repeated, then the ***xml:lang*** attribute must be set to a different language. • If the ***xml:lang*** attribute is being used for a **<langstring>** element in a VocabularyType, then the ***xml:lang*** attribute shall be set to **x-none**. • The ***xml:lang*** attribute shall adhere to the ISO639 and ISO3166 standards.
1.3	All elements that are represented by the **VocabularyType** shall adhere to the following requirements:
1.3.1	The **VocabularyType** shall contain the following sub-elements that adhere to the following requirements: • <source> - mandatory • <value> - mandatory
1.3.2	The **<source>** element shall adhere to the following requirements: • The **<source>** element shall appear 1 and only 1 time. • The **<source>** element shall be represented as a LangStringType. • The **<source>** element shall contain an ***xml:lang*** attribute. o The ***xml:lang*** attribute shall be set to a string with a value of "x-none". • The **<source>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*
1.3.3	The **<value>** element shall adhere to the following requirements: • The **<value>** element shall appear 1 and only 1 time. • The **<value>** element shall be represented as a LangStringType. • The **<value>** element shall contain an ***xml:lang*** attribute. o The ***xml:lang*** attribute shall be set to a string with a value of "x-none". • The **<value>** element's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.*

Table2.1.3.4a Data Type Conformance Requirements

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2.1.4. Content Packaging Conformance Requirements

This section defines the conformance requirements for SCORM Content Packages. There are currently two defined Content Packaging Application Profiles as defined in Section 2.3 of the SCORM Content Aggregation Model[1]:

1. Resource Package – a package containing a collection of learning resources.
2. Content Aggregation Package – a packaged containing a collection of organized (content structure) learning resources.

This section contains several requirements tables the define requirements that must be met to be deemed SCORM Version 1.2 Content Packaging XML Conformant.

- Table 2.1.4a - contains the high-level requirements that both types of SCORM Content Packaging Application profiles must meet in order to be deemed conformant.
- Table 2.1.4.1a - defines the detail requirements for a Resource Package.
- Table 2.1.4.2a – defines the detailed requirements for a Content Aggregation Package.

Req. No.	Conformance Requirement
1	In order to be SCORM Version 1.2 Content Packaging XML Conformant (ADLCP-PIF1) the content package must adhere to the following requirements:
1.1	The manifest shall be named imsmanifest.xml
1.2	The imsmanifest.xml shall be placed at the root of the Package.
1.3	All supporting schemas shall be placed at the root of the Package.
1.4	If the Package is placed into a Packaging Interchange File (PIF), then the PIF shall be conformant with PKZIP Version 2.04g (.zip).
1.5	The imsmanifest.xml instance shall be well-formed.
1.6	The imsmanifest.xml instance shall validate against the IMS Content Packaging XML Schema Definition (XSD) – imscp_rootv1p1p2.xsd.
1.7	The imsmanifest.xml instance shall validate against the extensions in the ADL Content Packaging XML Schema Definition (XSD) – adlcp_rootv1p2.xsd.
1.8	The Content Package shall adhere to either the Resource Package Conformance Requirements or the Content Packaging Conformance Requirements.
1.9	The content package shall contain at least one SCO or Asset (SCORM learning resources)
1.10	All learning resources identified as SCOs, shall be at least SCO-RTE1 conformant.
1.11	All meta-data used in the manifest instance shall adhere to the SCORM Meta-data Application Profiles

Req. No.	Conformance Requirement
	Application Profiles.

Table 2.1.4a: High-Level Conformance Requirements

2.1.4.1 SCORM Resource Package Conformance Requirements

The SCORM Resource Package Application Profile defines a mechanism for packaging learning resources (for example, Assets and SCOs) without having to provide a specific organization, learning context, or curricular taxonomy. Packaging learning resources provides a common medium for exchange. The SCORM Resource Package is merely a collection of reusable learning resources that can be transferred between learning systems.

Req. No.	Conformance Requirement
1	The Resource Package Manifest (imsmanifest.xml) must adhere to the following requirements:
1.1	The Resource Package shall contain a **<manifest>** element that adheres to the following requirements:
1.1.1	The **<manifest>** (root) element shall appear 1 and only 1 time.
1.1.2	The **<manifest>** element shall contain the following attributes that adhere to the following requirements: • ***identifier*** – mandatory • ***version*** – optional
1.1.2.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest.
1.1.2.2	The ***version*** attribute shall adhere to the following requirements: • The ***version*** attribute shall appear 0 or 1 time. • The ***version*** attribute shall be represented as a character string. • The ***version*** attribute's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.*
1.1.3	The **<manifest>** element shall contain the following sub-elements that adhere to the following requirements: • <metadata> - optional • <organizations> - mandatory (Must be an empty element for a Resource Package) • <resources> - mandatory • <manifest> - optional
1.1.3.1	The **<metadata>** element shall adhere to the following requirements: • Currently there is not Package Meta-data Application Profile, therefore the Meta-data describing the package as a whole shall be valid IMS Learning Resource Meta-data.

Req. No.	Conformance Requirement
1.1.3.1.1	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Content Package.
1.1.3.1.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional • {Inline Meta-data} – optional
1.1.3.1.2.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.3.1.2.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.3.1.2.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.3.1.2.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.4	The **<organizations>** element shall adhere to the following requirements:
1.1.4.1	The **<organizations>** element shall be represented as an empty element (<organizations/>).
1.1.5	The **<resources>** element shall adhere to the following requirements:

Req. No.	Conformance Requirement
	• The **<resources>** element shall appear 1 and only 1 time.
1.1.5.1	The **<resources>** element shall contain the following sub-elements that adhere to the following requirements: • <resource> - mandatory
1.1.5.1.1	The **<resource>** element shall adhere to the following requirements: • The **<resource>** element shall appear 1 or More times.
1.1.5.1.2	The **<resource>** element shall contain the following attributes that adhere to the following requirements: • ***identifier*** – mandatory • ***type*** – mandatory • ***href*** – optional • ***adlcp:scormtype*** – mandatory
1.1.5.1.2.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest.
1.1.5.1.2.2	The ***type*** attribute shall adhere to the following requirements: • The ***type*** attribute shall appear 1 and only 1 time. • The ***type*** attribute shall be represented as a character string. • The ***type*** attribute's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.* • The ***type*** element's value shall be set to "webcontent".
1.1.5.1.2.3	The ***href*** attribute shall adhere to the following requirements: • The ***href*** attribute shall appear 0 or 1 time. • The ***href*** attribute shall be represented as a character string. • The ***href*** attribute's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* *This is value will be used as the launch location when the resource is launched.*
1.1.5.1.2.4	The ***adlcp:scormtype*** attribute shall adhere to the following requirements: • The ***adlcp:scormtype*** shall appear 1 and only 1 time. • The ***adlcp:scormtype*** shall be represented as a character string. • The ***adlcp:scormtype*** shall be set to either: o "sco" – if the learning resource is a SCO o "asset" if the learning resource is an Asset.
1.1.5.1.3	The **<resource>** element shall contain the following sub-elements that adhere to the following requirements: • <metadata> - optional • <file> - optional • <dependency> - optional
1.1.5.1.3.1	The **<metadata>** element shall adhere to the following requirements: • The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Resource. • If the Resource is a SCO, then the Meta-data shall be Conformant to the SCO Meta-data Application Profile Requirements.

Req. No.	Conformance Requirement
	• If the Resource is an Asset, then the Meta-data shall be Conformant to the Asset Meta-data Application Profile requirements.
1.1.5.1.3.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional • {Inline Meta-data} - optional
1.1.5.1.3.2.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.5.1.3.2.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.5.1.3.2.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.2.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.3	The **<file>** element shall adhere to the following requirements: • The **<file>** element shall appear 0 or More times. • The **<file>** element shall identify one or more local files that this resource is dependent on.

Req. No.	Conformance Requirement
	ADL Note: The <file> element is required if the resource is local to the content package.
1.1.5.1.3.3.1	The **<file>** element shall contain the following attributes that adhere to the following requirements: • ***href*** – mandatory
1.1.5.1.3.3.1.1	The ***href*** attribute shall adhere to the following requirements: • The ***href*** attribute shall appear 1 and only 1 time. • The ***href*** attribute shall be represented as a character string. • The ***href*** attribute's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.*
1.1.5.1.3.3.2	The **<file>** element shall contain the following elements that adhere to the following requirements: • **<metadata>** – optional
1.1.5.1.3.3.2.1	The **<metadata>** element shall adhere to the following requirements:
1.1.5.1.3.3.2.2	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the File. • The Meta-data shall be Conformant to the Asset Meta-data Application Profile Requirements.
1.1.5.1.3.3.2.3	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional • {Inline Meta-data} - optional
1.1.5.1.3.3.2.3.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.5.1.3.3.2.3.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.5.1.3.3.2.3.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check,*

Req. No.	Conformance Requirement
	warning only. • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.3.2.3.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.4	The **<dependency>** element shall adhere to the following requirements: • The **<dependency>** element shall appear 0 or More times. • The **<dependency>** element shall be represented as an empty element (</dependency>) • The **<dependency>** element shall contain a mandatory (1 and only 1) ***identifierref*** attribute. o The ***identifierref*** attribute shall be represented as an IDRef. o The ***identifierref*** attribute shall reference another **<resource>**.
1.1.6	The **<manifest>** (sub-manifest) shall adhere to the following requirements: • The **<manifest>** (sub-manifest) element shall appear 0 or More times. • The **<manifest>** (sub-manifest) element shall adhere to those requirements defined in this table for the **<manifest>** element.

Table 2.1.4.1a: Resource Package Application Profile Conformance Requirements

2.1.4.2 SCORM Content Aggregation Package Conformance Requirements

The SCORM Content Aggregation Package Application Profile defines a mechanism for packaging learning resources (for example, Assets and SCOs) with a specific organization, learning context, and/or curricular taxonomy. Depending on the curricular taxonomy defined by organizations, the Content Aggregation Package can represent a variety of content aggregations. Content Aggregation Packages can be built for whole courses and for individual pieces of the course (Modules, Chapters, Lesson, etc…).

Req. No.	Conformance Requirement
1	The Content Aggregation Package Manifest (imsmanifest.xml) must adhere to the following requirements:
1.1	The Content Aggregation Package shall contain a **<manifest>** element that adheres to the following requirements:
1.1.1	The **<manifest>** (root) element shall appear 1 and only 1 time.
1.1.2	The **<manifest>** element shall contain the following attributes that adhere to the following requirements: • ***identifier*** – mandatory • ***version*** - optional
1.1.2.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest.
1.1.2.2	The ***version*** attribute shall adhere to the following requirements: • The ***version*** attribute shall appear 0 or 1 time. • The ***version*** attribute shall be represented as a character string. • The ***version*** attribute's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.*
1.1.3	The **<manifest>** element shall contain the following sub-elements that adhere to the following requirements: • <metadata> - optional • <organizations> - mandatory • <resources> - mandatory • <manifest> - optional
1.1.3.1	The **<metadata>** element shall adhere to the following requirements: • Currently there is not Package Meta-data Application Profile, therefore the Meta-data describing the package as a whole shall be valid IMS Learning Resource Meta-data.
1.1.3.1.1	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Content Package.
1.1.3.1.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional

Req. No.	Conformance Requirement
	• <adlcp:location> - optional • {Inline Meta-data} - optional
1.1.3.1.2.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.3.1.2.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.3.1.2.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.3.1.2.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.4	The **<organizations>** element shall adhere to the following requirements: • The **<organizations>** element shall appear 1 and only 1 time.
1.1.4.1	The **<organizations>** element shall contain the following attributes that adhere to the following requirements: • default - optional
1.1.4.1.1	The ***default*** attribute shall adhere to the following requirements: • The ***default*** attribute shall appear 0 or 1 time. • The ***default*** attribute shall be represented as an XML IDRef type. • If used, the ***default*** attribute shall reference an ***identifier*** attribute of an **<organization>**. This Organization shall be deemed the default organization.

Req. No.	Conformance Requirement
	• If not used, the first **<organization>** encountered shall be treated as the default.
1.1.4.2	The **<organizations>** element shall contain the following sub-elements that adhere to the following requirements: • <organization> - mandatory
1.1.4.2.1	The **<organization>** element shall adhere to the following requirements: • The **<organization>** shall appear 1 or More times • The **<organization>** element shall represent the content structure of the content aggregation. • If multiple **<organization>** elements are used, they shall represent multiple content structures for the same content aggregation.
1.1.4.2.2	The **<organization>** element shall contain the following attributes that adhere to the following requirements: • identifier – mandatory • structure – optional
1.1.4.2.2.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest. • If multiple **<organization>** elements are used to define multiple content structures for the content aggregation, then it shall be best practice to use and set the ***default*** attribute of the **<organizations>** to reference an ***identifier*** attribute of one of the **<organization>** elements – *Not a conformance check, warning only.*
1.1.4.2.2.2	The ***structure*** attribute shall adhere to the following requirements: • The ***structure*** attribute shall appear 0 or 1 time. • The ***structure*** attribute shall be represented as a character string. • The ***structure*** attribute's values length shall have a smallest permitted maximum of 200 – *Not a conformance check, warning only.* • The ***structure*** attribute shall have a default value of "hierarchical".
1.1.4.2.3	The **<organization>** element shall contain the following sub-elements that adhere to the following requirements: • <title> - mandatory • <item> - mandatory • <metadata> - optional
1.1.4.2.3.1	The **<title>** element shall adhere to the following requirements: • The **<title>** element shall appear 1 and only 1 time. • The **<title>** element shall be represented as a character string. • The **<title>** element's values length shall have a smallest permitted maximum of 200 characters – *Not a conformance check, warning only.* *The LMS can use the **<title>** element to display this information to the learner.*
1.1.4.2.3.2	The **<item>** element shall adhere to the following requirements: • The **<item>** element shall appear 1 or More time.
1.1.4.2.3.2.1	The **<item>** element shall contain the following attributes that adhere to the following requirements:

Req. No.	Conformance Requirement
	following requirements: • identifier - mandatory • identifierref - optional • isvisible - optional • parameters - optional
1.1.4.2.3.2.1.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest
1.1.4.2.3.2.1.2	The ***identifierref*** attribute shall adhere to the following requirements: • The ***identifierref*** attribute shall appear 0 or 1 time. • The ***identifierref*** attribute shall be represented as a character string. • The ***identifierref*** attribute's values length shall have a smallest permitted maximum of 2000 characters – Not a conformance check, warning only. • The ***identifierref*** attribute shall reference either: o The ***identifier*** attribute of a <resource>, in the current Manifest o The ***identifier*** attribute of a <manifest> (sub-manifest) o Nothing, if **<item>** is not meant to reference any learning resource.
1.1.4.2.3.2.1.3	The ***isvisible*** attribute shall adhere to the following requirements: • The ***isvisible*** attribute shall appear 0 or 1 time. • The ***isvisible*** attribute shall be represented as a Boolean value. • The ***isvisible*** attribute's value shall be either "true" or "false". • The ***isvisible*** attribute shall indicate whether or not the <title> of the <item> is displayed by the LMS navigation mechanism.
1.1.4.2.3.2.1.4	The ***parameters*** attribute shall adhere to the following requirements: • The ***parameters*** attribute shall appear 0 or 1 time. • The ***parameters*** attribute shall be represented as a character string. • The ***parameters*** attribute's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.* *Replaces the <parameterString> element from the SCORM Version 1.1 deprecated CSF file.*
1.1.4.2.3.2.2	The **<item>** element shall contain the following sub-elements that adhere to the following requirements: • title – mandatory • item - optional • metadata – optional • adlcp:prerequisites - optional • adlcp:maxtimeallowed - optional • adlcp:timelimitaction - optional • adlcp:datafromlms - optional • adlcp:masteryscore - optional
1.1.4.2.3.2.2.1	The **<title>** element shall adhere to the following requirements: • The **<title>** element shall appear 1 and only 1 time. • The **<title>** element shall be represented as a character string. • The **<title>** element's values length shall have a smallest permitted maximum of 200 characters – *Not a conformance check, warning only.*

Req. No.	Conformance Requirement
	*If the **isvisible** attribute is true, an LMS can use the **<title>** element to display the title of the item in the LMS navigation mechanism.*
1.1.4.2.3.2.2.2	The **<item>** element shall adhere to those requirements stated above.
1.1.4.2.3.2.2.3	
1.1.4.2.3.2.2.3.1	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Item. • The meta-data shall be conformant with the Content Aggregation Meta-data Application Profile requirements, as stated in this document.
1.1.4.2.3.2.2.3.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional • {Inline Meta-data} – optional
1.1.4.2.3.2.2.3.3	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.4.2.3.2.2.3.4	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.4.2.3.2.2.3.5	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.4.2.3.2.2.3.6	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline*

Req. No.	Conformance Requirement
	with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.

1.1.4.2.3.2.2.4	The **<adlcp:prerequisites>** element shall adhere to the following requirements:
	• The **<adlcp:prerequisites>** element shall appear 0 or 1 time.
	• The **<adlcp:prerequisites>** element shall be represented as a character string.
	• The **<adlcp:prerequisites>** element's values length shall have a smallest permitted maximum of 200 characters – Not a conformance check, warning only.
	• The **<adlcp:prerequisites>** element shall be used to define what other parts of the learning content must have been completed before starting the **<item>**.
	• If used, the **<adlcp:prerequisites>** element shall adhere to the scripting language defined in Section 2.3.2.5.1 of the SCORM Content Aggregation Model.
	  ○ The **<adlcp:prerequisites>** element shall use the ***identifier*** attribute of other item elements define the prerequisites.
	• The **<adlcp:prerequisites>** element shall contain the following attribute that adheres to the following requirements:
	  ○ ***type*** – mandatory

1.1.4.2.3.2.2.4.1	The ***type*** attribute shall adhere to the following requirements: • The ***type*** attribute shall appear 1 and only 1 time (if the **<adlcp:prerequisites>** element is used). • The ***type*** attribute shall be represented by a restricted enumerated value. • The ***type*** attribute's value shall be set to "aicc_script".

1.1.4.2.3.2.2.5	The **<adlcp:maxtimeallowed>** element shall adhere to the following requirements:
	• The **<adlcp:maxtimeallowed>** element shall appear 0 or 1 time.
	• The **<adlcp:maxtimeallowed>** element shall be represented as a Timespan.
	  ○ The Timespan shall adhere to the following requirements:
	  ▪ The Timespan shall represent a length of time in hours, minutes and seconds the learner is permitted in the learning resource referenced to by the <item>.
	  ▪ The Timespan shall be represented in the following format: HHHH:MM:SS.SS
	  ▪ The Hours shall have a minimum of 2 digits.
	  ▪ The Hours shall have a maximum of 4 digits.
	  ▪ The Minutes shall consist of exactly 2 digits.
	  ▪ The Seconds shall contain 2 digits.
	  ▪ The Seconds shall contain and optional decimal point and 1 or 2 additional digits.
	• If provided, the LMS shall use the **<adlcp:maxtimeallowed>** element to initialize the cmi.student_data.max_time_allowed SCORM Run-Time Environment Data Model Element (if the data model element is supported by the LMS).
	• The **<adlcp:maxtimeallowed>** element shall only appear on **<item>** elements that reference SCO.

1.1.4.2.3.2.2.6	The **<adlcp:timelimitaction>** element shall adhere to the following requirements: • The **<adlcp:timelimitaction>** element shall appear 0 or 1 time. • The **<adlcp:timelimitaction>** element shall be represented as a restricted

Req. No.	Conformance Requirement
	vocabulary. o "exit,message" o "exit,no message" o "continue,message" o "continue,no message" • The **<adlcp:timelimitaction>** element shall define the action that should be taken by the LMS when the **<adlcp:maxtimeallowed>** in the current attempt of the **<item>** is exceeded. • If provided, the LMS shall use the **<adlcp:timelimitaction>** element to initialize the cmi.student_data.time_limit_action SCORM Run-Time Environment Data Model Element (if the data model element is supported by the LMS). • The **<adlcp:timelimitaction>** element shall only appear on **<item>** elements that reference SCOs.
1.1.4.2.3.2.2.7	The **<adlcp:datafromlms>** element shall adhere to the following requirements: • The **<adlcp:datafromlms>** element shall appear 0 or 1 time. • The **<adlcp:datafromlms>** element shall be represented as a character string. • The **<adlcp:datafromlms>** element's values length shall have a smallest permitted maximum of 255 – *Not a conformance check, only a warning.* • The **<adlcp:datafromlms>** element shall provide a place for initialization data expected by the learning resource (SCO) after launch. • If provided, the LMS shall use the **<adlcp:datafromlms>** element to initialize the cmi.launch_data SCORM Run-Time Environment Data Model Element.
1.1.4.2.3.2.2.8	The **<adlcp:masteryscore>** element shall adhere to the following requirements: • The **<adlcp:masteryscore>** element shall appear 0 or 1 time. • The **<adlcp:masteryscore>** element shall be represented as a character string. • The **<adlcp:masteryscore>** element's values length shall have a smallest permitted maximum of 200 – *Not a conformance check, warning only.* • The **<adlcp:masteryscore>** element shall provide a place to establish the passing score for the learning resource (SCO) represented by the <item>. • The **<adlcp:masteryscore>** element's value shall be a normalized value between 0 and 100. • If provided, the LMS shall use the **<adlcp:masteryscore>** element to initialize the cmi.student_data.mastery_score SCORM Run-Time Environment Data Model Element (if the data model element is supported by the LMS).
1.1.4.2.4	
1.1.4.2.4.1	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Organization. • The meta-data shall be conformant with the Content Aggregation Meta-data Application Profile requirements, as stated in this document.
1.1.4.2.4.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional

Req. No.	Conformance Requirement
	• {Inline Meta-data} – optional
1.1.4.2.4.2.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.4.2.4.2.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.4.2.4.2.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.4.2.4.2.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5	• The **<resources>** element shall appear 1 and only 1 time.
1.1.5.1	The **<resources>** element shall contain the following sub-elements that adhere to the following requirements: • <resource> - optional
1.1.5.1.1	The **<resource>** element shall adhere to the following requirements: • The **<resource>** element shall appear 0 or More times. *Note: The **<resource>** element is optional to allow a content package to be made up entirely of sub-manifests.*

Req. No.	Conformance Requirement
1.1.5.1.2	The **<resource>** element shall contain the following attributes that adhere to the following requirements: • ***identifier*** – mandatory • ***type*** – mandatory • ***href*** – optional • ***adlcp:scormtype*** – mandatory
1.1.5.1.2.1	The ***identifier*** attribute shall adhere to the following requirements: • The ***identifier*** attribute shall appear 1 and only 1 time. • The ***identifier*** attribute shall be represented as an XML ID type. • The ***identifier*** attribute shall be unique within the Manifest.
1.1.5.1.2.2	The ***type*** attribute shall adhere to the following requirements: • The ***type*** attribute shall appear 1 and only 1 time. • The ***type*** attribute shall be represented as a character string. • The ***type*** attribute's values length shall have a smallest permitted maximum of 1000 characters – *Not a conformance check, warning only.* • The ***type*** element's value shall be set to "webcontent".
1.1.5.1.2.3	The ***href*** attribute shall adhere to the following requirements: • The ***href*** attribute shall appear 0 or 1 time. • The ***href*** attribute shall be represented as a character string. • The ***href*** attribute's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* *This is value will be used as the launch location when the resource is launched.*

1.1.5.1.2.4	The ***adlcp:scormtype*** attribute shall adhere to the following requirements:
	• The ***adlcp:scormtype*** shall appear 1 and only 1 time.
	• The ***adlcp:scormtype*** shall be represented as a character string.
	• The ***adlcp:scormtype*** shall be set to either:
	  ○ "sco" – if the learning resource is a SCO
	  ○ "asset" if the learning resource is an Asset.

1.1.5.1.3	The **<resource>** element shall contain the following sub-elements that adhere to the following requirements: • <metadata> - optional • <file> - optional • <dependency> - optional
1.1.5.1.3.1	The **<metadata>** element shall adhere to the following requirements: • The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the Resource. • If the Resource is a SCO, then the Meta-data shall be Conformant to the SCO Meta-data Application Profile Requirements. • If the Resource is an Asset, then the Meta-data shall be Conformant to the Asset Meta-data Application Profile requirements.
1.1.5.1.3.2	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional

Req. No.	Conformance Requirement
	• {Inline Meta-data} - optional
1.1.5.1.3.2.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.5.1.3.2.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.5.1.3.2.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.2.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml • The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.3	The **<file>** element shall adhere to the following requirements: • The **<file>** element shall appear 0 or More times. • The **<file>** element shall identify one or more local files that this resource is dependent on. ADL Note: The <file> element is mandatory if the resource is local to the content package.
1.1.5.1.3.3.1	The **<file>** element shall contain the following attributes that adhere to the following requirements: • ***href*** – mandatory
1.1.5.1.3.3.1.1	The ***href*** attribute shall adhere to the following requirements: • The ***href*** attribute shall appear 1 and only 1 time.

Req. No.	Conformance Requirement
	• The ***href*** attribute shall be represented as a character string. • The ***href*** attribute's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.*
1.1.5.1.3.3.2	The **<file>** element shall contain the following elements that adhere to the following requirements: • **<metadata>** – optional
1.1.5.1.3.3.2.1	The **<metadata>** element shall adhere to the following requirements:
1.1.5.1.3.3.2.2	The **<metadata>** element shall appear 0 or 1 time. • The Meta-data shall describe the File. • The Meta-data shall be Conformant to the Asset Meta-data Application Profile Requirements.
1.1.5.1.3.3.2.3	The **<metadata>** element shall contain the following sub-elements that adhere to the following requirements: • <schema> - optional • <schemaversion> - optional • <adlcp:location> - optional • {Inline Meta-data} - optional
1.1.5.1.3.3.2.3.1	The **<schema>** element shall adhere to the following requirements: • The **<schema>** element shall appear 0 or 1 time. • The **<schema>** element shall be represented as a character string. • The **<schema>** element's values length shall have a smallest permitted maximum of 100 characters – *Not a conformance check, warning only.* • The **<schema>** element's value shall be set to "ADL SCORM"
1.1.5.1.3.3.2.3.2	The **<schemaversion>** element shall adhere to the following requirements: • The **<schemaversion>** element shall appear 0 or 1 time. • The **<schemaversion>** element shall be represented as a character string. • The **<schemaversion>** element's values length shall have a smallest permitted maximum of 20 characters – *Not a conformance check, warning only.* • The **<schemaversion>** element's value shall be set to "1.2".
1.1.5.1.3.3.2.3.3	The **<adlcp:location>** element shall adhere to the following requirements: • The **<adlcp:location>** element shall appear 1 and only 1 time (if the meta-data is not included inline with the rest of the Manifest) • The **<adlcp:location>** element shall be represented as a character string. This may be a Universal Resource Indicator (URI). • The **<adlcp:location>** element's values length shall have a smallest permitted maximum of 2000 characters – *Not a conformance check, warning only.* • The **<adlcp:location>** element shall only appear if there is no inline meta-data. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*
1.1.5.1.3.3.2.3.4	{Inline Meta-data} shall be properly namespaced with the imsmanifest.xml

Req. No.	Conformance Requirement
	• The Inline Meta-data shall only appear if there is no meta-data indicated by the **<adlcp:location>** element. *The Meta-data Creator has two options for including meta-data: 1. Either inline with the other XML found in the imsmanifest.xml; or 2. Use the <adlcp:location> element to reference the location of the meta-data instance.*

1.1.5.1.3.4	The **<dependency>** element shall adhere to the following requirements:
	• The **<dependency>** element shall appear 0 or More times.
	• The **<dependency>** element shall be represented as an empty element (</dependency>)
	• The **<dependency>** element shall contain a mandatory (1 and only 1) ***identifierref*** attribute.
	  ○ The ***identifierref*** attribute shall be represented as an IDRef.
	  ○ The ***identifierref*** attribute shall reference another **<resource>**.

1.1.6	The **<manifest>** (sub-manifest) shall adhere to the following requirements: • The **<manifest>** (sub-manifest) element shall appear 0 or More times. • The **<manifest>** (sub-manifest) element shall adhere to those requirements defined in this table for the **<manifest>** element.

Table 2.1.4.2a: Content Aggregation Package Application Profile Conformance Requirements

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A. Appendix A (Appendix Number Style)

APPENDIX A

Acronym List

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Acronym Listing

ADL	Advanced Distributed Learning
API	Application Program Interface
CMI	Computer Managed Instructions
CP	Content Packaging
DC	Dublin Core
DoD	Department of Defense
DOM	Document Object Model
HTTP	Hypertext Transfer Protocol
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
LMS	Learning Management System
LOM	Learning Objects Metadata
LTSC	Learning Technology Standards Committee
MD	Meta-data
MIME	Multipurpose Internet Mail Extensions
PIF	Package Interchange Format
RTE	Run-Time Environment
SCO	Sharable Content Object
SCORM	Sharable Content Object Reference Model
URI	Universal Resource Identifier
URL	Universal Resource Locator
XSD	XML Schema Definition
XML	eXtensible Markup Language

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B. Appendix B (Appendix Number Style)

APPENDIX B

References

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References

1. Sharable Content Object Reference Model Version 1.2.
   Includes:
   - The SCORM Overview
   - The SCORM Content Aggregation Model
   - The SCORM Run-Time Environment
   - The SCORM Version 1.2 Addendums

   Available at http://www.adlnet.org/

2. IMS Learning Resource Meta-data Specification Version 1.2.1
   Includes:
   - IMS Learning Resource Meta-data Information Model
   - IMS Learning Resource Meta-data XML Binding Specification
   - IMS Learning Resource Best Practice and Implementation Guide

   Available at http://www.imsglobal.org/

3. IMS Content Packaging Specification Version 1.1.2
   Includes:
   - IMS Content Packaging Information Model
   - IMS Content Packaging XML Binding
   - IMS Content Packaging Best Practice Guide

   Available at http://www.imsglobal.org/

4. AICC/CMI CMI001 Guidelines for Interoperability Version 3.4. October 23, 2000.
   Includes AICC Course Structure Format and AICC CMI Data Model
   Available at: http://www.aicc.org/

5. IEEE Information Technology – Learning Technology – Learning Objects Meta-data LOM: Working Draft 6.1 (2001-04-18).
   As referenced by the IMS Learning Resource Meta-data Specification Version 1.2.1.
   Available at: http://ltsc.ieee.org/

6. vCard: This is standard defines how contact details for people and organizations can be represented.
   Available at: http://www.imc.org/pdi/.

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C. Appendix C (Appendix Number Style)

APPENDIX C

Revision History

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Revision History

Version	Comment
Version 1.1	This is the first public release of this document
Version 1.2	The following changes were made: 1. Updated the LMS Conformance Requirements for SCORM Version 1.2 2. Updated the SCO Conformance Requirements for SCORM Version 1.2 3. Updated the Meta-data Conformance Requirements for SCORM Version 1.2 a. Split the conformance requirements up into three tables (Asset, SCO and Content Aggregation) b. Updated requirements to match IMS Learning Resource Meta-data Version 1.2.1 4. Added the Content Packaging Conformance Requirements for SCORM Version 1.2 5. Removed the Test Procedures to a separate document.
Version 1.2 01/04/2002	Incorrect reference to XML Schema Definition files in Table 2.1.4a: High-Level Conformance Requirements. Correction 1was to the IMS Content Packaging XML Schema Definition (XSD) file to be used. The correct version should be imscp_rootv1p1p2.xsd. Correction 2 was to the ADL Content Packaging XML Schema Definition (XSD) file to be used. The correct version should be adlcp_rootv1p2.xsd.
Version 1.2 02/15/2002	Updated the following: 1. Section 2.1.4.1 SCORM Resource Package Conformance Requirements. o Changed requirement 1.1.3 to state that the <organizations> element is mandatory and that it must be an empty element <organizations/> for all Resource Packages. o Changed requirement 1.1.5.1.3.3 to add and ADL Note stating that the <file> element is mandatory if the resource is local to the content package. o Changed requirement 1.1.5.1.3.3.1 to state that the href attribute of the <file> element is mandatory. o Changed requirement 1.1.5.1.3.3.1.1 to state that the href attribute shall appear 1 and only 1 time. 2. Section 2.1.4.2 SCORM Content Aggregation Package Conformance Requirements. o Changed requirement 1.1.5.1.3.3 to add and ADL Note stating that the <file> element is mandatory if the resource is local to the content package. o Changed requirement 1.1.5.1.3.3.1 to state that the href attribute of the <file> element is mandatory. o Changed requirement 1.1.5.1.3.3.1.1 to state that the href attribute shall appear 1 and only 1 time. 3. Section 2.1.1.2 LMS Run-Time Environment API Requirements o Changed the reference to the textual string for error code 203, found in requirement 8.5, to state “Element not an array – cannot have count”. o Changed requirement 9.3.8. Corrected the wording for the handling of index values to: “…the index provided for the element must be less than or equal to the current number of elements…” o Changed requirement 10.2 to correct the textual description of error code 203. Changed the description to “Element not an array – cannot have children”

	○ Changed requirement 11.2 to correct the textual description of error code 203. Changed the description to "Element not an array – cannot have children" 4. Section 2.1.1.3 LMS Run-Time Environment Data Model Conformance Requirements. ○ Updated the following requirements: 6.3.5, 6.4.1.4, 6.4.2.5, 6.4.3.5, 6.4.4.5, 6.5.5, 9.3.3, 9.4.2.3, 9.5.3, 9.6.3, 9.7.1.4, 9.7.2.3, 9.8.3, 9.9.3, 9.10.3, 9.11.3. Corrected the wording for the handling of index values to: "Accept only elements where the list index (n) is less than or equal to the number of elements currently in the list".