



Advanced Distributed Learning

Sharable Content Object Reference Model
(SCORM™)
Packaging Application Profiles

Version 1.0 DRAFT

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1.1. Purpose

The primary purpose of this document is to describe the integration of the IMS Content Packaging Specification within the ADL environment. The SCORM Packaging Application Profiles are being provided to allow the ADL Community the opportunity to perform test and evaluation activities on the Packaging Application Profiles before they are included in the SCORM.

This Application Profile will be used as a basis for collaborative test and evaluation activities planned as part of the Plugfest 4 event. This Application Profile should be used to guide the ADL Community in the development of SCORM Packages. One of the focal points of Plugfest 4 will be to test and provide support in the development of SCORM Packages. It is anticipated that the Packaging Application Profiles that this document defines will be incorporated into the SCORM Version 1.2.

The SCORM Packaging Application Profiles are in a Final Draft version. This document should still be considered a work in progress. ADL is asking that any feedback on the Application Profile or examples be submitted to the ADL Technical Team as a post to the Implementing the SCORM Web board located in the Collaboration area of the ADL Web site (www.adlnet.org).

1.2. Introduction

This document describes the Sharable Content Object Reference Model (SCORMTM)¹ Packaging Application Profiles. The purpose of the SCORM Packaging Application Profiles is threefold:

1. To describe the integration of the IMS Content Packaging Specification Version 1.1², developed by the IMS Global Learning Consortium, Inc., into the SCORM.
2. To provide practical implementation guidance for the Advanced Distributed Learning (ADL) community related to the IMS Content Packaging Specification.
3. To outline the SCORM conformance requirements concerning the Packaging Application Profiles.

The IMS Content Packaging Specification defines an approach for describing and packaging content. An intention of the IMS Content Packaging Specification is to provide interoperability between content producers and content consumers. SCORM conformant Learning Management Systems (LMSs) will use the SCORM Packaging Application Profiles as the basis for packaging and exchanging various forms of SCORM conformant content. This document provides background information describing the construction of SCORM Conformance Packages. It includes:

- An overview of the IMS Content Packaging Specification Version 1.1

- Introduction to the SCORM Version 1.2 Content Aggregation Model
- Introduction to the SCORM Version 1.2 Meta-data Application Profiles.
- Definitions of the SCORM Packaging Application Profiles
 - Requirements for SCORM Conformant Packages
 - Best Practice guidelines for constructing SCORM Conformant Packages
 - Conformance Testing Approaches

1.3. The IMS Content Packaging Specification

The IMS Content Packaging Specification describes data structures that are used to provide interoperability of Internet-based content with content creation tools, Learning Management Systems (LMS), and run-time environments. The objective of the IMS Content Packaging Specification is to define a standardized set of structures that can be used to exchange content. The scope of the IMS Content Packaging Specification is focused on defining interoperability between systems that wish to import, export, aggregate, and disaggregate packages of learning content.

The SCORM Packaging Application Profiles are created by extending the IMS Content Packaging Specification in part through the introduction of ADL specific information elements. ADL specific elements necessary for packaging SCORM content are defined within an ADL namespace. The SCORM Packaging Application Profiles will adhere to, and extend, the XML binding defined in the IMS Content Packaging XML Binding Specification Version 1.1.

1.3.1. IMS Content Packaging Overview

An IMS Content Package contains two major components:

- a (required) special XML document describing the content organization and resources of the package. The special file is called the Manifest file (imsmanifest.xml) because package content and organization is described in the context of manifests.
- the physical files referenced in the Manifest.

The following figure (Figure 1.3.1-a) is a conceptual diagram that illustrates the components of an IMS Content Package.

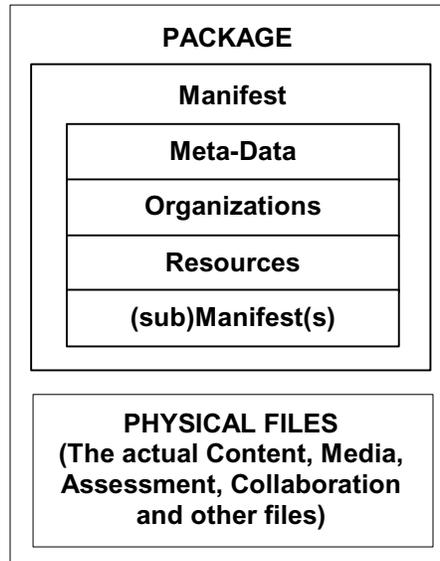


Figure 1.3.1-a: an IMS Content Package Components

Section 1.3.2 provides a brief description of the components presented in Figure 1.3.1-a. For a detailed description of each component of an IMS Content Package see the IMS Content Packaging Specification².

1.3.2. The IMS Content Package Components

This section will describe the components depicted in Figure 1.3.1-a at a high level. Much of this text is drawn directly from the IMS Content Packaging Specification Information Model Version 1.1 Final Specification. Appendix A provides a more detailed look at the IMS Content Package components within the context of the IMS Content Packaging XML Binding Specification. The table in Appendix A also includes and describes packaging elements of the ADL namespace.

1.3.2.1 Package

A package represents a unit of usable (and reusable) content. This may be part of a course that has instructional relevance outside of a course organization and can be delivered independently, as an entire course or as a collection of courses. Once a package arrives at its destination to a run-time service, such as an LMS, the package must allow itself to be aggregated or disaggregated into other packages. A package must be able to stand-alone; that is, it must contain all the information needed to use the packaged contents for learning when it has been unpacked.

1.3.2.2 Manifest

A Manifest is a description in XML of the resources comprising meaningful instruction. A Manifest may also contain zero or more static ways of organizing the instructional resources for presentation.

The scope of “manifest” is elastic. A Manifest can describe part of a course that can stand by itself outside of the context of a course (an “instructional object”), an entire course, or a collection of courses. It is left up to content developers to describe their content in the way they want it to be considered for aggregation or disaggregation. The general rule is that a package always contains a single top-level Manifest that may contain one or more sub-manifests. The top-level Manifest always describes the package. Any nested sub-manifests describe the content at the level at which the sub-manifest is scoped, such as: course, “instructional object”, or other.

1.3.2.3 Meta-Data

Meta-data is data about data. It is used to describe components in the IMS Content Package at various levels. The meta-data depicted in Figure 1.2.1-a is used to describe the package as a whole. Meta-data may also exist to describe organizations and resources and would exist as sub-components of these components.

1.3.2.4 Organizations

The organizations component is used to provide structure to the content. Typically, this structure is provided in the form of a learning taxonomy hierarchy. The IMS Content Packaging Specification does not bind the user to any particular structure. The organizations component provides the means to describe any number of different taxonomies that may be required.

1.3.2.5 Resources

The resources component can describe external resources, as well as the physical files that the package consists of. These files may be media files, text files, assessment objects or other pieces of data in electronic form. Conceptual groupings and relationships between files can be represented within the resources component. The combination of resources is generally categorized as “content”. The resources are referred to at various points within the organizations component, which provides the structure for the resources.

1.3.2.6 Physical Files

The physical files component represents the actual files referenced in the resources component. These files may be local files that are actually contained within the content package, or they can be external files that are referenced by a URI.

1.3.2.7 Package Interchange File

This component is not depicted in Figure 1.3.1-a. The Package Interchange File (PIF) is a representation of the content packaging components within an archive format such as zip, jar, cab, tar, etc. It is not mandatory that a content package be archived as a PIF. The PIF provides a concise Web delivery format that can be used to transport content packages between systems.

1.4. The SCORM Version 1.2 Content Aggregation Model

The SCORM Content Aggregation Model defines how learning content can be identified and described, aggregated into a course or portion of a course, and moved from one Learning Management System (LMS) to another and/or between repositories. In order to harmonize the evolving SCORM, guidelines and specifications with the IMS Content Packaging Specification, the SCORM Version 1.2 introduces changes to the SCORM Version 1.1 Content Aggregation Model. The SCORM Content Aggregation Model components define a generalized framework for object-based learning content (see Figure 1.4-a below). The SCORM Version 1.2 Content Aggregation Model consists of:

- **Assets.** Learning content in its most basic form is composed of Assets that are electronic representations of media, text, images, sound, web pages, assessment objects or other pieces of data that can be delivered to a Web client. Assets are represented as simple <file> elements in the IMS Content Packaging Specification.
- **Resource.** A resource is the smallest unit that can be referred to within a content aggregation. At this point in time there are two specialized instances of resources that are recognized by the SCORM, the Sharable Resource and the Sharable Content Object, both described below. However, as depicted in Figure 1.4-a, further derivations of resources such as assessments, collaborations, etc. are not precluded from this model now and may possibly be integrated as the SCORM evolves.
 - **Sharable Resource.** A Sharable Resource is a specialized instance of a Resource. By definition a Sharable Resource is a resource that is capable of being searched for and discovered within on-line repositories, thereby enhancing opportunities for reuse. In order to allow this capability a Sharable Resource must be tagged with Resource Meta-data as defined in the SCORM Version 1.2.
 - **Sharable Content Objects (SCOs).** A SCO is a specialized instance of a Resource. A SCO represents a collection of one or more Assets and/or Sharable Resources that includes a specific launchable asset that utilizes the SCORM Run-time Environment to communicate with Learning Management Systems (LMSs). A SCO represents the lowest level of granularity of content that can be tracked by an LMS using the SCORM

Run-time Environment. SCOs can be tagged with SCO meta-data as defined in the SCORM Version 1.2.

- **Content Aggregations.** A Content Aggregation is a map that can be used to aggregate learning content into a cohesive unit of instruction (e.g. course, chapter, module, etc.), apply structure, and associate learning taxonomies.

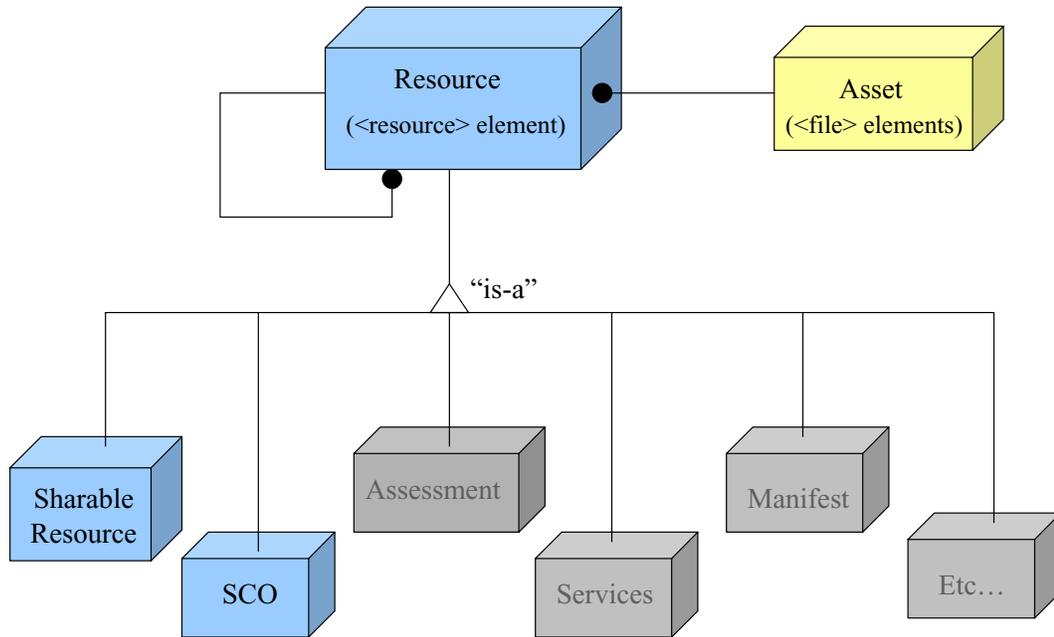


Figure 1.4-a: UML Representation of the SCORM Version 1.2 Content Aggregation Model Components

1.5. The SCORM Version 1.2 Meta-data Application Profiles

The purpose of meta-data (data about data) is to provide a common nomenclature so that learning content can be described in a useful way. Meta-data can be collected in catalogs, as well as directly packaged with the content it describes. Learning content that is described by meta-data can be systematically searched for and retrieved for use and reuse.

Within the SCORM, the SCORM Meta-data Application Profiles are specializations of the IMS Learning Resource Meta-data Specification Version 1.1 (ADL anticipates updating this Application Profile once IMS publishes the IMS Learning Resource Meta-data Specification Version 1.2). The SCORM imposes additional constraints on the

application of the specification. Because of this specialization, the SCORM Meta-data Application Profiles fit nicely into the IMS Content Packaging Specification in all of the places that the IMS Content Packaging Specification already accounts for the use of meta-data.

Within the SCORM there are two main types of meta-data: context specific and context independent. Context specific meta-data describes learning content in a particular context – usually, this is a ‘learning’ context within a larger unit of content. Context independent meta-data is meta-data describing learning content in a context (or use) independent manner.

The SCORM Version 1.2 contains three meta-data application profiles:

- Resource (SCORM Version 1.1 Raw Media Meta-data)
- SCO (SCORM Version 1.1 Content Meta-data)
- Content Aggregation (SCORM Version 1.1 Course Meta-data)

The SCORM Version 1.2 changed the names for the meta-data application profiles to better align with changes to the Content Aggregation Model for the SCORM Version 1.2 and in general with the IMS Content Packaging nomenclature. The name change will harmonize meta-data with packaging to help clear up some confusion. At this time the requirements for which meta-data elements are mandatory for each application profile will stay the same. The table below shows the SCORM Version 1.1 Meta-data application profiles and the Content Aggregation Model components where the meta-data would be used. The table also shows the mapping to the new SCORM Version 1.2 Meta-data application profile names.

SCORM Version 1.1 Meta-data Application Profile Name	Content Aggregation Model Components	SCORM Version 1.2 Meta-data Application Profile Name	SCORM Packaging Profile Element Meta-data is used by
Course Meta-data	Course	Content Aggregation Meta-data	<organization>
Content Meta-data	Block	Content Aggregation Meta-data	<item>,<resource>
Content Meta-data	SCO	SCO Meta-data	<resource adlcp:scormtype="sco" >
Raw Media Meta-data	Sharable Resource	Resource Meta-data	<resource adlcp:scormtype="shar ableresource">

Table 1.5-a: SCORM meta-data Application Profile mapping

Meta-data is used to describe components in the SCORM Content Aggregation Model. The following section describes the use of meta-data at various levels within the SCORM Packaging Application Profiles.

1.5.1. <manifest> Element

Meta-data describing the <manifest> as a whole is referred to as Package Level Meta-data. SCORM, at this time, does not require package level meta-data. If package level meta-data is used to describe the package, the SCORM requires that the meta-data be valid IMS Learning Resource Meta-data Version 1.1.

1.5.2. <organization> Element

Meta-data describing an <organization> should be context specific meta-data. If meta-data is applied to an <organization>, the SCORM requires that the meta-data be valid SCORM Content Aggregation Meta-data. This meta-data maps to the Course Meta-data definition in the SCORM Version 1.1.

1.5.3. <item> Element

Meta-data describing an <item> should be context specific meta-data. This meta-data should describe the <item> in the manner in which it fits into the <organization>. If meta-data is applied to an <item>, the SCORM requires that the meta-data be valid SCORM Content Aggregation Meta-data. This meta-data maps to the Content Meta-data definition in the SCORM Version 1.1. If your <item> is representing a SCO (identifierref attribute points to a SCO resource), and the meta-data is trying to describe the SCO in a context independent manner, the meta-data must be placed in the <resource> element.

1.5.4. <resource> Element

Meta-data describing a <resource> should be context independent. If meta-data is applied to a SCORM <resource> (SCO or Sharable Resource), the SCORM requires that the meta-data be valid SCORM SCO or Resource Meta-data depending on the type of resource the meta-data is describing.

1.5.5. <file> Element

Meta-data describing a <file> should be context independent. Since files are not recognized as stand-alone components of the SCORM Version 1.2 Content Aggregation

Model, if meta-data is applied to a <file>, the SCORM requires that the meta-data be valid IMS Learning Resource Meta-data Version 1.1.

1.6. The SCORM Packaging Application Profiles

The SCORM Packaging Application Profiles describe how the IMS Content Packaging Specification will be applied within the overall context of the SCORM. They provide practical guidance for implementers and define the SCORM conformance requirements. The IMS Content Packaging Specification will be used as the basis for packaging SCORM conformant content. Furthermore, the SCORM will impose additional packaging requirements to ensure sufficient information is included in each package. This will enable SCORM conformant learning systems to import and export packages that can be used by other SCORM conformant learning systems.

1.6.1. Resource Package Application Profile

Learning content in its most basic form is composed of Assets that are electronic representations of media, text, images, sound, Web pages, assessment objects or other pieces of data that can be delivered to a Web client.

A Sharable Resource is a collection of one or more Assets. A Sharable Resource is a specialized instance of a Resource. By definition a Sharable Resource is sufficiently described and identified such that it is capable of being searched for and discovered within on-line repositories, thereby enhancing opportunities for reuse. In order to allow this capability a Sharable Resource must be tagged with Resource Meta-data as defined in the SCORM Version 1.2.

A Sharable Content Object (SCO) is a collection of one or more Sharable Resources and/or Assets that includes a specific launchable asset that utilizes the SCORM Run-time Environment to communicate with an LMS. A SCO represents the lowest level of content granularity that is tracked by an LMS using the SCORM Run-Time Environment.

The SCORM Resource Package Application Profile defines a mechanism for packaging Sharable Resources and/or SCOs without having to provide a specific organization, learning context, or curricular taxonomy. Packaging Sharable Resources and SCOs provides a common medium for the exchange of these discrete learning objects. The SCORM Resource Package is merely a collection of reusable objects that can be transferred between learning systems.

In many cases a Sharable Resource or a SCO will be comprised of a single file. However, there are cases where Sharable Resources and SCOs could be comprised of multiple files. The SCORM Resource Package Application Profile allows for packaging of Sharable Resources and SCOs comprised of single or multiple files. Also, Sharable Resources and SCOs may be included locally in the package or may be referenced externally. Locally packaged files will be included as physical resources within the

overall package. When externally referenced, the Sharable Resources and SCO Resources may include reference to physical files within the package, but may also reference component resources by an URL.

1.6.1.1 The SCORM Resource Package Requirements

The SCORM Resource Package shall adhere to the requirements listed in Table 1.6.1.1-a in order to be SCORM Conformant. The SCORM Version 1.1 Content Structure Format elements have been mapped to ADL specific elements (in the ADL namespace) within the <manifest> element. These elements, along with additional requirements, are defined in Appendix A.

Requirement Number	Description
General Requirements	
1.	The SCORM Resource Package ('package') shall be IMS Package Conformance Level 1 conformant
1.1.	The package shall contain a file called imsmanifest.xml in the root (top-level directory) of the PIF file or distribution medium (archive file, CD-ROM, etc.).
1.2.	The package shall contain any directly referenced controlling files used (DTD, XDR, XSD) in the root of the distribution medium (archive file, CD-ROM, etc.).
1.3.	The imsmanifest.xml file shall contain well-formed XML that adheres to the XML format described in the IMS Content Packaging XML Binding Specification.
1.4.	If the imsmanifest.xml file contains IMS Learning Resource Meta-data, it shall contain a namespace (see Appendix D) extension to include meta-data according to the IMS Learning Resource Meta-data Specification Version 1.1.
1.5.	The imsmanifest.xml file shall not reference any elements using Xinclude.
1.6.	All files that a local <resource> (i.e. a resource that is contained entirely within the distribution medium) is dependent on must be identified by <file> elements in the <resources> section of the imsmanifest.xml file and must be contained within the directory or sub-directories that contain the imsmanifest.xml.
1.7.	The imsmanifest.xml file may contain additional namespace extensions. If additional namespace extensions are described and controlled using a

	schema or modified DTD, then any directly referenced control files shall be included in the root of the distribution medium (archive file, CD-ROM, etc.).
2.	If the package is contained in a Package Interchange File (PIF) archive, the PIF archive shall be compatible with PKZIP Version 2.04.
<manifest> Element Requirements	
3.	The <metadata> sub-element of the <manifest> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:.
3.1.	The meta-data shall be valid IMS Learning Resource Meta-data defined in the IMS Learning Resource Meta-data Specification Version 1.1 ³
3.2.	The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to "ADL SCORM". <pre> <manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </manifest> </pre>
3.3.	The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to "1.2". <pre> <manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </manifest> </pre>
3.4.	The Meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location> <pre> <manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>Manifest Title</langstrng> </title> </general> </record> </metadata> </manifest> <manifest identifier="Manifest01" version="1.1"> <metadata> </pre>

	<pre> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location>PackageMD.xml</adlcp:location> </metadata> </manifest> </pre>
<organizations> Element Requirements	
4.	<p>The <organizations> element shall be an empty element. The SCORM Resource Package does not have or imply any structure. The packaged Sharable Resources and/or SCOs are simply a collection of reusable resources, therefore there is no defined <organization></p> <pre> <manifest identifier="Manifest01" version="1.1"> ... <organizations/> ... </manifest> </pre>
<resources> Element Requirements	
5.	Each Sharable Resource and/or SCO shall be represented in the <resources> element as individual <resource> elements.
Sharable Resource <resource> Requirements	
5.1.	All Sharable Resources must be identified by the adlcp:scormtype attribute.
5.1.1.	<p>The adlcp:scormtype must have be a String value of “sharableresource”.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sharableresource" href="Course01/Lesson01/index.htm"> </resource> </pre>
5.2.	All Sharable Resources must contain the mandatory href attribute.
5.2.1.	<p>The href attribute must reference to the “entry point” of the resource. The href attribute can reference an internal (located in the distribution medium – PIF, CD-ROM) or external (located external to the distribution medium) Sharable Resource.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sharableresource" href="Course01/Lesson01/index.htm"> </resource> <resource identifier="R_1" adlcp:scormtype="sharableresource" href="http://www.adlnet.org/samples/index2.htm"> </resource> </pre>
5.3.	<p>If a Sharable Resource is internal to the distribution medium, the resource shall be represented as one ore more <file> elements associated with the resource.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sharableresource" href="Course01/Lesson01/index.htm"> <file href="Course01/Lesson01/index.htm"/> </pre>

	<code></resource></code>
5.4.	<p>If the Sharable Resource is external to the distribution medium, the resource shall be referenced using the mandatory href attribute of the <code><resource></code></p> <pre><resource identifier="R_1" adlcp:scormtype="sharableresource" href="http://www.adlnet.org/samples/index.htm"> </resource></pre>
5.5.	<p>The <code><metadata></code> sub-element of the <code><resource></code> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:</p>
5.5.1.	<p>The meta-data shall be valid Resource Meta-data defined by the SCORM Version 1.2 Resource Meta-data definition.</p>
5.5.2.	<p>The <code><schema></code> sub-element of <code><metadata></code> is optional, however if the <code><schema></code> sub-element is provided it shall contain a value equal to "ADL SCORM".</p> <pre><resource> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- SCORM Resource Meta-data --> </metadata> </resource></pre>
5.5.3.	<p>The <code><schemaversion></code> sub-element of <code><metadata></code> is optional, however if the <code><schemaversion></code> sub-element is provided it shall contain a value equal to "1.2".</p> <pre><resource"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!--SCORM Resource Meta-data --> </metadata> </resource></pre>
5.5.4.	<p>The Meta-data shall be provided either inline or by using the ADL namespace element <code><adlcp:location></code></p> <pre><resource identifier="R1" adlcp:scormtype="sharableresource" href="assets\resource1.htm"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>Resource Title</langstring> </title> <!-- other Mandatory SCORM Resource Meta-data --> </general> </record> </metadata> </resource> <resource identifier="R1" adlcp:scormtype="sharableresource"</pre>

	<pre> href="resources\resource1.htm"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location> metadata\resource1.xml </adlcp:location> </metadata> </resource> </pre>
Sharable Content Object <resource> Requirements	
5.6.	All SCOs must be identified by the adlcp:scormtype attribute.
5.6.1.	<p>The adlcp:scormtype must have be a String value of “sco”.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sco" href="Course01/Lesson01/index.htm"> </resource> </pre>
5.7.	All SCOs must contain the mandatory href attribute.
5.7.1.	<p>The href attribute must reference the “entry point” of the resource. The href attribute can reference an internal (located in the distribution medium – PIF, CD-ROM) or external (located external to the distribution medium) SCO.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sco" href="Course01/Lesson01/index.htm"> </resource> </pre> <p>OR</p> <pre> <resource identifier="R_1" adlcp:scormtype="sco" href="http://www.adlnet.org/samples/index2.htm"> </resource> </pre>
5.8.	<p>If the SCOs is internal to the distribution medium, the resource shall be represented as one ore more <file> elements associated with the resource.</p> <pre> <resource identifier="R_1" adlcp:scormtype="sco" href="Course01/Lesson01/index.htm"> <file href="Course01/Lesson01/index.htm"/> </resource> </pre>
5.9.	<p>If the SCO is external to the distribution medium, the resource shall be referenced using the mandatory href attribute of the <resource></p> <pre> <resource identifier="R_1" adlcp:scormtype="sco" href="http://www.adlnet.org/samples/index.htm"> </resource> </pre>
5.10.	The <metadata> sub-element of the <resource> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:

5.10.1.	The meta-data shall be valid SCO Meta-data defined by the SCORM Version 1.2 SCO Meta-data definition.
5.10.2.	<p>The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to “ADL SCORM”.</p> <pre> <resource> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- SCORM SCO Meta-data --> </metadata> </resource> </pre>
5.10.3.	<p>The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to “1.2”.</p> <pre> <resource"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!--SCORM SCO Meta-data --> </metadata> </manifest> </pre>
5.10.4.	<p>The Meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location></p> <pre> <resource identifier="R1" adlcp:scormtype="sco" href="lesson01\sco.htm"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>SCO Title</langstring> </title> <!-- other Mandatory SCORM SCO Meta-data --> </general> </record> </metadata> </resource> <resource identifier="R1" adlcp:scormtype="sco" href="lesson01\sco.htm"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location> metadata\scol.xml </adlcp:location> </metadata> </resource> </pre>
<file> Element Requirements	
6.	<p>The <file> element shall contain a mandatory href attribute</p> <pre> ... <file href="Course01/Lesson01/pics/img1.jpg" /> </pre>

	...
7.	The <metadata> sub-element of the <file> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:.
7.1.	The meta-data shall be valid IMS Learning Resource Meta-data defined in the IMS Learning Resource Meta-data Specification Version 1.1 ³
7.2.	The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to “ADL SCORM”. <pre><file href="Course01/Lesson01/pics/img1.jpg"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </file></pre>
7.3.	The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to “1.2”. <pre><file href="Course01/Lesson01/pics/img1.jpg"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </manifest></pre>
7.4.	The meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location> <pre><file href="Course01/Lesson01/pics/img1.jpg"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>Manifest Title</langstring> </title> </general> </record> </metadata> </file></pre> OR <pre><file href="Course01/Lesson01/pics/img1.jpg"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location>assetMD.xml</adlcp:location> </metadata> </file></pre>

Table 1.6.1.1-a: SCORM Resource Package Requirements

1.6.1.2 Best Practices Guidance

1.6.1.2.1 When to use the dependent <resource> element vs the <file> element

If the parent resource is made up of multiple files, there may be a need to create separate resource elements for these files. As an example, consider the following:

```
<resource identifier="R1" adlcp:scormtype="sco" href="scol.htm">
  <metadata/>
  <file href="scol.htm">
  <file href="img1.jpg">
  <file href="mov1.mov">
    <metadata>
      <schema>ADL SCORM</schema>
      <schemaversion>1.2</schemaversion>
      <record>
        <general>
          <title>
            <langstring>Title for movie</langstring>
          </title>
        </general>
      </record>
    </metadata>
  </resource>
```

If the 'img.jpg' file is standalone and reusable, then that file might be considered a resource and should be made a Sharable Resource using the definitions defined earlier in this paper. Doing so, the given example becomes:

```
<resource identifier="R1" adlcp:scormtype="sco" href="scol.htm">
  <metadata/>
  <file href="scol.htm">
  <dependency identifierref="R1_1">
  <file href="mov1.mov">
    <metadata>
      <schema>ADL SCORM</schema>
      <schemaversion>1.2</schemaversion>
      <record>
        <general>
          <title>
            <langstring>Title for movie</langstring>
          </title>
        </general>
      </record>
    </metadata>
  </resource>

<resource identifier="R1_1" adlcp:scormtype="sharableresource"
  href="img1.jpg">
  <metadata>
    <schema>ADL SCORM</schema>
    <schemaversion>1.2</schemaversion>
    <adlcp:location>img1.xml</adlcp:location>
  <file href="img1.jpg"/>
</resource>
```

If the 'img.jpg' file has no intention of being reused or placed in a repository in order to be searched on and discovered, then leave the asset as a simple <file> element of the resource. The file is not considered a Sharable Resource, however, meta-data can still be

applied to the <file> element, however it is only required to be IMS Learning Resource Meta-data.

1.6.1.2.2 Use of the <dependency> element

In situations in which multiple resources need to access the same Assets, the Assets should be extracted into a stand alone Sharable Resource and the <dependency> element should be used. For example, there could be two SCOs in the form of HTML pages that both include the same graphic image. The best practice is to represent the SCOs and the common graphic image as separate resources. The SCOs will then have a dependency on the image resource. This is best illustrated in the following example Manifest fragment.

```
<resources>
  <resource identifier="SCO1" adlcp:scormtype="sco" href="sco1.htm">
    <metadata>
      <schema>ADL SCORM</schema>
      <schemaversion>1.2</schemaversion>
      <!-- {SCO Meta-data would be placed here.} -->
    </metadata>
    <file href="sco1.htm"/>
    <dependency identifierref="ASSET1" />
  </resource>

  <resource identifier="SCO2" adlcp:scormtype="sco" href="sco2.htm">
    <metadata>
      <schema>ADL SCORM</schema>
      <schemaversion>1.2</schemaversion>
      <!-- {SCO Meta-data would be placed here.} -->
    </metadata>
    <file href="sco2.htm"/>
    <dependency identifierref="ASSET1" />
  </resource>

  <resource identifier="ASSET1" adlcp:scormtype="sharableresource"
    href="image1.jpg">
    <metadata>
      <schema>ADL SCORM</schema>
      <schemaversion>1.2</schemaversion>
      <!-- {Resource Meta-data would be placed here.} -->
    </metadata>
    <file href="image1.jpg"/>
  </resource>
</resources>
```

In this example the resource identified, as 'ASSET1' is a Sharable Resource between SCO1 and SCO2 and is therefore defined using the <dependency> element.

1.6.1.3 Conformance Testing Approach

Conformance testing on a SCORM Resource Package will be performed as follows:

1. The package will be accessed and the imsmanifest.xml file will be extracted. The imsmanifest.xml file, along with all control documents referenced through validation of the Manifest, must exist at the root of the package.

2. If meta-data exists at the <manifest> level, this meta-data will be tested for validity against the IMS Learning Resource Meta-data Specification Version 1.1.
 - 2.1.If provided, the <schema> sub-element of <metadata> will be verified to ensure that it contains a value equal to “ADL SCORM”.
 - 2.2.If provided, the <schemaversion> sub-element of <metadata> will be verified to ensure that it contains a value equal to “1.2”.
3. The <organizations> element will be tested to ensure that it is empty.
4. Each resource will then be processed as follows:
 - 4.1.Each **Sharable Resource resource** will be tested as follows:
 - 4.1.1. The href attribute of the <resource> element will be checked for its presence.
 - 4.1.2. The href attribute of the <resource> element will be checked to ensure that it is not an empty string (“”).
 - 4.1.3. The adlcp:scormtype attribute of the <resource> element will be checked for its presence
 - 4.1.4. The adlcp:scormtype attribute of the <resource> element will be checked to ensure that it has the value of “sharableresource”.
 - 4.1.5. If the Sharable Resource contains meta-data, the resource’s <metadata> sub-element will be verified to conformance with the SCORM using the SCORM Resource Meta-data Test.
 - 4.1.5.1.If provided, the <schema> sub-element of <metadata> will be verified to ensure that it has the value of “ADL SCORM”.
 - 4.1.5.2.If provided, the <schemaversion> sub-element of <metadata> will be verified to ensure that it has the value of “1.2”.
 - 4.1.6. For each <file> element of the Sharable Resource, the <file> element will be tested as follows:
 - 4.1.6.1.The href attribute of the <file> element will be checked for its presence.
 - 4.1.6.2.The href attribute of the <file> element will be checked to ensure that it is not an empty string (“”).
 - 4.1.6.3.If meta-data exists at the <file> level, this meta-data will be tested for validity against the IMS Learning Resource Meta-data Specification Version 1.1.

4.1.6.4. If provided, the <schema> sub-element of <metadata> will be verified to ensure that it contains a value of “ADL SCORM”.

4.1.6.5. If provided, the <schemaversion> sub-element of <metadata> will be verified to ensure that it contains a value of “1.2”.

4.2. Each **SCO resource** will be tested as follows:

4.2.1. The href attribute of the <resource> element will be checked for its presence.

4.2.2. The href attribute of the <resource> element will be checked to ensure that it is not an empty string (“”).

4.2.3. The adlcp:scormtype attribute of the <resource> element will be checked for its presence

4.2.4. The adlcp:scormtype attribute of the <resource> element will be checked to ensure that it has the value of “sco”.

4.2.5. If the SCO resource contains meta-data, the resource’s <metadata> sub-element will be verified to conformance with the SCORM using the SCORM SCO Meta-data Test.

4.2.5.1. If provided, the <schema> sub-element of <metadata> will be verified to ensure that it contains a value of “ADL SCORM”.

4.2.5.2. If provided, the <schemaversion> sub-element of <metadata> will be verified to ensure that it contains a value of “1.2”.

4.2.6. For each <file> element of the SCO, the <file> element will be tested as follows:

4.2.6.1. The href attribute of the <file> element will be checked for its presence.

4.2.6.2. The href attribute of the <file> element will be checked to ensure that it is not an empty string (“”).

4.2.6.3. If meta-data exists at the <file> level, this meta-data will be tested for validity against the IMS Learning Resource Meta-data Specification Version 1.1.

4.2.6.4. If provided, the <schema> sub-element of <metadata> will be verified to ensure that it contains a value of “ADL SCORM”.

4.2.6.5. If provided, the <schemaversion> sub-element of <metadata> will be verified to ensure that it contains a value of “1.2”.

1.6.2. Content Aggregation Package Application Profile

The early SCORM Version 1.1 Content Structure Format (CSF) provided a means to represent the structure and curricular taxonomy for courses, or portions of courses built from SCOs. The SCORM does not impose any particular structure for content aggregation. Individual content developers are free to aggregate content into any structure that provides value to them. The SCORM Version 1.1 CSF was, however, not appropriate for content packaging. The IMS Content Packaging Specification Version 1.1 model provides a framework that includes most of the information that exists within the CSF, as well as logical places in which extensions can be added to capture the rest of the information from the CSF. Additionally, the IMS packaging model also provides a clean way to inventory and bundle all of the physical files required to deliver the content, as well as to identify relationships between files that belong to one or more content "resources", including externally referenced resources that are not contained as physical files within a package. The IMS Content Packaging Specification also enables a separation of content resources from the way those resources can be organized, allowing for one or more uses of the same content resources within different contexts or uses. The SCORM Content Aggregation Package Application Profile defines a mechanism for packaging the files and providing the structure.

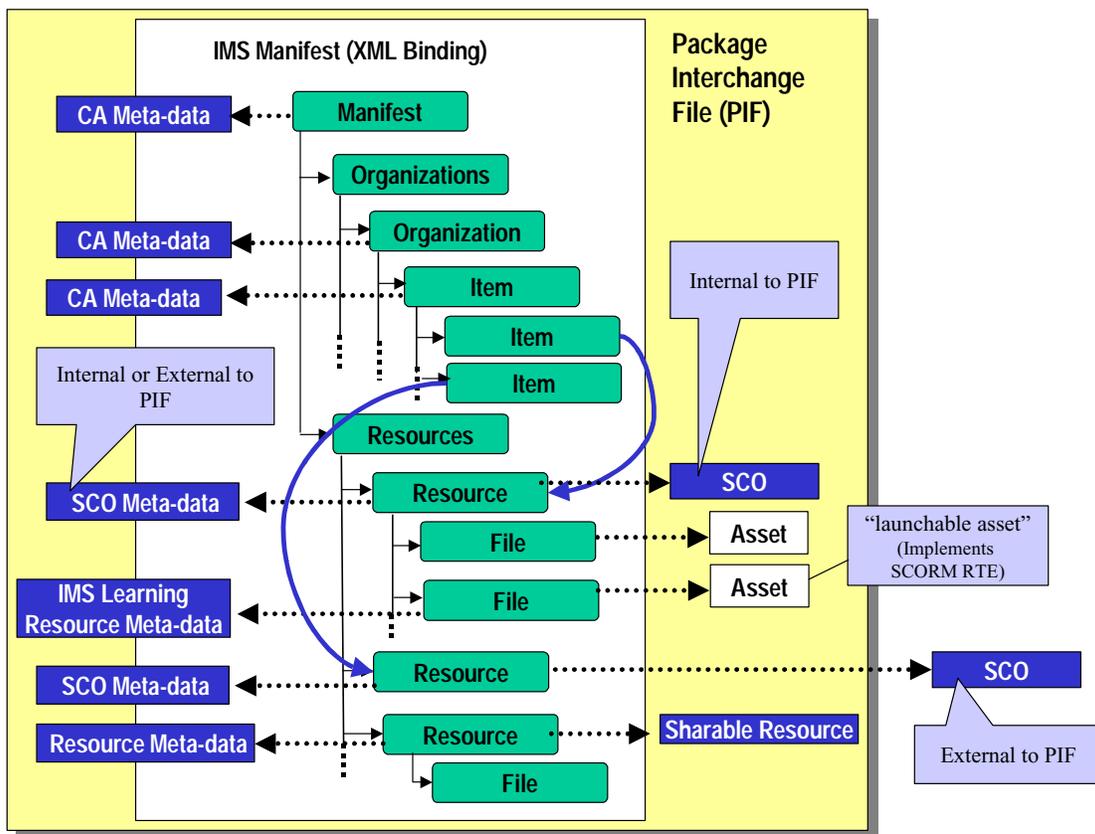


Figure 1.6.2-a: Conceptual view of a Content Aggregation Manifest

1.6.2.1 The SCORM Content Structure Format Elements

The SCORM Version 1.2 will re-map the SCORM Version 1.1 CSF elements into either IMS Content Packaging Elements or the IMS Meta-data Elements to form the Content Aggregation Profile. With the convergence of the SCORM Version 1.1 CSF into an IMS Content Package, the need to revisit the SCORM Version 1.1 CSF Information Model arose. Some elements were no longer needed, some were replaced with existing IMS Manifest elements or were recommended to move to IMS Meta-data elements, and some remained the same. The following table describes how the SCORM Version 1.1 CSF elements are remapped into the IMS Manifest or IMS Learning Resource Meta-data. The table also describes additional requirements, outside of those defined in the SCORM Version 1.1.

SCORM Version 1.1 CSF Element	Remapping
<content>	<p>Description: This element has been removed. The structure of the content (<resource>'s) is now defined in an <organization> element.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>
<globalProperties>	<p>Description: This element contained the <externalMetadata> and <curricularTaxonomy> elements.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed, sub-elements re-mapped into the Manifest.</p>
<externalMetadata>	<p>Description: This element was used in several places inside the SCORM Version 1.1 CSF (<globalProperties>, <block> and <sco>). This element has been removed. Meta-data should be provided in the appropriate places defined in the requirements section of this document. Meta-data can be provided in one of the following ways:</p> <ol style="list-style-type: none"> 1. Inline inside the <metadata> sub-element. 2. The <location> sub-element has not been removed. The element will be used as an ADL namespace item inside the <metadata> structure. The <location> element could be used to reference the location of the meta-data file. <p>Representation in IMS Manifest:</p> <p><globalProperties> - this meta-data should be defined in the <metadata> sub-element of the <organization>.</p> <p><block> - this meta-data should be defined in the <metadata></p>

	<p>sub-element of either:</p> <ul style="list-style-type: none"> • <organization> element, if block is being represented as an organization. • <item> element, if the block is being represented as an <item>. <p><sco> - this meta-data should be defined in the <metadata> sub-element of the:</p> <ul style="list-style-type: none"> • <resource> element <p>Status in the SCORM Version 1.2: Element removed, along with <source>, <model> sub-elements.</p>
<curricularTaxonomy>	<p>Description: This element was used in the <globalProperties> element inside the SCORM Version 1.1 CSF. The curricular taxonomy element should be mapped into the meta-data record for the element being described. The Classification section of the Meta-data can be used to describe the curricular taxonomy.</p> <p>Representation in IMS Manifest: None</p> <p>Representation in Meta-data: Example of using the Classification section of the Meta-data:</p> <pre> <record> <classification> <purpose> <langstring>CurricularTaxonomy</langstring> </purpose> <taxonpath> <source>Army</source> <taxon> <entry> <langstring>Course</langstring> </entry> <description> <langstring>The curricular taxonomy used for this course is the Army Model</langstring> </description> </classification> </record> </pre> <p>Status in the SCORM Version 1.2: Element should be expressed in the Classification section of meta-data.</p>

<block>	<p>Description: This element has been removed. The concept of a block can now be represented in one of the following ways:</p> <ol style="list-style-type: none"> 1. Use an <item> element as a container for other <item> elements that represent SCOs or other Blocks. Context specific meta-data describing the block should be placed in the <metadata> sub-element of the <item> element. The identifierref attribute for the <item> should be an empty string(""). There should not be a <resource> element that represents a block. The block id attribute, in the SCORM Version 1.1 CSF, is now mapped to the identifier attribute of the <item> element. 2. If a content aggregation being packaged represents a block then an <item> element is optional to represent the block. Meta-data describing the block should be placed in the <metadata> sub-element of the <organization> element. The block id attribute, in the SCORM Version 1.1 CSF, is now mapped to the identifier attribute of the <organization> element. This alleviates the need for an outer most <block> element, that was necessary in the SCORM Version 1.1 CSF. <p>Representation in IMS Manifest: A block can now be represented by an <item> element or an <organization> element. The <organization> element would represent the outer most container that contains other blocks (<item> elements) or SCOs (<item> elements). The id attribute of block is now mapped to the identifier attribute of either the <item> or the <organization> element.</p> <p>Status in the SCORM Version 1.2: Element has been merged into the IMS Manifest using the <item> and/or <organization> elements.</p>
<identification>	<p>Description: This element has been removed. All sub-elements of <identification> are referenced as standalone elements.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>
<title>	<p>Description: This element has been removed. It has been superseded by the <title> element of the IMS Manifest</p>

	<p>document.</p> <p>Representation in IMS Manifest:</p> <p>...</p> <pre><organization> <item identifier="SCO1" identifierref="R_S1"> <title>Title for the SCO</title> </item> </organization></pre> <p>...</p> <p>Status in the SCORM Version 1.2: Element has been replaced with the IMS <title> element.</p>
<description>	<p>Description: The description element should be mapped into the meta-data record for the element being described. The General section of the Meta-data can be used to describe the curricular taxonomy.</p> <p>Representation in IMS Manifest: None</p> <p>Representation in Meta-data: The description data should be mapped into the meta-data record for the element being described.</p> <pre><record> <general> <description> <langstring>This course represents ... </langstring> </description> </general> </record></pre> <p>Status in the SCORM Version 1.2: Element should be expressed in the General section of the meta-data.</p>
<labels>	<p>Description: This parent element has been removed.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed, sub-elements re-mapped into the Manifest.</p>
<curricular>	<p>Description: The <curricular> element should be mapped into the meta-data record for the element being described. The Classification section of the meta-data can be used.</p> <p>Representation in IMS Manifest: None</p> <p>Representation in Meta-data: Example using the Classification section of the meta-data:</p> <pre><record></pre>

	<pre> <classification> <purpose> <langstring>CurricularLabel</langstring> </purpose> <taxonpath> <source>Army</source> <taxon> <entry> <langstring>Learning Step</langstring> </entry> </taxon> </taxonpath> </classification> </record> </pre> <p>Status in the SCORM Version 1.2: Element should be expressed in the Classification section of the meta-data.</p>
<developer>	<p>Description: The <developer> element should be mapped into the meta-data record for the element being described. The Classification section of the meta-data can be used.</p> <p>Representation in IMS Manifest: None</p> <p>Representation in the Meta-data: Example using the Classification section of the meta-data:</p> <pre> <record> <classification> <purpose> <langstring>DeveloperLabel</langstring> </purpose> <taxonpath> <taxon> <entry>0985093ga-asd23545</entry> </taxon> </taxonpath> <description> <langstring>Unique id assigned by the developer</langstring> </description> </classification> </record> </pre> <p>Status in the SCORM Version 1.2: Element should be expressed in the Classification section of the meta-data.</p>
<prerequisites>	<p>Description: This element is now a standalone element. The <adlcp:prerequisites> element may occur once, and only</p>

	<p><adlcp:prerequisites> element may occur once, and only once, within any <item> element.</p> <p>Representation in IMS Manifest:</p> <pre> ... <organization> <item identifier="SCO2" identifierref="R_S2"> <title>Title for the SCO</title> <adlcp:prerequisites type="aicc_script">SCO1 </adlcp:prerequisites> ... </pre> <p>SCO1 should represent an ID of an <item> sub-element of an <organization> element.</p> <p>Status in the SCORM Version 1.2: No change.</p>
<blockAlias>	<p>Description: This element has been removed.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>
<sco>	<p>Description: This element has been removed. An <item> element should be used in the <organization> section to reference a SCO <resource> (using the identifierref attribute of the <item> element). The id attribute of a <sco> is now mapped to the identifier attribute of the <item> element.</p> <p>Representation in IMS Manifest:</p> <pre> ... <organization> <item identifier="SCO2" identifierref="R_S2"> ... <resources> <resource identifier="R_S2" adlcp:scormtype="sco" href="sco2.htm"> <file href="sco2.htm"/> <file href="pic1.jpg"/> </resource> </resources> ... </pre> <p>Status in the SCORM Version 1.2: Element has been merged into the IMS Manifest element <item>.</p>
<timeLimit>	<p>Description: This element has been removed.</p>

	<p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>
<maxTimeAllowed>	<p>Description: The <adlcp:maxtimeallowed> element is now a standalone element. If used, the element must be used once and only once on an <item> element.</p> <p>Representation in IMS Manifest:</p> <p>...</p> <p><organization> <item identifier="SCO1" identifierref="R_S1"></p> <p><adlcp:maxtimeallowed>02:00:00</adlcp:maxtimeallowed></p> <p>...</p> <p>Status in the SCORM Version 1.2: Element is now standalone. Element is now lowercase <adlcp:maxtimeallowed>.</p>
<timeLimitAction>	<p>Description: The <adlcp:timelimitaction> element is now a standalone element. If used, the element must be used once and only once on an <item> element.</p> <p>Representation in IMS Manifest:</p> <p>...</p> <p><organization> <item identifier="SCO1" identifierref="R_S1"></p> <p><adlcp:timelimitaction>exit,message</adlcp:timelimitaction></p> <p>...</p> <p>Status in the SCORM Version 1.2: Element is now standalone. Element is now lowercase <adlcp:timelimitaction>.</p>
<launch>	<p>Description: This element has been removed.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>
<location>	<p>Description: This element has been removed. All launch locations should be addressed using the href attribute of the <resource> element.</p> <p>Representation in IMS Manifest:</p> <p>...</p> <p><organization> <item identifier="SCO1" identifierref="R_S1"></p>

	<pre> ... <item identifier="SCO2" identifierref="R_S2"> ... <resources> <resource identifier="R_S1" href="Course/Lesson/sco.htm"> <file href="Course/Lesson/sco.htm"/> </resource> <resource identifier="R_S2" href=http://www.someurl.com/sco2.htm/> </resource> </resources> </pre> <p>Status in the SCORM Version 1.2: Element has merged into the href attribute of the <resource> element.</p>
<parameterString>	<p>Description: This element has been removed. The parameters attribute of the <item> should be used to represent the <parameterString>.</p> <p>Representation in IMS Manifest:</p> <pre> ... <organization> <item identifier="S1" identifierref="R1" parameters=""?param1=1"> ... </pre> <p>Status in the SCORM Version 1.2: Element has merged into the parameters attribute of the <item> element.</p>
<dataFromLms>	<p>Description: This element is now a standalone element. The <adlcp:datafromlms> element may occur once, and only once, within any <item> element that represents a SCO.</p> <p>Representation in IMS Manifest:</p> <pre> ... <organization> <item identifier="S1" identifierref="R1"> <adlcp:datafromlms>Some data</adlcp:datafromlms> ... </pre> <p>Status in the SCORM Version 1.2: Element is now standalone. Element is now lowercase <adlcp:datafromlms>.</p>
<masteryScore>	<p>Description: This element is now a standalone element. The <adlcp:masteryscore> element may occur once and only once within an <item> element that represents a SCO.</p> <p>Representation in IMS <manifest>:</p>

	<p>...</p> <pre><organization> <item identifier="S1" identifierref="r1"> <adlcp:masteryscore>0.75</adlcp:masteryscore> </item> ... </pre> <p>Status in the SCORM Version 1.2: The element has been renamed to all lowercase <adlcp:masteryscore>.</p>
<scoAlias>	<p>Description: This element has been removed. Manifests can reference the same SCO <resource> more than once in the <organization> element. No need for a <scoAlias> element any more.</p> <p>Representation in IMS Manifest: None.</p> <p>Status in the SCORM Version 1.2: Element removed.</p>

Table 1.5.2.1-a: Proposed SCORM Version 1.1 CSF re-mapping

1.6.2.2 ADL Namespace Elements

Each <organization> element describes a static structure of a package’s resources. Additional context information describing the <item> sub-elements of the <organization> can be used to customize content navigation for individual learners. Previously, the SCORM Version 1.1 CSF was used to describe content aggregations. The CSF information model has been updated; some elements are no longer needed and have been removed, and other elements have been ‘promoted’ from children to standalone elements (see Table 1.5.2.1-a). The SCORM Version 1.1 CSF elements included in an IMS Manifest will be referenced as members of the ADL namespace. The ADL namespace should be defined in the <manifest> element.

Specification	Namespace	Filename	Prefix
ADL	http://www.adlnet.org/xsd/adl_cp_rootv1p1	adl_cp_rootv1p1.xsd	adlcp:

Table 1.5.2.2-a: Definition of ADL Namespace

```
<manifest identifier="MultipleSCOManifest" version="1.1"
  xmlns="http://www.imsproject.org/xml/IMS_CONTENTv1p1"
  xmlns:adlcp="http://www.adlnet.org/xsd/adl_cp_rootv1p1"
  xmlns:xsi="http://www.w3.org/2000/10/XMLSchema-instance"
  xsi:schemaLocation=
    "http://www.imsproject.org/xml/IMS_CONTENTv1p1
    IMS_CONTENTv1p1.xsd
    http://www.imsproject.org/xml/IMS_METADATAv1p1
    IMS_METADATAv1p1.xsd
    http://www.adlnet.org/xsd/adl_cp_rootv1p1
    adl_cp_rootv1p1.xsd">
```

1.6.2.3 The SCORM Content Aggregation Package Requirements

The SCORM Content Aggregation Package must adhere to the following requirements in order to be SCORM Conformant:

Requirement Number	Description
General Requirements	
1.	The Content Package shall be IMS Package Conformance Level 1 conformant
1.1.	The package shall contain a file called imsmanifest.xml in the root of the distribution medium (archive file, CD-ROM, etc.).
1.2.	The package shall contain any directly referenced controlling files used (DTD, XDR, XSD) in the root of the distribution medium (archive file, CD-ROM, etc.).
1.3.	The imsmanifest.xml file shall contain well-formed XML that adheres to the XML format described in the IMS Content Packaging XML Binding Specification.
1.4.	If the imsmanifest.xml file contains IMS Learning Resource Meta-data, it shall contain a namespace (see Appendix D) extension to include meta-data according to the IMS Learning Resource Meta-data Specification 1.1.
1.5.	The imsmanifest.xml file shall not reference any elements using Xinclude.
1.6.	All files that a local <resource> (i.e. a resource that is contained entirely within the distribution medium) is dependent on must be identified by <file> elements in the <resources> section of the imsmanifest.xml file and must be contained within the directory or sub-directories that contain the imsmanifest.xml.
1.7.	The imsmanifest.xml file may contain additional namespace extensions. If additional namespace extensions are described and controlled using a schema or modified DTD, then any directly referenced control files shall be included in the root of the distribution medium (archive file, CD-ROM, etc.).
2.	If the package is contained in a Package Interchange File (PIF) archive, the PIF archive shall be compatible with PKZIP Version 2.04.
<manifest> Element Requirements	

3.	The <metadata> sub-element of the <manifest> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:
3.1.	The meta-data shall be valid IMS Learning Resource Meta-data defined in the IMS Learning Resource Meta-data Specification Version 1.1 ³
3.2.	<p>The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to “ADL SCORM”.</p> <pre><manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </manifest></pre>
3.3.	<p>The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to “1.2”.</p> <pre><manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- Insert IMS Learning Resource Meta-data --> </metadata> </manifest></pre>
3.4.	<p>The Meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location></p> <pre><manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>Manifest Title</langstrng> </title> </general> </record> </metadata> </manifest> <manifest identifier="Manifest01" version="1.1"> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location>PackageMD.xml</adlcp:location> </metadata> </manifest></pre>
<organizations> Element Requirements	

4.	<p>The <organizations> sub-element of the <manifest> shall exist and in turn shall contain at least one <organization> sub-element. This <organization> sub-structure will represent the learning taxonomy structure of the content. Roughly speaking, each <organization> will be equivalent to one SCORM Version 1.1 CSF.</p> <pre> <manifest identifier="Manifest01" version="1.1"> <metadata/> <organizations default="Org1"> <organization identifier="Org1" structure="hierarchial"> ... </organization> </organizations> </manifest> </pre>
<organization> Element Requirements	
5.	See Appendix A for more details
6.	The <metadata> sub-element of the <organization> element is not required. However, if meta-data is provided, it shall be conformant to the following requirements:.
6.1.	The meta-data shall be valid Content Aggregation Meta-data defined by the SCORM Version 1.2 Content Aggregation Meta-data definition.
6.2.	<p>The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to "ADL SCORM".</p> <pre> <organization> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- SCORM Content Aggregation Meta-data --> </metadata> </organization> </pre>
6.3.	<p>The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to "1.2".</p> <pre> <organization> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!--SCORM Content Aggregation Meta-data --> </metadata> </organization> </pre>

6.4.	<p>The Meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location></p> <pre> <organization> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>SCO Title</langstring> </title> <!-- other Mandatory SCORM Content Aggregation Meta-data --> </metadata> </organization> <organization> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location> organization_metadata.xml </adlcp:location> </metadata> </organization> </pre>
<item> Element Requirements	
7.	See Appendix A for details
8.	The <metadata> sub-element of the <item> element is not required. However, if meta-data is provided, it shall conform to the following requirements:.
8.1.	The meta-data shall be valid Content Aggregation Meta-data defined by the SCORM Version 1.2 Content Aggregation Meta-data definition.
8.2.	<p>The <schema> sub-element of <metadata> is optional, however if the <schema> sub-element is provided it shall contain a value equal to “ADL SCORM”.</p> <pre> <item> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!-- SCORM Content Aggregation Meta-data --> </metadata> </item> </pre>
8.3.	<p>The <schemaversion> sub-element of <metadata> is optional, however if the <schemaversion> sub-element is provided it shall contain a value equal to “1.2”.</p> <pre> <item> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <!--SCORM Content Aggregation Meta-data --> </metadata> </item> </pre>

8.4.	<p>The Meta-data shall be provided either inline or by using the ADL namespace element <adlcp:location></p> <pre> <item> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <record> <general> <title> <langstring>SCO Title</langstring> </title> <!-- other Mandatory SCORM Content Aggregation Meta-data --> </metadata> </item> <item> <metadata> <schema>ADL SCORM</schema> <schemaversion>1.2</schemaversion> <adlcp:location> item_metadata.xml </adlcp:location> </metadata> </item> </pre>
9.	<p>If an <item> element is used to represent a content aggregation item, a SCORM Block, the identifierref attribute shall be an empty string (“”). This means that the <item> should not reference a <resource> in the <resources> section of the Manifest.</p>
10.	<p>The SCORM Version 1.1 CSF elements are remapped to ADL namespace elements within the Manifest. See the table in Appendix A for a mapping of elements and additional requirements.</p>
<resource> Element Requirements	
11.	<p>See requirements defined for the Resource Package Application Profile</p>

Table 1.5.2.3-a: SCORM Resource Package Requirements

1.6.2.4 Conformance Testing Approach

All packaged SCOs and Sharable Resources (<resource> elements) will be tested as described in section Conformance Testing Approach for SCORM Resource Packages. The following tests will be performed for each <organization> element.

1. If the <metadata> sub-element exists in the <organization> element, its contents will be tested against the SCORM Meta-data Test for Content Aggregation.
2. Each <item> element will be processed as follows:
 - 2.1. If an item has an ‘identifierref’ attribute, it will be considered a SCO <item>.
 - 2.1.1. It must not have any child <item> elements.

- 2.1.2. If the <metadata> sub –element exists in the <item> element, its contents will be tested against the SCORM Meta-data Test for Content Aggregation.
- 2.1.3. The <resource> pointed to by its ‘identifierref’ must be a SCO <resource> (represented by the adlcp:scormtype attribute of sco).
- 2.2. If an item has no ‘identifierref’ attribute, it will be considered a block <item>.
 - 2.2.1. If the <metadata> sub –element exists in the <item> element, its contents will be tested against the SCORM Meta-data Test for Content Aggregation.
 - 2.2.2. It must have at least one child <item> element. This <item> could be another <item> representing another block or a SCO.
 - 2.2.3. Any included ADL namespace elements will be tested for conformance against the definitions given in Appendix A.

1.6.3. Using Submanifests

At times, developers or learning systems may find it useful to aggregate packages. This is done by combining Manifests into one ‘parent’ Manifest. The SCORM does not provide any guidelines or impose any rules on how and when Manifests can or should be aggregated. This decision is left to the content and learning systems developers.

For example, if all content comprising a course is so tightly coupled that no part of it may be presented out of the course context, a content developer would want to use a single Manifest to describe that course’s resources and organization. However, content developers who create “instructional objects” that could be recombined in different contexts with other instructional objects to create different course presentations would want to describe each instructional object in its own Manifest, then aggregate those Manifests into a higher-level Manifest containing a course organization. Finally, a content developer who wants to move multiple courses in a single package (a curriculum), could use a top-level Manifest to contain each course-level Manifest and any instructional object Manifests that each course might contain.

If submanifests are used, each contained <manifest> element must conform to the standards described in this document. During conformance testing, each <manifest> element will be extracted and tested independently of each other. If any Manifest fails conformance, the package fails conformance.

1.6.4. Future Packaging Application Profiles

1.6.4.1 Developer Profile

It may be important to package and exchange developer specific information/content, such as source code. This information may be included with deliverable content in the same package. ADL recognizes the need to define a standard for packaging developer

specific information, but has only begun to investigate the alternatives available. At this time, there is no definition for a SCORM Developer Package Application Profile.

1.6.4.2 Repository Profile

ADL recognizes the possible need to define a standard for packaging content that may be imported into and/or exported out of a SCORM Repository. There may be additional information required in a package when trying to import/export packages in a SCORM Repository. At this time, there is no definition for a SCORM Repository Package Application Profile.

1.6.4.3 Others

Other Packaging Profiles will be defined as needed. If the ADL Community has any suggestions for new profiles, please provide feedback to the Implementing SCORM Web board located in the Collaboration Area of the ADL Web site. Suggested future Packaging Application Profiles.

Appendix A

IMS and ADL Harmonization

Table A-2 in this appendix presents a listing of the IMS Content Packaging Manifest elements. In addition, the ADL extension elements are also listed in their appropriate positions within the Manifest. The table presents the elements as they are to appear in the XML `imsmanifest.xml` file that is a necessary component of the content package (See the IMS Content Packaging Specification for more detail). The following items are presented in the table:

- The Multiplicity indicator of the element refers to the repeatability of the element within its parent element.
- The Required indicator of the element refers to whether or not the element is required to exist. This is indicated for both the IMS space and the ADL space. It is possible for an element to be optional in one space and required in the other.
- Table A-1 lists the data types that are used to represent the elements and attributes.

Data Type	Description
Container	This type is used to indicate that the element contains sub-elements and does not actually contain any data value.
String	A set of characters. The maximum length allowed will also be specified.
Timespan	A length of time in hours, minutes and seconds shown in the following numerical format: HHHH:MM:SS.SS. Hours has a minimum of 2 digits and a maximum of 4 digits. Minutes shall consist of exactly 2 digits. Seconds shall contain 2 digits, with an optional decimal point and 1 or 2 additional digits.
id	Element used to uniquely identify an object within an XML instance document.
idref	A reference to an id.
boolean	A binary flag with value of 0 representing false and a value of 1 representing true.
Vocabulary	A restricted vocabulary list exists for the element. The element data value must be a value from the vocabulary list. Vocabulary words must be complete and exact matches to the list.
ADL Restricted	A value of ADL Restricted indicates that the element is not permitted to be used.

Table A-1: Element and Attribute Data Types

Element (XML Binding Name)	Description
<p>1. manifest</p> <p>Required: IMS Mandatory ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Single Instance ADL: Single Instance</p>	<p>Description: The first, outermost <manifest> element in the Manifest encloses all the reference data. Subsequent occurrences of the <manifest> elements inside the outermost <manifest> are used to compartmentalize files, meta-data, and organization structure for aggregation, disaggregation, and reuse.</p> <p>Attributes:</p> <p>identifier Description: An identifier, provided by an author or authoring tool, that is unique within the Manifest. Required: IMS Mandatory, ADL Mandatory Data Type: id</p> <p>version Description: Identifies the version of the Manifest. Required: IMS Optional, ADL Optional Data Type: String</p> <p>ADL Note: All namespace declarations should be declared inside the <manifest> element.</p>
<p>1.1. metadata</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: This element contains context specific meta-data that is used to describe the content of the overall package. (Package level meta-data).</p> <p>Attributes: None</p> <p>ADL Note: None</p> <p>This meta-data should conform to the IMS Learning Resource Meta-data definition.</p>
<p>1.1.1. schema</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 100</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “ADL SCORM”.</p>
<p>1.1.2. schemaversion</p> <p>Required: IMS Optional</p>	<p>Description: Describes the version of the schema that defines the meta-data.</p> <p>Attributes:</p>

<p>ADL Optional</p> <p>Data Type: String – max length 20</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “1.2”.</p>
<p>1.1.3. adlcp:location</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element describes the location where the meta-data describing the package may be found. This may be a URI.</p> <p>Attributes: None</p> <p>ADL Note: This element can be used to reference a file that contains the meta-data. Either the meta-data is included in-line within the <metadata> element, or this element is used to provide the file location.</p>
<p>1.2. organizations</p> <p>Required: IMS Mandatory ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Exactly Once ADL: Exactly Once</p>	<p>Description: Describes one or more structures, or organizations for this package.</p> <p>Attributes:</p> <p>default Description: Identifies the default organization to use. Required: IMS Mandatory, ADL Mandatory Data Type: idref</p> <p>ADL Note: When defining a SCORM Resource Package, this element is required to be empty. When defining a SCORM Content Aggregation Package, this element is required to contain at least one organization sub-element.</p>
<p>1.2.1. organization</p> <p>Required: IMS Optional ADL Restricted (for Resource Package profile) ADL Mandatory (for content aggregation package profile)</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or More ADL: Zero (for Resource Package profile) ADL: One or More (for content aggregation package profile)</p>	<p>Description: This element describes a particular organization.</p> <p>Attributes:</p> <p>identifier Description: An identifier, provided by an author or authoring tool, that is unique within the Manifest. Required: IMS Mandatory, ADL Mandatory Data Type: id</p> <p>structure Description: Has a default value of “hierarchical” for describing the shape of an organization. Required: IMS Optional, ADL Optional Data Type: String – max length 200</p> <p>ADL Note: This element replaces the outermost <block> element defined in the SCORM Version 1.1 CSF. At least one organization element is required for a SCORM Content Aggregation Package. The <organization> element is not permitted to be present for a SCORM Resource</p>

	Package.
<p>1.2.1.1. metadata</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: This element contains context specific meta-data that is used to describe the organization.</p> <p>Attributes: None</p> <p>ADL Note: This meta-data replaces the <metadata> element found within the <globalProperties> element defined in the SCORM Version 1.1 CSF. This meta-data should be context specific and describe the <organization> as a whole. This may be describing an entire course or some portion of a course (block, chapter, module, etc...). The meta-data should be conformant to the SCORM Content Aggregation Meta-data definition.</p>
<p>1.2.1.1.1. schema</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 100</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “ADL SCORM”.</p>
<p>1.2.1.1.2. schemaversion</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 20</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the version of the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “1.2”.</p>
<p>1.2.1.1.3. adlep:location</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element describes the location where the meta-data describing the organization may be found. This may be a URI.</p> <p>Attributes: None</p> <p>ADL Note: This element can be used to reference a file that contains the meta-data. Either the meta-data is included in-line within the <metadata> element, or this element is used to provide the file location.</p>
<p>1.2.1.2. title</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 256</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Title of the organization.</p> <p>Attributes: None</p> <p>ADL Note: This element replaces the <title> sub-element of the outermost <block> element within the SCORM Version 1.1 CSF.</p>

<p>1.2.1.2.1. adlep:location</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element describes the location where the curricular taxonomy specification may be found. This may be a URI.</p> <p>Attributes: None</p> <p>ADL Note: None</p>
<p>1.2.1.3. item</p> <p>Required: IMS Mandatory ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: One or More ADL: One or More</p>	<p>Description: This element describes a node within the organization structure.</p> <p>Attributes:</p> <p>identifier Description: An identifier, provided by an author or authoring tool, that is unique within the Manifest. Required: IMS Mandatory, ADL Mandatory Data Type: id</p> <p>identifierref Description: A reference to a <resource> identifier (within the same package or a submanifest) that is used to resolve the ultimate location of the file. If no identifierref is supplied, it is assumed that there is no content associated with this entry in the organization. Required: IMS Mandatory, ADL Mandatory Data Type: String – max length 2000</p> <p>isvisible Description: Indicates whether or not this item is displayed when the unit of instruction is rendered. If not present, value is assumed to be “1”. Required: IMS Optional, ADL Optional Data Type: boolean</p> <p>parameters Description: Static parameters to be passed to the content file at launch time. Required: IMS Optional, ADL Optional Data Type: String – max length 1000</p> <p>ADL Note: This element is used to represent <block> and <sco> elements that are defined in the SCORM Version 1.1 CSF. The identifierref attribute is required to be empty (“”) for items that represent <block> elements. A <block> element is just a container for other <block> elements and <sco> elements and does not contain actual content and therefore does not need to reference a resource. The identifierref attribute for items that represent</p>

	<p><sco> elements is require to reference a resource that defines a SCO.</p> <p>The parameters attribute of this elements replaces the <parameterString> SCORM Version 1.1 CSF element.</p>
<p>1.2.1.3.1. metadata</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: This element contains context specific meta-data that is used to describe the item.</p> <p>Attributes: None</p> <p>ADL Note: This meta-data should be context specific and describe the <item> as a whole. This may be describing some portion of a course (block, chapter, module, etc...). The meta-data should be conformant to the SCORM Content Aggregation Meta-data definition.</p>
<p>1.2.1.3.2. schema</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 100</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “ADL SCORM”.</p>
<p>1.2.1.3.3. schemaversion</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 20</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the version of the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “1.2”.</p>
<p>1.2.1.3.4. title</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 200</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Title of the item.</p> <p>Attributes: None</p> <p>ADL Note: This element replaces the <title> element for <sco> and <block> elements defined in the SCORM Version 1.1 CSF.</p>
<p>1.2.1.3.5. adlcp:prerequisites</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p>	<p>Description: This element defines what other parts of the learning content must have been completed before starting the Block/SCO. This allows an LMS to compute multiple paths through the learning content.</p> <p>Attributes:</p>

<p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>type Description: Defines the scripting language used to represent the prerequisites. Required: IMS Not Applicable, ADL Mandatory Data Type: String – max length 255 ADL Note: The only accepted value for the type is “aicc_script”</p>
<p>1.2.1.3.6. adlcp:maxtimeallowed</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: Timespan</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element defines the amount of time a student is allowed to have in the current attempt of the SCO represented by the item.</p> <p>Attributes: None</p> <p>ADL Note: This element is only allowed to exist if the parent item element is representing a SCO and not a Block. This element was a sub-element of the <timeLimit> element defined within the SCORM Version 1.1 CSF. The <timeLimit> container element was removed.</p>
<p>1.2.1.3.7. adlcp:timelimitaction</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: Vocabulary</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element defines the action that should be taken when the max time allowed in the current attempt of the SCO represented by the <item> is exceeded.</p> <p>Restricted Vocabulary: exit,message exit,no message continue,message continue,no message.</p> <p>Attributes: None</p> <p>ADL Note: This element is only allowed to exist if the parent item element is representing a SCO and not a Block. This element was a sub-element of the <timeLimit> element defined within the SCORM Version 1.1 CSF. The <timeLimit> container element was removed.</p>
<p>1.2.1.3.8. adlcp:datafromlms</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element provides a place for initialization data expected by the SCO represented by the item after launch. This data is unconstrained and undefined. Usage of this element is not yet well defined and should be used with caution.</p> <p>Attributes: None</p> <p>ADL Note: This element is only allowed to exist if the parent item element is representing a SCO and not a Block. This element was a sub-element of the <launch> element defined within the SCORM Version 1.1 CSF. The <launch> container element was removed.</p>
<p>1.2.1.3.9. adlcp:masteryscore</p>	<p>Description: This element establishes the passing score</p>

<p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>for this SCO represented by the <item>. Note that what is considered a passing score often depends on the context of a SCO within the learning content. Some learning content may set the mastery score for a SCO higher than in others. This element assumes that the SCO has some content that will report score (such as a test) via the SCORM Run-time Environment API and data model defined in the SCORM.</p> <p>Attributes: None</p> <p>ADL Note: This element is only allowed to exist if the parent item element is representing a SCO and not a Block.</p>
<p>1.3. resources</p> <p>Required: IMS Mandatory ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Once ADL: Once</p>	<p>Description: A collection of references to resources. There is no assumption of order or hierarchy.</p> <p>Attributes:</p> <p>xml:base Description: This provides a relative path offset for the content file(s). The usage of this element is defined in the XML Base Working Draft from the W3C. Required: IMS Optional, ADL Optional Data Type: String – max length 2048</p> <p>ADL Note: None</p>
<p>1.3.1. resource</p> <p>Required: IMS Optional ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or More ADL: One or More</p>	<p>Description: This element describes a specific content file.</p> <p>Attributes:</p> <p>identifier Description: An identifier, provided by an author or authoring tool, that is unique within the Manifest. Required: IMS Mandatory, ADL Mandatory Data Type: id</p> <p>type Description: A string that identifies the type of resource. Required: IMS Mandatory, ADL Mandatory Data Type: String – max length 1000</p> <p>xml:base Description: This provides a relative path offset for the content file(s). The usage of this element is defined in the XML Base Working Draft from the W3C. Required: IMS Optional, ADL Optional Data Type: String – max length 2048</p> <p>href Description: A reference to the “entry point” of</p>

	<p>this resource.</p> <p>Required: IMS Optional, ADL Mandatory – for Sharable Resources and SCOs, ADL Optional for Resources</p> <p>Data Type: String – max length 2048</p> <p>scormtype</p> <p>Description: Defines the type of the resource</p> <p>Required: IMS Optional, ADL Mandatory</p> <p>Data Type: Restricted Vocabulary: sharableresource sco</p> <p>ADL Note: This value will be used as the launch location when testing SCO Resources.</p>
<p>1.3.1.1. metadata</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once – See ADL Note</p>	<p>Description: This element contains meta-data that is used to describe the resource.</p> <p>Attributes: None</p> <p>ADL Note: If the parent resource element is describing a Sharable Resource, then the metadata is required and the element will define the SCORM Resource meta-data for that Sharable Resource.</p> <p>If the parent resource element is describing a SCO, then this metadata is optional and the element will define the SCORM Content meta-data for that SCO.</p>
<p>1.3.1.1.1. schema</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 100</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “ADL SCORM”.</p>
<p>1.3.1.1.2. schemaversion</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 20</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the version of the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “1.2”.</p>
<p>1.3.1.1.3. adlcp:location</p> <p>Required: IMS Not Applicable</p>	<p>Description: This element describes the location where the meta-data describing the resource may be found. This may be a URI.</p>

<p>ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Attributes: None</p> <p>ADL Note: This element can be used to reference a file that contains the meta-data. Either the meta-data is included in-line within the meta-data element, or this element is used to provide the file location.</p>
<p>1.3.1.2. file</p> <p>Required: IMS Optional ADL Mandatory (if the parent resource represents a locally referenced SCO or Asset)</p> <p>ADL Optional (if the parent resource represents an externally referenced SCO or Asset).</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or More ADL: Zero (if the parent resource represents an externally referenced SCO or Asset) ADL: One or More (if the parent resource represents a locally referenced SCO or Asset)</p>	<p>Description: Identifies one or more local files that this resource is dependent on.</p> <p>Attributes: href Description: A reference to the location of this file. Required: IMS Mandatory, ADL Mandatory Data Type: String – max length 2000</p> <p>ADL Note: This element can only be present if the parent resource element is describing a locally referenced SCO or Asset. In the case of the file representing a SCO, the href value must refer to the launch location of a SCO, and this value will be used to run the SCORM Run-time Environment test.</p>
<p>1.3.1.2.1. metadata</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: This element contains meta-data that is used to describe the file.</p> <p>Attributes: None</p> <p>ADL Note: If the <adlcp:scormtype> element of the file contains the value “sco” then the meta-data defined by this element must be SCORM SCO Meta-data. If the <adlcp:scormtype> element of the file contains the value “asset” then the meta-data defined by this element must be SCORM Asset Meta-data.</p>
<p>1.3.1.2.1.1. schema</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: String – max length 100</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>Description: Describes the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present it must contain the value of “ADL SCORM”.</p>
<p>1.3.1.2.1.2. schemaversion</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type:</p>	<p>Description: Describes the version of the schema that defines the meta-data.</p> <p>Attributes: None</p> <p>ADL Note: This element is optional, however if present</p>

<p>String – max length 20</p> <p>Multiplicity: IMS: Zero or Once ADL: Zero or Once</p>	<p>it must contain the value of “1.2”.</p>
<p>1.3.1.2.1.3. adlep:location</p> <p>Required: IMS Not Applicable ADL Optional</p> <p>Data Type: String – max length 255</p> <p>Multiplicity: IMS: Not Applicable ADL: Zero or Once</p>	<p>Description: This element describes the location where the meta-data describing the file resource may be found. This may be a URI.</p> <p>Attributes: None</p> <p>ADL Note: This element can be used to reference a file that contains the meta-data. Either the meta-data is included in-line within the meta-data element, or this element is used to provide the file location.</p>
<p>1.3.1.3. dependency</p> <p>Required: IMS Optional ADL Optional</p> <p>Data Type: Empty Element – data represented by attribute</p> <p>Multiplicity: IMS: Zero or Once ADL: Once</p>	<p>Description: This element contains a reference to a single resource that can act as a container for multiple files that resources may be dependant on.</p> <p>Attributes:</p> <p>identifierref</p> <p>Description: A reference to the location of a resource.</p> <p>Required: IMS Required, ADL Required</p> <p>Data Type: idref</p> <p>ADL Note: None</p>
<p>1.3.2. manifest</p> <p>Required: IMS Mandatory ADL Mandatory</p> <p>Data Type: Container</p> <p>Multiplicity: IMS: Single Instance ADL: Single Instance</p>	<p>Description: The first, outermost <manifest> element in the Manifest encloses all the reference data. Subsequent occurrences of the <manifest> elements within <resource> elements inside the outermost <manifest> are used to compartmentalize files, meta-data, and organization structure for aggregation, disaggregation, and reuse.</p> <p>Attributes:</p> <p>identifier</p> <p>Description: An identifier, provided by an author or authoring tool, that is unique within the Manifest.</p> <p>Required: IMS Mandatory, ADL Mandatory</p> <p>Data Type: id</p> <p>version</p> <p>Description: Identifies the version of the Manifest.</p> <p>Required: IMS Optional, ADL Optional</p> <p>Data Type: String</p> <p>ADL Note: All namespace declarations should be declared inside the <manifest> element.</p>

Table A-2: IMS and SCORM Content Packaging Manifest Elements

Appendix B

ADL Schema and Namespace Reference

The namespaces, filenames, and namespace prefixes for XML instances using the XML-Schema files are as defined as follows:

Specification	Namespace	Filename	Prefix
IMS Content Packaging	http://www.imsproject.org/xsd/ims_cp_rootv1p1	ims_cp_rootv1p1.xsd	imscp:
IMS Learning Resource Meta-Data	http://www.imsproject.org/xsd/ims_md_rootv1p1	ims_md_rootv1p1.xsd	imsmd:
ADL Content Packaging	http://www.adlnet.org/xsd/adl_cp_rootv1p1	adl_cp_rootv1p1.xsd	adlcp:

References

1. Sharable Content Object Reference Model (SCORM) Version 1.1
Available at: www.adlnet.org
2. IMS Content Packaging Specification Version 1.1.
Includes:
 - IMS Content Packaging Information Model
 - IMS Content Packaging XML Binding
 - IMS Content Packaging Best Practice GuideAvailable at: www.imsproject.org.
3. IMS Learning Resource Meta-data Specification Version 1.1.
Includes:
 - IMS Learning Resource Meta-data Information Model
 - IMS Learning Resource Meta-data XML Binding Specification
 - IMS Learning Resource Meta-data Best Practice and Implementation GuideAvailable at: www.imsproject.org.