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Information technology — Sharable Content Object Reference Model (SCORM®) 2004 3rd Edition —

Part 1: Overview Version 1.1

Technologies de l'information — Modèle de référence d'objet de contenu partageable (SCORM®) 2004 3e édition —

Partie 1: Exposé général Version 1.1

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, the joint technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 29163-1, which is a Technical Report of type 3, was prepared by the Advanced Distributed Learning (ADL) Initiative (as SCORM® 2004 3rd Edition Overview Version 1.1) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by the national bodies of ISO and IEC.

ISO/IEC TR 29163 consists of the following parts, under the general title *Information technology — Sharable Content Object Reference Model (SCORM®) 2004 3rd Edition*:

— *Part 1: Overview Version 1.1*

— *Part 2: Content Aggregation Model Version 1.1*

— *Part 3: Run-Time Environment Version 1.1*

— *Part 4: Sequencing and Navigation Version 1.1*

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Advanced Distributed Learning (ADL)

Sharable Content Object Reference Model (SCORM)® 2004 3rd Edition

Overview Version 1.1

For questions and comments visit the
Ask The Experts at ADLNet.gov

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Alliance of Remote Instructional Authoring & Distribution Networks for Europe (ARIADNE) (http://www.ariadne-eu.org/)

Aviation Industry CBT Committee (AICC) (http://www.aicc.org/)

Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Committee (LTSC) (http://ltsc.ieee.org/)

IMS Global Learning Consortium, Inc. (http://www.imsglobal.org/)

ADL would also like to thank the ADL Community for their commitment and contribution to the evolution of SCORM.

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SECTION 1
SCORM® 2004 Overview

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1.1. About This Document

The United States Department of Defense (DoD) and the White House Office of Science and Technology Policy (OSTP) launched the Advanced Distributed Learning Initiative (ADL) in November 1997. The vision of the ADL Initiative is to provide access to the highest quality learning and performance aiding, that can be tailored to individual needs, delivered cost-effectively anytime and anywhere. The ADL Initiative aims to accelerate large-scale development of dynamic and cost-effective learning software and systems and to stimulate the market for these products.

As a foundation for accomplishing those goals, ADL's Sharable Content Object Reference Model (SCORM) aims to foster the creation of reusable learning content as "instructional objects" within a common technical framework for computer-based and Web-based learning. SCORM describes that technical framework by providing a harmonized set of guidelines, specifications and standards based on the work of several distinct e-learning specifications and standards bodies. These organizations continue to work with ADL, developing and refining their own e-learning specifications and standards, and helping to build and improve SCORM.

This document provides an overview of the SCORM 2004 3rd Edition documentation suite, the SCORM 2004 3rd Edition Conformance Test Suite and SCORM 2004 3rd Edition Sample Run-Time Environment. It is written at an intentionally high level. The technical details of SCORM can be found in three stand-alone documents, or books that cover the Content Aggregation Model (CAM), the Run-Time Environment (RTE) and Sequencing and Navigation (SN).

This third edition is released in response to enhancements identified by the ADL Technical Team and the ADL Community at large, as well as updates to specifications and standards work that have taken place since the release of SCORM 2004 2nd Edition, in July 2004.

1.2. Introduction to the Sharable Content Object Reference Model

"SCORM" stands for "Sharable Content Object Reference Model." A "reference model" is something that shows what kinds of services will be needed to solve a particular problem, how they can be put together, the relevant standards that apply, and how they might be used.

There are three primary criteria for a reference model such as SCORM. First, it must articulate guidelines that can be understood and implemented by developers of learning content. Second, it must be adopted, understood and used by as wide a variety of stakeholders as possible -- especially learning content and tool developers and their customers. Third, it must permit mapping of any stakeholder's specific model for instructional systems design and development into itself. Stakeholders must be able to see how their own model of instructional design is reflected by the reference model they hold in common.

Up-front investment is required to develop and convert learning content for technology-based presentation. These investment costs may be reduced by an estimated 50-80 percent through the use of learning content that is accessible, interoperable, durable and reusable.

Procedures for developing such learning content are state-of-the-art in e-learning, but they must be articulated, accepted and widely used as guidelines by developers and their customers. These goals can be achieved through collaborative development. Collaboration will increase the number, quality and per-unit value of learning content. Such collaboration requires agreement upon a common reference model.

ADL architects recognized early the need for a reference model that would specify learning content and its labeling, storage, and presentation in distributed learning. SCORM provides a coordinating model of standard practices that can be generally accepted and widely implemented throughout the distributed learning community.

SCORM helps define the technical foundations of a Web-based learning environment. It is a model that references and integrates a set of interrelated technical standards, specifications and guidelines designed to meet high-level requirements for learning content and systems. SCORM describes a "Content Aggregation Model" and a "Run-Time Environment " for instructional objects to support adaptive instruction based on a learner's goals, preferences, prior performance and other factors. SCORM also describes a "Sequencing and Navigation" model for the dynamic presentation of content based on learner needs.

SCORM seeks to knit together the contributions of disparate groups and interests in the distributed learning community. It is intended to coordinate emerging technologies and capabilities with commercial/public implementations.

1.2.1. The "ilities" – Conceptual Starting Point for SCORM

To help stimulate industry agreement and to realize such a model, SCORM adapts the object properties listed above into high-level functional requirements for all SCORM-based e-learning environments. These requirements are known as ADL's "ilities," and they form the foundation on which all changes and additions to SCORM are based. These "ilities" are as follows:

Accessibility: The ability to locate and access instructional components from one remote location and deliver them to many other locations.

Adaptability: The ability to tailor instruction to individual and organizational needs.

Affordability: The ability to increase efficiency and productivity by reducing the time and costs involved in delivering instruction.

Durability: The ability to withstand technology evolution and changes without costly redesign, reconfiguration or recoding.

Interoperability: The ability to take instructional components developed in one location with one set of tools or platform and use them in another location with a different set of tools or platform.

Reusability: The flexibility to incorporate instructional components in multiple applications and contexts.

In addition to these "ilities," another foundational concept for SCORM is "the Web-based assumption," which asserts that the Web provides the best opportunity to maximize access to and reuse of learning content. ADL made this assumption for several reasons:

- Web-based technologies and infrastructure are rapidly expanding and provide a mainstream basis for learning technologies.
- Web-based learning technology standards do not yet exist in widespread form.
- Web-based content can be delivered using nearly any medium (e.g., CD-ROM, stand-alone systems and/or as networked environments).

The Web-based assumption embraces industry's transition to common content and delivery formats. Computer operating system environments now natively support Web content formats. The trend is toward the use of common formats that can be used locally, on local intranets or over the Web. SCORM extends this trend to learning technologies.

Combining the "ilities" with the Web-based assumption, SCORM's operational principles offer the following abilities:

- The ability of a Web-based LMS to launch content that is authored using tools from different vendors and to exchange data with that content.
- The ability of Web-based LMS products from different vendors to launch the same content and exchange data with that content during execution.

- The ability of multiple Web-based LMS products/environments to access a common repository of executable content and to launch such content.

A key function of an LMS in the ADL context, then, is to manage the run-time experience the learner has with the learning content.

1.2.2. Learning Management Systems (LMSs)

"LMS" is a catchall term in SCORM. It refers to a suite of functionalities designed to deliver, track, report on and manage learning content, learner progress and learner interactions. "LMS" can apply to very simple course management systems, or highly complex enterprise-wide, distributed environments. A highly generalized model showing potential components or services of an LMS is shown in Figure 1.5.3a. Many people now use the term LMS instead of CMI (computer-managed instruction) to indicate the inclusion of new functionalities and capabilities not historically associated with those older systems. These include: back-end connections to other information systems, sophisticated tracking and reporting of student activity and performance, centralized registration, online collaboration and adaptive content delivery.

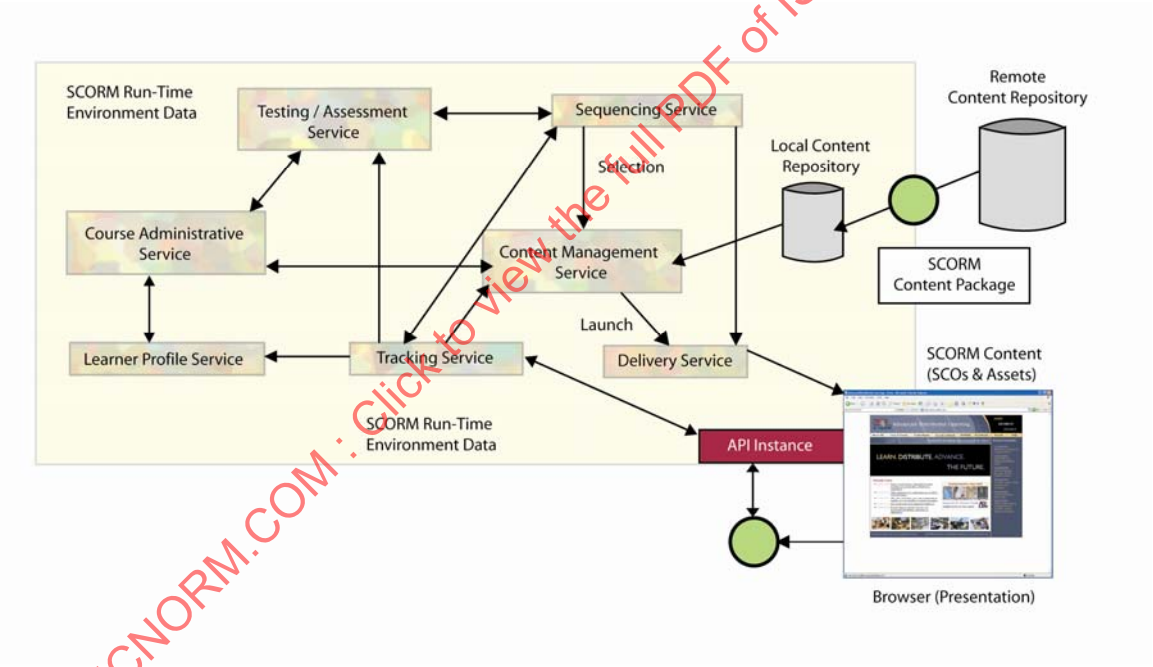


Figure 1.2.2a: Highly generalized model of an LMS

LMS implementations vary widely. SCORM focuses on interface points between instructional content and LMS environments, and is silent about the specific features and capabilities provided within a particular LMS. This allows individual vendors to provide an array of instructional-management services, and an array of competitive alternatives, while maintaining the important SCORM goal of interoperability.

In SCORM, “LMS” implies a server-based environment that has the capacity for managing and delivering content to learners. In other words, in SCORM, the LMS determines what to deliver and when, and tracks progress and performance as the learner moves through the instructional program.

SCORM supports the notion of content comprised of reusable content objects aggregated to form meaningful units of instruction. To support the goal of reuse, instructional content may be prepared separately from context, or example, or advance organizers, or perception checks, or assessment items.. Instead, these additional elements of instructional presentation may be included in an aggregation of various and different types of content objects to meet a specific instructional goal. Highly granular content objects can thus be designed for reuse in multiple contexts.

Content objects do not determine, by themselves, how to progress through an aggregation of content objects that comprise a unit of instruction. Doing so would require content objects to contain information about the possible suitability of other content objects within an aggregation for an instructional sequence, which would limit reusability. Instead, the LMS merely processes external defined sequencing rules which allows the instructional content designer/developer to specify sequencing behavior independently from the instructional content. Keeping sequencing separate from content allows for individual learners to be directed toward individually responsive paths through the program. It also allows for both sequencing prescriptions and content objects to become more readily available for reuse in future applications.

1.2.3. SCORM and Other Standards Activities

ADL has adapted specifications, standards and guidelines developed by other organizations to form an integrated reference model to meet the goals of SCORM. ADL continues to work with these organizations to develop those specifications and standards. ADL’s role involves:

- contributing technical ideas and concepts
- integrating and testing these specifications, standards and derivative works
- helping to bridge the gap between initial development and ultimate adoption by industry.

Of the many organizations working on specifications related to e-learning, there are four in particular that are key to SCORM. ADL encourages active participation in one or more of these organizations in support of future specification development.

- Alliance of Remote Instructional Authoring & Distribution Networks for Europe (ARIADNE) (http://www.ariadne-eu.org/)
- Aviation Industry CBT Committee (AICC) (http://www.aicc.org/)
- Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Committee (LTSC) (http://ieeeltsc.org/)
- IMS Global Learning Consortium, Inc. (http://www.imsglobal.org/)

1.3. SCORM 2004 3rd Edition

SCORM 2004 3rd Edition introduces changes from past SCORM 2004 editions. The changes continue to strengthen and solidify SCORM 2004. These changes fall into several categories: clarifications of concepts, clarification of requirements, changes due to standardization/specification efforts, best practices from the ADL Community, enhancements and bug fixes.

One of the primary forces behind changes to SCORM has been the evolution of the underlying specifications and standards. These include:

- IEEE Data Model For Content Object Communication
- IEEE ECMAScript Application Programming Interface for Content to Runtime Services Communication
- IEEE Learning Object Metadata (LOM)
- IEEE Extensible Markup Language (XML) Schema Binding for Learning Object Metadata Data Model
- IMS Content Packaging
- IMS Simple Sequencing.

With the release of SCORM 2004 3rd Edition, ADL has decided to place the versions of each of the technical books to version 1.0. This marks the first version of these books within the third edition of SCORM 2004. If changes are required to correct defects, make enhancements or for clarification, it is expected that these internal versions will change.

The key factors that have influenced changes found in SCORM 2004 3rd Edition were:

- The approval of the IEEE's Standard for Extensible Markup Language (XML) Schema Definition (XSD) Language Binding for Learning Object Metadata (LOM) as a formal accredited IEEE Standard.
- The release of an IMS Global Learning Consortium, Inc. maintenance update to the IMS Content Packaging Specification, the IMS Content Packaging Specification Version 1.1.4.
- A SCORM Technical Working Group Meeting that was held to address several reported issues with SCORM 2004 2nd Edition.
- Impacts due to continued evolution and stabilization of the ADL Registry.
- Feedback from the ADL Community:
    - Discussions, lessons learned and issues collected at Plugfest 9, International Plugfest II and other events.
    - SCORM 2004 2nd Edition Addendums and resolutions to other reported defects.

- Various editorial and technical refinements based on feedback from the ADL Community and lessons learned from SCORM implementers.

ADL encourages the ADL Community to implement to SCORM 2004 3rd Edition. This edition corrects and clarifies issues raised with SCORM 2004 2nd Edition.

This document ties together the component documents that comprise SCORM 2004. Figure 1.3a: *SCORM Evolution* below illustrates the evolution of SCORM 2004:

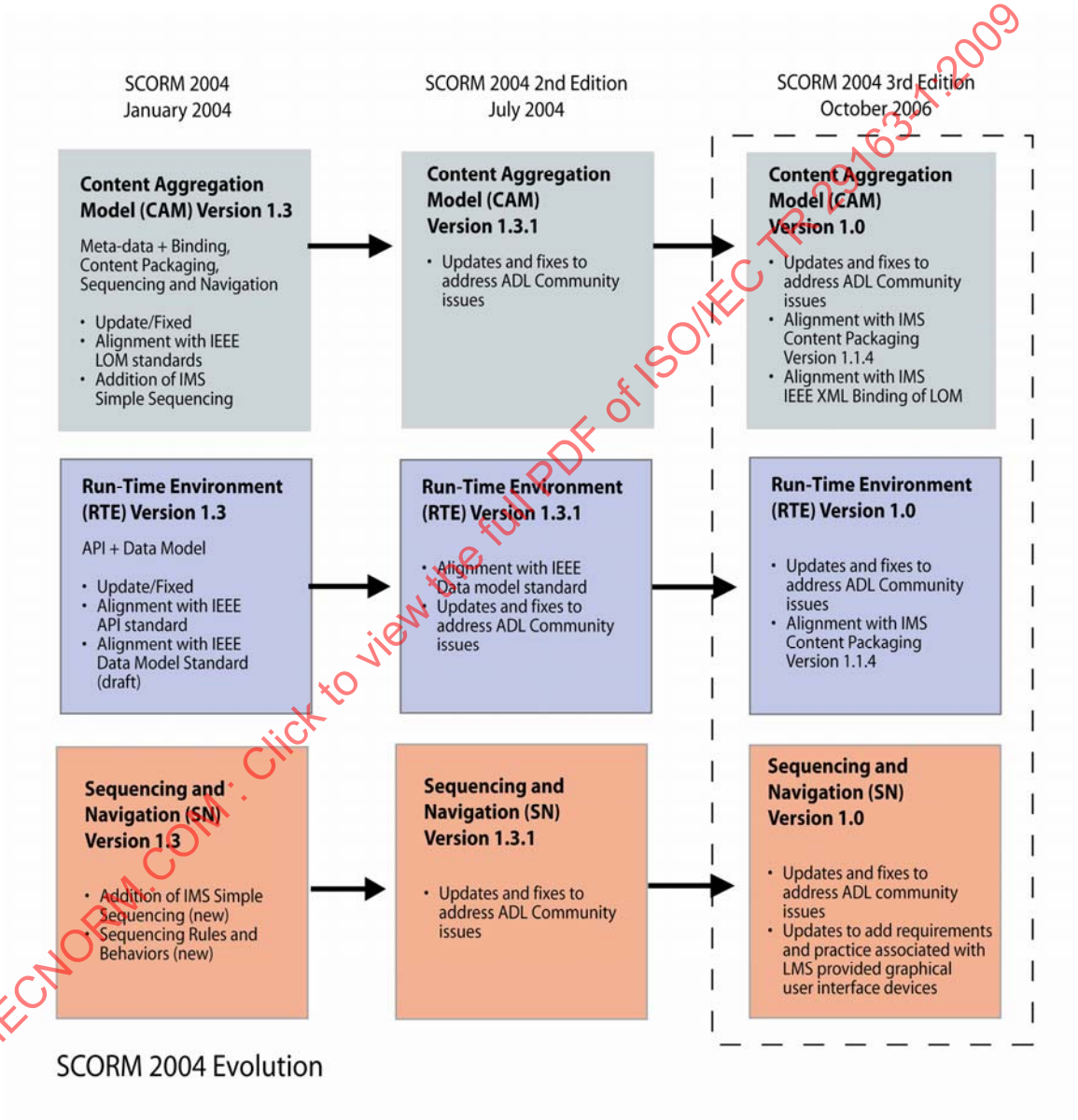


Figure 1.3a: SCORM 2004 Evolution

1.3.1. The Organization of SCORM

SCORM is a collection, integration and harmonization of specifications and standards that have been bundled into a collection of "technical books." Nearly all of the specifications and guidelines are taken from other organizations. These technical books are presently grouped under three main topics: the "Content Aggregation Model (CAM)," the "Run-time Environment (RTE)" and "Sequencing and Navigation (SN)."

SCORM integrates technology developments from groups such as IMS, AICC, ARIADNE and the IEEE LTSC – within a single reference model to specify consistent implementations that can be used across the e-learning community.

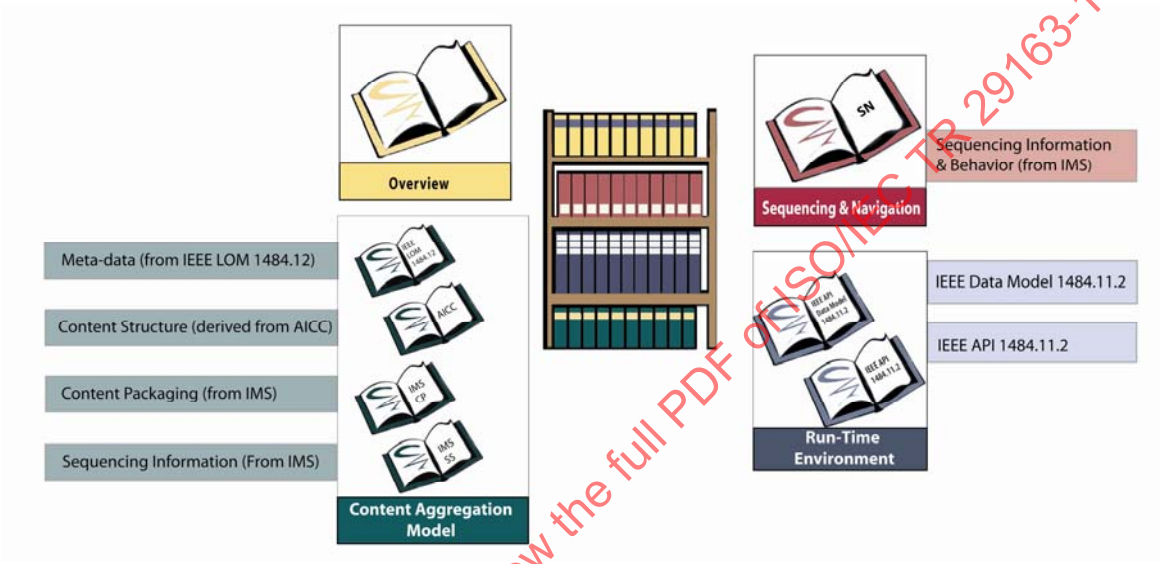


Figure 1.3.1a: SCORM Bookshelf

While the various SCORM books can stand-alone, there are areas of overlap. For instance, while the RTE book focuses primarily on communication between content and LMSs, it frequently refers to the different types of content objects conducting that communication: Sharable Content Objects (SCOs). More details about SCOs are found in the CAM book. Similarly, while the SN book covers the details of SCORM sequencing and navigation, the RTE book deals with content delivery and gives high-level information on how an LMS determines which piece of content to deliver at any given time. Table 1.3.1a summarizes the books.

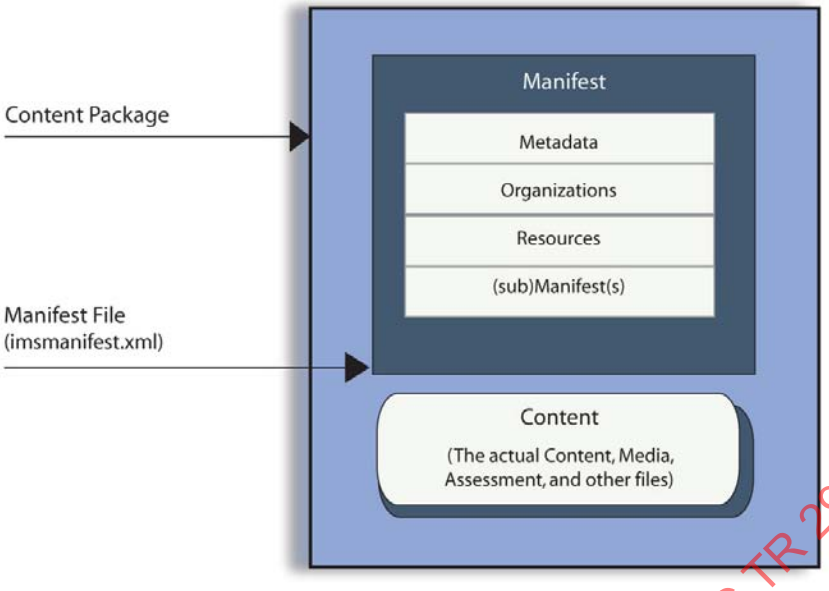
Table 1.3.1a: SCORM Book Coverage

SCORM Book	Concepts Covered	Key SCORM Technologies Covered	Areas of Overlap
Overview	High-level conceptual information.	Introduction to numerous high-level elements of SCORM terminology.	Covers areas of the CAM, RTE and SN books at a high level.
Content Aggregation Model (CAM)	Assembling, labeling and packaging of learning content.	SCO, Asset, Content Aggregation, Package, Package Interchange File (PIF), Metadata, Manifest, Sequencing Information, Navigation Information.	SCOs and manifests. SCOs communicate with an LMS via the RTE. Manifests contain Sequencing and Navigation information.
Run-Time Environment (RTE)	LMS's management of the RTE, which includes launch, content to LMS communication, tracking, data transfer and error handling.	API, API Instance, Launch, Session Methods, Data Transfer Methods, Support Methods, Temporal Model, Run-Time Data Model.	SCOs are described in the CAM book, are content objects which use the RTE.
Sequencing and Navigation (SN)	Sequencing content and navigation.	Activity Tree, Learning Activities, Sequencing Information, Navigation Information, Navigation Data Model.	Sequencing and Navigation affects how content is assembled in a manifest.

1.3.2. The SCORM 2004 3rd Edition Content Aggregation Model Book

The SCORM Content Aggregation Model (CAM) book describes the types of content objects used in a content aggregation, how to package those content objects to provide for successful exchange from system to system, how to describe those content objects using metadata to enable search and discovery, and how to define the sequencing rules for the content objects to complete the design of the learning experience. The CAM enables the consistent labeling, packaging, storing, exchange and discovery of content objects.

A Content Package bundles content objects or aggregations of content objects together with a content organization. A SCORM Content Package may represent a course, lesson, module or may simply be a collection of related content objects. The manifest, an essential part of all SCORM Content Packages, is similar in many ways to a "packing slip." It lists the contents of the package and may include an optional description of the content structure.



SOURCE: IMS Content Packaging Information Model Version 1.1.4 Final Specification

Figure 1.3.3a: Conceptual Content Package

SCORM Content Packages may include additional information that describes how an LMS is intended to process the Content Package and its contents. Some of these elements are utilized by SCORM RTE model.

- Content object launch locations and launch parameters are described as elements in SCORM Content Packages. The SCORM RTE book details these elements and their effects on launching content objects;.
- Several pieces of information that can be found in a SCORM Content Package affect initialization and management of a content object's run-time data model. The SCORM RTE book details these elements and the required LMS behaviors.
- Other elements in SCORM Content Packages describe initial values for specific elements of a content object's run-time data model. The SCORM RTE book details these elements and their initialization behavior.
- When a SCORM Content Package includes a description of content structure, sequencing and navigation information elements may be added to define an intended approach to sequencing the package's content objects.

For a better understanding of how all of the elements described above are specified in a SCORM Content Package, refer to the SCORM CAM book.

1.3.3. The SCORM 2004 3rd Edition Run-Time Environment Book

The SCORM 2004 3rd Edition Run-Time Environment (RTE) book describes the requirements that are imposed on LMS to ensure the conditions that allow for interoperability of content across different LMSs (i.e., a standardized content launch process, standardized methods of effecting communication between content and LMSs and standardized data model elements used for passing information about the learner's interactions with the content). The RTE covers the requirements of SCOs and their use of a standard communication mechanism as well as the data that can be transferred to and from the LMS using this communication mechanism.

The purpose of the SCORM RTE is to provide for interoperability between SCOs and LMSs. SCORM provides a means for learning content to be interoperable across multiple LMSs regardless of the tools used to create the content. For this to be possible, there must be a common way to launch content, a common way for content to communicate with an LMS, and predefined data elements that are exchanged between an LMS and content during its execution. The three components of the SCORM RTE are defined as Launch, API and Data Model. The technical details of these elements are described in SCORM RTE book, but a brief overview of each of these elements of the RTE follows.

"Launch" defines the conventions by which LMSs and SCORM conforming content will be delivered and displayed to the learner.

The SCORM API provides a set of functions that are agreed upon by both LMS vendors and content authoring tool vendors to enable communication between an LMS and the SCOs it launches. These functions complete the launch process by establishing a "handshake" between the SCO and the LMS that launched it, and breaking that handshake when the SCO is no longer needed. In addition, the functions allow SCORM content to "set" and "get" data on the LMS, such as assessment results, and to check for and address any errors that occur during these processes. This "get" and "set" data is used to determine the state of the learner's progress through the content and consequent sequencing decisions.

The SCORM RTE Data Model provides the vocabulary that was negotiated by industry, government and academia to provide an agreed-upon method to pass information, or to "get" and "set" data from and to an LMS when calling SCORM API functions. For instance, when transmitting a test score for a learner, a SCO would use the SCORM Data Model element known as "`cmi.score.scaled`" to inform the LMS how the learner performed. This and all other SCORM Data Model elements are described in detail in the SCORM RTE book.

1.3.4. The SCORM 2004 3rd Edition Sequencing and Navigation Book

The SCORM Sequencing and Navigation (SN) book defines a method for representing the intended behavior of a learning experience such that any SCORM conformant LMS will sequence learning activities in a consistent way. It also defines the required behaviors and functionality that SCORM conformant LMSs must implement to process sequencing information at run-time. More specifically, it describes the branching and flow of learning activities in terms of an Activity Tree, based on the results of a learner's interactions with content objects and an authored sequencing strategy. An Activity Tree is a conceptual structure of learning activities managed by the LMS for each learner as shown Figure 1.6.4a. In SCORM, a learning activity may reference content objects that are delivered to the learner.

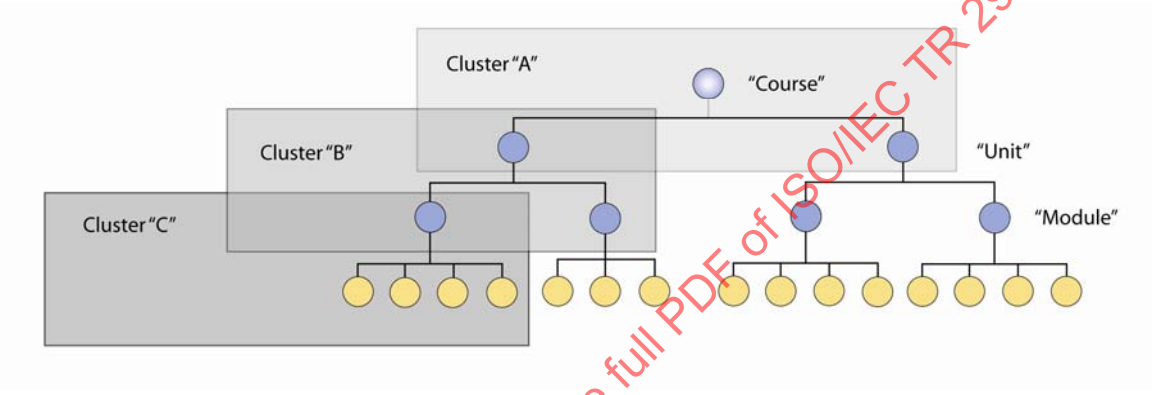


Figure 1.3.5a: Conceptual Activity Tree and Clusters

The SCORM SN book describes how learner-initiated and system-initiated navigation events can be triggered and processed, resulting in the identification of learning activities for delivery. Each learning activity identified for delivery will have an associated content object. The SCORM RTE book describes how these content objects are launched. The SCORM RTE model also describes how the LMS manages the resulting learning experience and how that learning experience may affect the Activity Tree.

Various concepts described in the SCORM CAM book have relationships to the SCORM SN book. The CAM describes how to build sequencing rules and represent those rules in XML. The CAM then describes how to build onto the existing manifest to apply these sequencing rules. Refer to the SCORM SN book for more details on the relationship between the XML binding of the sequencing rules and the processes and behaviors of those rules.

1.3.5. SCORM 2004 3rd Edition Conformance Requirements

The SCORM Conformance Requirements document describes what is tested to establish conformance. This document outlines SCORM conformance requirements for the following:

- Learning Management Systems (LMSs)
- Content Packages
- Sharable Content Objects (SCOs)

This document serves as the basis for the Conformance Test Suite.

1.3.6. SCORM Conformance Test Suite

The SCORM Conformance Test Suite contains the software, procedures and supporting documents for organizations to perform self-testing on LMSs, SCOs and Content Packages. Beginning with SCORM 2004, LMSs must pass all of the tests to be considered conformant. Previously, different levels of conformance were possible.

The SCORM Conformance Test Suite used by the certification centers is the same one that is available for download free of charge from ADLNet.gov for self-testing. Only content packages and LMSs can be certified as SCORM conformant (not tools or organizations).

1.3.6.1. SCORM Certification Testing

The ADL Certification Program is a third-party testing of LMSs and content. The ADL Certification Testing Center use the latest SCORM Conformance Test Suite software as the basis of certification.

The ADL Co-Laboratory Hub signed a Memorandum of Understanding (MOU) in November 2002 with the Wisconsin Testing Organization in Madison, Wisconsin and the Naval Undersea Warfare Center (NUWC) Division Keyport in Keyport, Washington to designate these organizations as ADL Certification Testing Centers.

Certification is not an endorsement from the ADL Initiative or a guarantee that the product and/or content has been tested for defects in functionality and/or the product's content is instructionally sound.

Visit ADLNet.gov for more details on SCORM Certification.

1.3.6.2. Compliant vs. Conformant vs. Certified

The terms "compliant," "conformant" and "certified" are used throughout the ADL Community in different contexts. ADL avoids using the term "SCORM compliant" in favor of "SCORM conformant," even though some often use the terms "SCORM conformant" and "SCORM compliant" interchangeably. The term "conformant" should be used when describing a product that follows the SCORM 2004 specifications.

A "SCORM Conformant Product" is defined as a product that has passed the SCORM Conformance Test Suite (Self Test), which indicates that the product conforms to the latest version of SCORM Conformance Requirements. Anyone whose products pass the

latest version of the SCORM Conformance Test Suite can claim themselves to be SCORM conformant.

A “SCORM Certified Product” has been independently tested by one of the ADL Certification Testing Centers and has passed. ADL certification assures consumers of distributed learning content and systems that certified products have successfully implemented SCORM specifications.

From a technical standpoint, an “ADL Certified Product” is no different than a “SCORM Conformant Product.” The key difference is that “ADL certified” products have been tested by the independent ADL Certification Testing Centers.

1.3.7. SCORM 2004 3rd Edition Sample Run-Time Environment

The SCORM 2004 Sample Run-Time Environment provides a working example of the Run-Time Environment described in SCORM 2004. Several of the SCORM conformance requirements demonstrated in this sample implementation include the importing and delivery of SCORM Content Aggregation Content Packages, standardized communication between content and LMSs, standardized data model elements used for passing information relevant to the learner's experience with the content, and Sequencing and Navigation of content.

The SCORM Sample RTE allows the ADL community developers to evaluate their content in a scaled-down LMS environment without the cost of a commercial LMS.

1.4. Commonly Used Terms in SCORM

Below is a list of commonly used terms throughout the SCORM books and their definitions.

ADL Co-Laboratory Hub (ADL Co-Lab Hub) Network: A network of organizations designed to foster the collaborative research, development and assessment of the common tools, standards, content and guidelines for advanced distributed learning.

SCORM Run-Time Environment (RTE) Application Program Interface (API): The communication mechanism for informing the LMS of the state of a content object (e.g., initialized, finished, in an error condition). The API is used for getting and setting data (e.g., score, time limits, etc.) between the LMS and the Sharable Content Object (SCO).

Assets: Assets are electronic representations of media, such as text, images, sound, web pages or other pieces of data that can be delivered using web technologies.

Content Organization: A standardized way to describe the structure and behavior of content.

Content Packaging: A standardized way to identify and exchange digital resources between different systems or tools. Content packaging can also define content organizations.

SCORM Run-Time Environment (RTE) Data Model: A standard set of data elements used to define the information being communicated, such as, the status of the learning resource. In its simplest form, the data model defines elements that both the LMS and SCO are expected to "know about." The LMS must maintain the state of required data elements across sessions, and the learning content must utilize only these predefined data elements if reuse across multiple systems is to occur.

Learning Management System (LMS): Software that automates training event administration through a set of services that launches learning content, keeps track of learner progress, sequences learning objects, and reports student mastery.

Metadata: Information about content that includes descriptions of characteristics and relationships among category items.

Asset Metadata: Metadata can be applied to Assets to provide descriptive information about the Assets independent of any usage or potential usage within courseware content. This metadata is used to facilitate reuse and discoverability, within, for example, a content repository during content creation.

Content Organization Metadata: Content Organization Metadata describes the Content Organization. The purpose of applying Content Organization Metadata is to enable discoverability within, for example, a content repository and to provide descriptive information about the content structure, as a whole, defined by the Content Organization.

Sharable Content Object (SCO) Metadata: Metadata can be applied to SCOs to provide descriptive information about the content in the SCO independent of use. This metadata is used to facilitate reuse and discoverability of content.

Sharable Content Object (SCO): A collection of one or more assets that represents a single launchable resource that can communicate with an LMS using the SCORM RTE. A SCO represents the lowest level of granularity of learning resources that can communicate with an LMS using the SCORM RTE.

The Sharable Content Object Reference Model (SCORM®): A collection and harmonization of specifications and standards that defines the interrelationship of content objects, data models, and protocols such that objects are sharable across systems that conform to the same model.

SCORM Content Aggregation Model (CAM): A common method to describe the components used in a learning experience, how to package those components for exchange from system to system, how to describe those components to enable search and discovery, and how to define sequencing rules for the components.

SCORM Run-Time Environment (RTE): The RTE describes the LMS requirements for managing the run-time environment (i.e., content launch process, standardized communication between content and LMSs, and standardized data model elements used for passing information relevant to the learner's experience with the content.

SCORM Sequencing and Navigation (SN): Information and behaviors that an LMS must apply in order to present a designed learning experience. The information is expressed within Content Structure and encoded in the organization section of Content Packaging.

APPENDIX A
Acronym Listing

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Acronym Listing

ADL	Advanced Distributed Learning
AICC	Aviation Industry CBT Committee
API	Application Program Interface
ARIADNE	Alliance of Remote Instructional Authoring & Distribution Networks for Europe
CAM	Content Aggregation Model
CBI	Computer-Based Instruction
CBT	Computer-Based Training
CMI	Computer Managed Instruction
DND	Department of National Defence
DoD	Department of Defense
DOL	Department of Labor
DTEP	Director of Training and Education Policy
IDA	Institute for Defense Analyses
IEEE	Institute of Electrical and Electronics Engineers
IMS	IMS Global Learning Consortium, Inc.
ITS	Intelligent Tutoring Systems
LMS	Learning Management System
LOM	Learning Objects Metadata
LTSC	Learning Technology Standards Committee
NGB	National Guard Bureau
NUWC	Naval Undersea Warfare Center
OSTP	Office of Science and Technology Policy
PIF	Package Interchange File
RTE	Run-Time Environment
SCO	Sharable Content Object
SCORM	Sharable Content Object Reference Model
SN	Sequencing and Navigation
SS	Simple Sequencing
UK	United Kingdom
UI	User Interface
XML	Extensible Markup Language

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