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Information Technology

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ISO/IEC JTC1 SC36 N1662

ISO/IEC JTC1 SC36
Information Technology for Learning, Education, and Training

Title:

New Work Items (3-Parts) on Content Packaging in response to Jeju Plenary Resolution #62

Source:

KATS

Project:

N/A

Document Type:

Text for NP ballot

Status:

This document is circulated to SC36 P-members for ballot in accordance with Resolution 62 (Jeju 2008). The results will be discussed at the 2008-09 Stuttgart Meeting.

Date:

2008-05-07

Action ID:

For ballot. Please use the electronic committee balloting application and vote **by 2008-08-07 at the latest.**

Distribution:

P, O, & L Members

1. This document has been prepared by the Korean National Body and the IMS Global Learning Consortium (GLC) to submit a New Work Item for Content Packaging that is based on the IMS Content Packaging version 1.2.

2. The IMS Content Packaging documents were already forwarded to SC36 as document N1511 titled
   "*IMS Content Packaging*
   Specification Primer (36N1511-1)
   Information Model (36N1511-2)
   Best Practice Implementation Guide (36N1511-3)
   Version 1.2"

   The 36N1511 document was issued on 2 April, 2007 and comments were due by 2 August. The results of NB comments were published in document 36N1542 (dated 2007-08-14).

3. It is to be submitted as a NWI for Content Packaging Part 1, Part 2, and Part 3 for ballot as required by Jeju Plenary resolution #62

G3 New Work Item Proposal

April 28, 2008

PROPOSAL FOR A NEW WORK ITEM

Date of presentation of proposal: 2008-04-28	Proposer: KATS (Korean National Body)
Secretariat: UK (BSI)	**ISO/IEC JTC 1 N** XXXX ISO/IEC JTC 1/SC 36 N1662

A proposal for a new work item shall be submitted to the secretariat of the ISO/IEC joint technical committee concerned with a copy to the ISO Central Secretariat.

Presentation of the proposal - to be completed by the proposer

Title
New Work Item on Information technology – Information Technology for Learning, Education, and Training – Content Packaging
Part 1: Content Packaging Information Model,
Part 2: Content Packaging XML Binding, and
Part 3: Content Packaging Best Practice and Implementation Guide

Scope

These standards specify the description of data structures that can be used to exchange content among systems that wish to import, export, aggregate, and disaggregate packages of digital content. These standards based on IMS Content Packaging v1.2 will be multi part standards that are composed of three parts. Content packages enable exporting content (including references to web-based content) from one learning content management system or digital repository and importing it into another while retaining information describing the media in the content package and how it is structured, such as a table of contents or which web page to show first. These standards focus on the packaging and transport of resources but don't determine the nature of those resources. This is because the specifications allow adopters to gather, structure, and aggregate content in an unlimited variety of formats. The composition of this standard are as follow :

- Part 1: Content Packaging Information Model
- Part 2: Content Packaging XML Binding
- Part 3: Content Packaging Best Practice and Implementation Guide

Part 1 of these standards is the normative description of the Content Package data structures and their relationships. The Information Model document also contains the conformance statements against which an implementation must comply and describes the core Content Package functionality plus the extensions that have been introduced in IMS Content Packaging version 2.1 (the new functionality is expressed as extensions to the core).

Part 2 of these standards describes the realization of the Content Packaging Information Model in XML. The binding is realised as two XSDs, namely the core Content Package XSD file and the extension functionality in the XSD file. The binding document describes the underlying structure of the XSD and the formats of the corresponding instances of a Content Package.

Part 3 of these standards is intended to provide implementers with an overall understanding of the Content Packaging specification, the relationship of this specification with other Content Packaging specifications, and a best practices guide derived from experiences of those using the specification. This part also includes a significant number of actual examples that describe how implementers can make the best use of the Content Packaging standard. These examples are also useful as a starting template for each of the different forms of Content Package.

This standard will harmonize with IMS Content Packaging v1.2 and conduct collaboration with the related IMS working groups.

Purpose and justification

These standards clarify and regularize the behaviour of software components that are engaged in the creation of content packages and harvesting the information contained within them. These software components are referred to generically as Package Writers and Readers.

The information held in content packages is often stored in enterprise scale repositories. There is a high degree of interest in re-using existing information structures, whether to leverage proven structures, apply known information in novel ways, or simply to lower costs of knowledge and skill acquisition.

Earlier versions of the IMS Content Packaging specification focused almost exclusively on exchanging physical files, especially a special purpose compressed binary file called a Package Interchange File. These standards continue to support that approach, but also broadens the exchange of information to exchanging a logical package rather than a physical one. That is, a manifest (called IMS manifest) may be exchanged only – all assets referenced within it (or other IMS manifests to which it might be linked) remain in their known storage locations, and are used from those systems. This dramatically reduces costs for all parties concerned, in terms of storage, maintenance, and payload pushed "across the wire". This, in turn, should greatly facilitate or accelerate the provision of information to areas in which it is best applied.

An interest is also a growing in tailoring the presentation of information to a given profile, needs, or requirements of a given individual or groups of individuals. This often involves wide varieties of the same information expressed in different formats or presentation modalities. These standards offer to relate assets that support such varied and richly adaptable requirements. The approach relies heavily on an emerging consensus around how best to define such requirements and describe the assets enabling them in metadata.

Metadata is a key to the discovery and use of information expressed in terms of references to physical artefacts, digital and non-digital. IMS Content Packaging version 1.2 heals a long-running issue in terms of its approach to modelling metadata and binding the data structures used to convey it. IMS Content Packaging v1.1.3 and v1.1.4 both defined specific object models for expressing metadata, which unfortunately were not faithfully bound as data structures. This split between the definition in the information model and the model's realization in XML Schema data structures has caused some confusion among adopters of the IMS Content Packaging.

IMS Content Packaging version 1.2, which will be base document for these standards, addresses this issue by declaring the original meaning normative, and the laxity of the previous bindings tolerated (i.e. the binding does not disallow the use of 'schema' and 'schemaversion' to indicate metadata control files, even if developers should not author packages in this way.) It means these standards can be support several metadata specification including MLR, developed by ISO/IEC JTC1 SC36.

Given the widespread adoption of IMS Content Packaging and the proliferation of hundreds of thousands of IMS Packages (including use in SCORM and, most importantly, independent of SCORM), it is important that existing software components continue to process packages they were designed to handle, and that new software components conforming to IMS Content Packaging version 1.2 also process the older packages as designed. Newer systems will also honour the new extension objects that enable the linking and referencing behaviours desired by enterprise scale users. The new objects are defined in a separate namespace that leverages the extension points and semantics of IMS Content Packaging *without* affecting the existing IMS Content Packaging namespace. The best of the past is preserved as it provides a strong foundation for future growth without having to alter its structural integrity.

Finally these standards will have a secure and thriving future to benefit all adopters, but most importantly, the learners – end users for who all this interoperability activity in the learning space is focused on.

Programme of work

If the proposed new work item is approved, which of the following document(s) is (are) expected to be developed?

____ a single International Standard

____ more than one International Standard (expected number: .....)

__**X**_ a multi-part International Standard consisting of ....**3**.... parts

____ an amendment or amendments to the following International Standard(s) ....

____ a technical report type .....

And which standard development track is recommended for the approved new work item?

____ a. Default Timeframe

_ **X** _ b. Accelerated Timeframe

__ c. Extended Timeframe

Relevant documents to be considered SC36 N1511 (IMS Content Packaging)

IMS GLC reference documents to be considered are:

- IMS Content Packaging Information Model v1.2 CM/DN Draft v2.0
- IMS Content Packaging XML Binding v1.2 CM/DN Draft v2.0
- IMS Content Packaging Best Practice and Implementation Guide v1.2 CM/DN Draft v2.0

Co-operation and liaison IMS GLC

It is considered important that every NB involves its LET community to the greatest possible extent to ensure that all current teaching and learning resources and content are can be distributing and sharing.

If it is necessary to consider the ISO/IEC MPEG group, SC29 (WG11) or MPEG group can be cooperate with this NP as required.

Preparatory work offered with target date(s)

(1) 2008-09: CD (2) 2009-03: FCD (3) 2009-09: DIS (4) 2010-03: FIDS (5) 2010-09: IS

Preparatory work has been completed in the form of the IMS specification documents listed above. It is expected that the CD ballot document for Part 1 will be ready in ISO/IEC JTC1 format to accompany this NP ballot, with that for the other 2 Parts being completed for CD ballot within 3 months of completion date of a successful NP ballot.

Signature: Yong Sang Cho

Will the service of a maintenance agency or registration authority be required? .....No.....
- If yes, have you identified a potential candidate? .....
- If yes, indicate name .....

Are there any known requirements for coding? .....No.....
-If yes, please specify on a separate page

Does the proposed standard concern known patented items? .....No.....

- If yes, please provide full information in an annex

Comments and recommendations of the JTC 1 or SC 36 Secretariat - attach a separate page as an annex, if necessary

Comments with respect to the proposal in general, and recommendations thereon:
It is proposed to assign this new item to JTC 1/SC 36

Voting on the proposal - Each P-member of the ISO/IEC joint technical committee has an obligation to vote within the time limits laid down (normally three months after the date of circulation).

Date of circulation:	**Closing date for voting:**	**Signature of Secretary:**
2008-05-07	2008-08-07	David Hyde

NEW WORK ITEM PROPOSAL - PROJECT ACCEPTANCE CRITERIA		
Criterion	**Validity**	**Explanation**
A. Business Requirement		
A.1 Market Requirement	Essential _X_ Desirable ___ Supportive ___	See Annex A
A.2 Regulatory Context	Essential ___ Desirable _X__ Supportive ___ Not Relevant ___	See Annex B
B. Related Work		
B.1 Completion/Maintenance of current standards	Yes ___ No _X_	
B.2 Commitment to other organisation	Yes _X_ No ___	IMS GLC (See Annex C)
B.3 Other Source of standards	Yes _X_ No ___	IMS GLC (See Annex C)
C. Technical Status		
C.1 Mature Technology	Yes _X_ No ___	See Annex D
C.2 Prospective Technology	Yes ____ No __X_	
C.3 Models/Tools	Yes _X_ No ___	See Annex E
D. Conformity Assessment and Interoperability		

D.1 Conformity Assessment	Yes _X_ No ___	See Annex F
D.2 Interoperability	Yes _X_ No ___	See Annex G
E. Cultural and Linguistic Adaptability		
E.1 Cultural and Linguistic Adaptability	Yes _X_ No ___	See Annex H
E.2 Adaptability to Human functioning and Context of Use	Yes _X_ No ___	See Annex I
F. Other Justification		

Notes to Proforma

A. Business Relevance. That which identifies market place relevance in terms of what problem is being solved and or need being addressed.

A.1 Market Requirement. When submitting a NP, the proposer shall identify the nature of the Market Requirement, assessing the extent to which it is essential, desirable or merely supportive of some other project.

A.2 Technical Regulation. If a Regulatory requirement is deemed to exist - e.g. for an area of public concern e.g. Information Security, Data protection, potentially leading to regulatory/public interest action based on the use of this voluntary international standard - the proposer shall identify this here.

B. Related Work. Aspects of the relationship of this NP to other areas of standardisation work shall be identified in this section.

B.1 Competition/Maintenance. If this NP is concerned with completing or maintaining existing standards, those concerned shall be identified here.

B.2 External Commitment. Groups, bodies, or for a external to JTC 1 to which a commitment has been made by JTC for Co-operation and or collaboration on this NP shall be identified here.

B.3 External Std/Specification. If other activities creating standards or specifications in this topic area are known to exist or be planned, and which might be available to JTC 1 as PAS, they shall be identified here.

C. Technical Status. The proposer shall indicate here an assessment of the extent to which the proposed standard is supported by current technology.

C.1 Mature Technology. Indicate here the extent to which the technology is reasonably stable and ripe for standardisation.

C.2 Prospective Technology. If the NP is anticipatory in nature based on expected or forecasted need, this shall be indicated here.

C.3 Models/Tools. If the NP relates to the creation of supportive reference models or tools, this shall be indicated here.

D. Conformity Assessment and Interoperability Any other aspects of background information justifying this NP shall be indicated here.

D.1 Indicate here if Conformity Assessment is relevant to your project. If so, indicate how it is addressed in your project plan.

D.2 Indicate here if Interoperability is relevant to your project. If so, indicate how it is addressed in your project plan

E. Cultural and Linguistic Adaptability Indicate here if cultural and linguistic adaptability is applicable to your project. If so, indicate how it is addressed in your project plan.

F. Other Justification Any other aspects of background information justifying this NP shall be indicated here

Annex A:

Market Requirement - Essential

People want to be able to share teaching and learning content for a variety of reasons. Educators may want to share particularly useful lessons with colleagues, publishers want to sell content, and communities of various descriptions want to pool resources for the expensive business of creating effective learning content. All of these scenarios presuppose that content can be exchanged freely, without technical barriers.

In a learning content environment, it is also desirable to have a variety of tools to help with the creation, management and playback of e-learning content. Different people will also have different requirements for each of these types of tools: for some, price is more important than user-friendliness, for example. What's more, such requirements can change over time, which means that the same content should work with tools that may not have been developed yet.

To enable such sharing of content, and to enable people a free choice of content creation, management and playback tools, it is necessary to agree to a content format. Such a format means that, for example, content can be authored without worrying about which Learning (Content) Management System (LCMS) it will be used with at any given point in the content object's lifetime.

Content Packaging is such a content format agreement.

Annex B:

Regulatory Context - Desirable

Many jurisdictional domains with the mandated or recommended responsibility in the field of "education" be they countries, provinces, states, etc. or of the nature of the European Union (EU) have made legislative commitments to provide equal access to education. These legislative commitments are enacted through regulations and other statutory instruments of a similar nature. Many of these have already been identified as part of the development of the IMS specifications (see Scope section). This proposed standards project will improve the efficiency and effectiveness of efforts to meet these jurisdictional requirements with cultural and educational variety.

Annex C:

Commitment to other Organizations

Permission Agreement from IMS (in process of being submitted), modelled after successful agreement accepted by ISO/IEC in support of liaison and harmonization of SC36 WG7 Access for All work process, i.e. the first three Parts of the multipart ISO/IEC 24751. It is noted that the three parts of the IMS Content Packaging Specification are also “freely available documents”.

Annex D:

Mature Technology

D.1 Implementations:

The IMS specifications upon which the proposed new standards project will be based have been tested and refined through a number of mature implementations and works in progress over a nearly 10 year history of application to the learning segment.

D.2 Specifications:

A prime indicator of the stability of the proposed approach for this new standards project is the fact that it is based on IMS specifications document developed by the global non-profit consortium, IMS Global Learning Consortium. The specification allows adopters to gather, structure, and aggregate content in an unlimited variety of formats. Atypical content package consists of Web pages and common picture formats, such as JPEGs. Other packages may contain more specialized material such as Java applets or other IMS formats, such as Question and Test Interoperability items or IMS Learner Information Packaging fragments.

Prior to the current work, IMS Content Packaging version 1.1 was the most recent major functional revision, completed in April 2001. Since then, many requests have been made for mostly minor functional additions and corrections, resulting in the version 1.1.x series of this specification. Requests for a few major additions were allowed to accumulate as practice matured around implementing IMS Content Packaging. The release of IMS Content Packaging version 1.2 should be considered to be the last major functional revision of this specification.

A summary of the major functional changes from IMS Content Packaging version 1.1.x is as follows:

- Separation of control documents (DTD and XSD) from the information model document;
- Clarifications of the use of child manifests;
- 'xml:' prefix recommendation – adoption of the W3C 'xml.xsd' file for the definition of the 'xml:' name-spaced attributes available to the content package. This means that newer packages are easier to validate with modern tools'
- 'parameter' attribute vocabulary – adoption of a syntax for the definition of the parameters as contained in the 'parameter' attribute plus definition of the algorithm to construct an associated URI;
- 'Href' filename format recommendation – formal definition of the file name formats that must be adopted when using the 'Href' attribute;
- ZIP file format recommendation – formal definition of the ZIP file format that must be adopted for interchange packages that are ZIP archive based;
- Name-spacing of 'xml:lang' made consistent;
- Clarification of the scoping of Meta-data in a Content Package;
- Clarified the usage of Local and Remote XSDs for Instance Validation;
- Improved Guidance on Merging Sub-manifests. This is an intricate operation that may be best replicated using the newer 'ipointer' mechanism;
- Clarified sub-manifest referencing using the <dependency> element;
- Requirement to declare all files in a package's manifest.
- In addition, the various versions contain many more clarifications and some corrections. Apart from a completely new documentation set, he main functional changes from version 1.1.4 and 1.2 are:
- Bringing the binding into line with the information model such that the schema and 'schemaversion' elements can only refer to the whole package;
- New mechanism to extend and register resource type values;
- New mechanism to extend and register organization type values;
- 'variant' element enables package authors to point to alternative resources;
- New mechanism to refer to remote manifest structures and include them in the base manifest

D.3 Implementations in use include:

The Cyber Home Learning System of Korea is an Internet-based learning service that offers primary and secondary school students a supplementary learning experience to the classroom. Led by the MOE&HRD (Ministry of Education and Human Resources Development), 16 MPOEs (Metropolitan and Provincial Offices of Education) and education-related organizations formed a commission to discuss the direction of cyber home learning. Currently, each city and province operates their own the cyber home learning system which is customized to the specific educational needs of their region. After a pilot service launched in 2004, cyber home learning was made available nationwide to middle school students in 2005.

Cyber home learning content is a best practice case that highlights the importance of standardization. Currently, cities and provinces share the content that they had developed individually. For example, a city or province may have developed math content for middle school juniors while another city or province may have developed content for other subjects and grades. However, since the service platform LMS of cities and provinces reflects their unique needs and service objectives, a standardized method is required to service or reorganize the content separately developed by cities and provinces. The standardized method used for this purpose is IMS Content Packaging.

Other implementation cases will be added, including the Learning Federation of Australia (see http://www.imsglobal.org/articles/29Oct2007Tait1.cfm) and MIT OpenCourseware.

Annex E:

Models and Tools - Application Profiles, Best Practices

The IMS specification documents referenced in 'Scope' section include descriptions of the information model as an application profile and Best Practice. Both SCORM 1.2 and 2004 have used profiles of the IMS specifications. IMS specifications such as QTI, Learning Design, Common Cartridge, Content Packaging, etc are used extensively worldwide.

Annex F:

Conformity Assessment - Application Profiles, Best Practices

When adhering to the IMS Content Packaging specification, content and resources are bound using the XML language. The XML Binding document describes the realization of the Content Packaging Information Model in XML. The binding document is expressed using the IMS UML Profile for Platform Specific Model (PSM) Descriptions of Specification Bindings. This PSM has been transformed into the corresponding XML Schema Definition (XSD) files using the IMS Binding Auto-generation Toolkit (I-BAT). The binding is realised as two XSDs, namely the core Content Package XSD file ‘imscp_v1p2.xsd’ and the extension functionality in the XSD file ‘imscp_extensionv1p2.xsd’. The binding document describes the underlying structure of the XSD and the formats of the corresponding instances of a Content Package.

Using the proposed approach, content and resources can be accessed whether well described or ill-defined through the manifest file which describes the logical package and the relationships among all its components. The manifest is both an XML document, and, more abstractly, the structure of information in that document.

Annex G:

Interoperability - (Also portability)

The IMS Content Packaging Information Model describes data structures that can be used to exchange data between systems that wish to import, export, aggregate, and disaggregate packages of content.

IMS Content Packaging specification was initially conceived for the packaging of instructional content. The specification supports the description of content supporting a given learning activity, location of the content, and

how these pieces of content may be organized for best instructional effect. As a result of wide adoption of the specification there are millions of IMS packages of instructional content used in a variety of applications.

Adopters of IMS Content Packaging have extended its use beyond just the packaging of instructional content. IMS Content Packaging is now profiled by other IMS Specifications to package and exchange other types of data.

Given the nature of the proposed standard, success in implementing the standard is dependent upon interoperable structuring and binding of content and resources components, irrespective of language or culture.

Annex H:

Cultural and Linguistic Adaptability

The content packaging process of educational content and resources encompass response to cultural and linguistic adaptability. To optimize distributing and sharing of content and resources for an individual all of these factors must be taken into consideration. The proposed new standards would address matching these individual needs with the appropriate resources and systems. This also requires the capability to adapt resources using culturally or linguistically aggregation and control methods, and to present the same learning objective (or goal, outcome, curriculum requirement, etc.)

Annex I:

Adaptability to Human Functioning and Context of Use

As practice in the use of IMS Content Packaging has grown over the years, several different types of packages have emerged. Depending on community (or various educational domains) requirements and processes, commonly found packages tend to look like instances of one of the following stereotypes:

I.1 The Simple Stand-alone Package

Using a ZIP archive for its interchange format, these packages typically include all of their resources in the interchange file. For simplicity, they have only one level of manifest; no child manifests are included. A couple of organisations tend to be included, usually to provide an alternative to the default organisation in a different language or to meet some other access requirement.

Packages that comply with a popular content packaging profile (SCORM), also typically follow the simple stand-alone pattern. Where they differ from packages that follow other profiles is in the inclusion of metadata: SCORM packages need to have package level metadata in a separate file, which is linked to from the manifest. Other profiles typically include package level metadata inline, in the manifest itself. Other differences include the support SCORM packages have for learner to content interaction tracking and, in SCORM 2004, IMS Simple Sequencing.

Packages of the simple, stand-alone type are likely to be most widely supported in various LMSs, and therefore the most robust in interoperability.

I.2 The Bare Manifest

This type of package does not include all resources in the interchange file. It references them instead via links to a known repository. Depending on the implementation, a bare manifest package can be interchanged using either just the manifest file, or the manifest file as the sole content of a ZIP archive or other interchange file.

The advantages of using this kind of package include:

- The exact same resources can be re-used many times;
- Resources can be updated at any time;

- Resources can be tracked easily by the publisher or repository owner;
- Access to resources can be controlled easily and precisely by the publisher or repository owner;

The main disadvantage of this type of package is the fact that the LMS needs to have a reliable internet connection to all resource repositories.

I.3 The Composite or Meta-Package

This type of package takes the bare manifest model one step further by linking to whole other packages, rather than just content assets. Various patterns of aggregating packages and resources are conceivable within this type of package, but it is expected that a popular type will be of the relatively 'thin' package that aggregates little beyond references to a set of complete, relatively self contained packages. More or less like a number of lectures can constitute a course.

The main advantage of the composite package is the fact that it takes re-usability of structured content a significant step further, compared to other types of package. The disadvantage is that the functionality that enables this type is comparatively new, which means that not every package reader will be able to support all the functionality.

I.4 The Archive Package

This common type of package is not intended for presentation to a learner. Instead, it gathers up a number of resources and captures their basic structure. These packages do not have an organisation section, just a resource section.

These kinds of packages are typically used to exchange raw content files that can be turned into finished packages later.

I.5 'Specialised' Packages

These packages do not conform to a particular common pattern, but are similar in that they are used to convey very specific types of content, often inline, in the manifest. Most of these packages are combinations of packages with other IMS specification content such as ePortfolios, Question and Test Interoperability items, and Learning Design Units of Learning. In each of these cases, a significant part of the content that is described in the manifest is neither an external file, nor is it structure that conforms to content packaging itself.

Instead, the core of these packages is the description of specific data in an XML dialect, and content packaging merely provides a convenient way of aggregating such descriptions.