Application and Policy Brief:

Open-Standards Requirements for Digital Content and Application Integration with Enterprise Learning Platforms

This brief provides explicit guidance for ensuring that requests for proposals for learning content or platform products address the use of open standards.

The IMS Global Learning Consortium provides a set of interoperability standards to address the most often-encountered educational enterprise integration issues for digital content and learning software/platforms. This includes (a) content that "moves" into and is stored in a learning platform as well as, (b) content that is hosted "behind" a web-based application and "linked to" from the learning platform. Products that pass interoperability testing are designated with the IMS Certification logo shown to the right and a unique registration number available at http://www.imscert.org/ IMS has worked with a wide range of suppliers and institutions at all levels of education to put these standards in place.

Note: This document covers digital content and applications in the context of a "learning platform" (such as an LMS, IMS, VLE or Course Management System) only. For interoperability

of content with Assessment Systems or Interactive WhiteBoards please see companion documents from IMS.

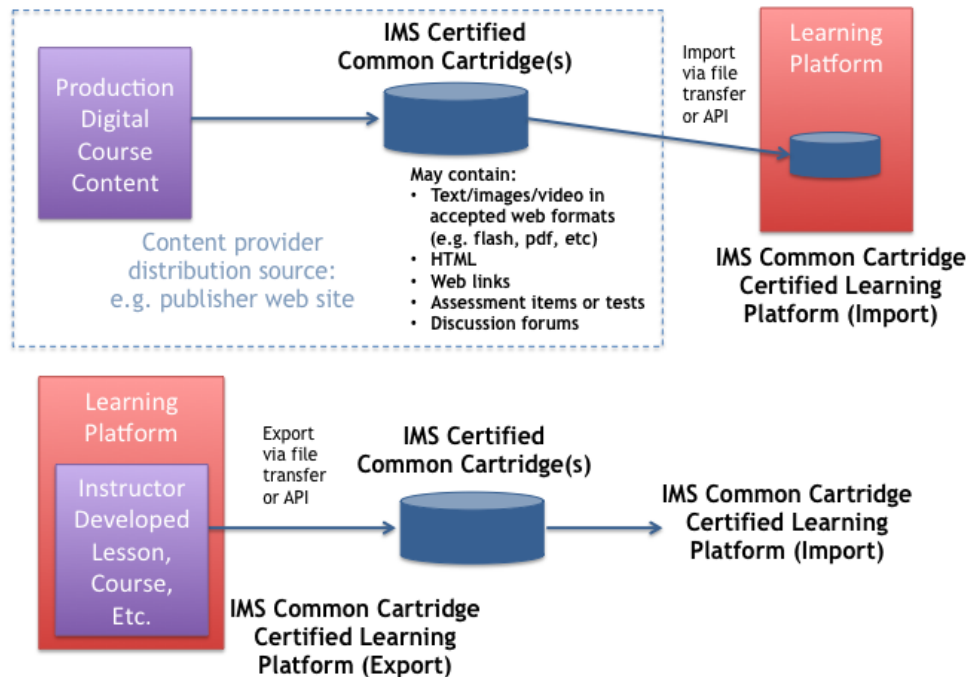## I. Ingested and User Generated Exportable Digital Content (see Figure 1)

Figure 1: Content Ingested Into or Created By the Learning Platform for Export

Learning Platform Requirements
- Learning platform (learning management software, instructional management software, professional development software, etc.) software (specific version of software proposed) must be certified as compliant with IMS Common Cartridge v1.2 for both (a) import of the Common Cartridge format and (b) export of the Common Cartridge format. Evidence of a valid conformance certification, including a current registration number must be available from the IMS Global web site. See http://www.imscert.org/
- Any features of Common Cartridge that are not supported by a learning platform for either import or export should be noted explicitly in the RFP response. For a full feature list see http://www.imsglobal.org/cc/primeronCCConformance.html .

Digital Content Provider Requirements
- A content provider shall provide content (specific version number) that is certified as compliant with IMS Common Cartridge v1.2. Evidence of a valid conformance certification, including a current registration number must be available from the IMS Global web site. See http://www.imscert.org/

- Any features of Common Cartridge that are not provided by the content should be noted explicitly in the RFP response. For a full feature list see http://www.imsglobal.org/cc/primeronCCConformance.html
- Assessment and assessment item content for use in Learning Platforms must also be certified as compliant with IMS Common Cartridge utilizing the Common Cartridge profile of IMS QTI (Question and Test Interoperability) v1.2.1. See the Common Cartridge specification for more information: http://www.imsglobal.org/cc/index.html

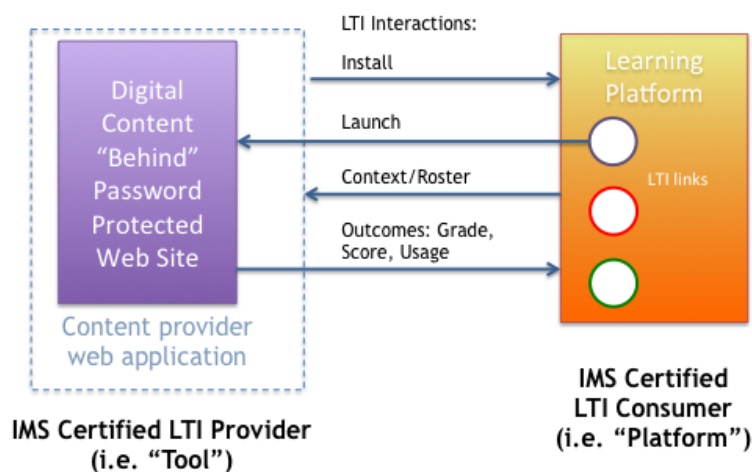## II. Linked Content Via Web-hosted Applications (See Figure 2)

Figure 2: Linked Content Via Web-hosted Applications

Learning Platform Requirements
- Learning platform (learning management software, instructional management software, professional development software, etc.) software (specific version of software proposed) must be certified as compliant with IMS Learning Tools Interoperability (LTI) v1.1.1. Evidence of a valid conformance certification, including a current registration number must be available from the IMS Global web site. See http://www.imscert.org/
- Any features of LTI that are not supported by a learning platform should be noted explicitly in the RFP response. For a full feature list see http://www.imsglobal.org/LTI/primeronLTIConformance.html

Linked Digital Content and Web-hosted Applications Requirements
- A linked content or web-hosted application provider shall provide linked content or web-hosted application that is certified as compliant with IMS Learning Tools Interoperability (LTI) v1.1.1. Evidence of a valid certification, including a current registration number must be available from the IMS Global web site. See http://www.imscert.org/

- Any features of LTI that are not provided by the linked content or web-hosted application should be noted explicitly in the RFP response. For a full feature list see http://www.imsglobal.org/LTI/primeronLTIConformance.html

III. Mixed Models

The combination of IMS Common Cartridge and LTI enables a wide variety of scenarios that combine the use of the standards, with perhaps the most common being the passing of Common Cartridges that contain LTI links. Common Cartridge v1.1 and above certified products support the use of LTI links in the cartridge.

IV. Evolution to Open-Standards

Providers of Learning Platforms that are not currently certified as compliant to the prescribed open-standards shall provide the following:
- A detailed technical description for how the software or content will interoperate in the interim
- A list of the open-standards specified above that the each proposed software or content is not compliant with
- A time schedule for achieving conformance certification
- The estimated cost for converting the proposed products (software or content) to become conformant to the prescribed open-standards. This cost will be added to the bid price of the products in the evaluation.

Student Information and Authentication Services Integration:
- If synchronizing of student information data between learning systems and student information systems is required additional requirement paragraphs for conformance to IMS Learning Information Services (LIS) are required. See http://www.imsglobal.org/lis.html
- To achieve authentication of students into learning tools using a standards-based service (such as SAML, cass, or shibboleth) there is an optional best practice for LTI that should be noted – see http://developers.imsglobal.org/LI2012-lti-saml.pdf

V. More Information
IMS Global provides additional detailed information on use of IMS specifications by end-user organizations as well as support in adopting standards-based educational technology. Please contact via the web: http://www.imsglobal.org/contactus.cfm

Appendix A

Rationale: Use of interoperability Standards in Education Systems

Parents, students and staff increasingly expect university and district systems to provide the same ease of use, personalized services and ubiquitous access found in ecommerce and social media applications. State and federal legislation has further emphasized these expectations by mandating systems that facilitate: adoption of digital curriculum and assessment; analysis of student academic performance, analysis of teacher and administrator performance, prescription of individualized learning resources, and ingestion of public input. Successful delivery of these functions requires automated data exchange and interoperation among district human resource, finance, student information, learning management, content and Web delivery systems.

These circumstances are compelling some universities and districts to embrace proprietary solutions in order to establish required interoperability and data exchange capabilities. The short-lived expedience of a proprietary approach is more than negated by its static and inflexible nature. Proprietary solutions are incapable of efficiently evolving with the inevitable changes in instructional approach, assessment, and governance or with the continuous changes in the landscape of vendors and products. Any addition or replacement of a component within a proprietary system will necessarily involve another commitment of fiscal and human resource to re-establish requisite interoperability and data exchange capabilities.

There are standards-based approaches to system interoperability and data exchange that are far more sustainable and affordable. Simply stated, all standards compliant resources whether assessment items, learning objects, courses, assessment results, demographic data, etc. contain standard descriptive information that allows them to be exchanged, displayed and/or processed when used with standards compliant applications. Addition or replacement of individual components of district systems becomes a modular process when all components are compliant with industry interoperability and data exchange standards. Each component is inherently capable of working with the others.

Adoption of interoperability standards is not an all or nothing proposition. Inclusion of requirements in RFPs and contracts for software to become compliant with interoperability standards by a date certain is a viable starting place. Inquiring about interoperability compliance in initial vendor negotiations is also helpful. These strategies often result in discovery that a product is already compliant with interoperability standards in some areas and the vendor is willing to pursue further compliance as part of a purchase agreement. Any relief from the effort required to sustain proprietary systems is a positive step.