Summary Report - LETSI Technical Workshop
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Continuing its efforts to understand the systems interoperability issues and requirements for the next generation of learning systems, LETSI hosted a Technical Workshop in June. The primary goal of the workshop was to review jointly the activity of three active LETSI working groups: Software Architecture, Orchestration, and Runtime Web Services. These working groups were formed about six months ago in response to requirements that emerged from LETSI's Pensacola Workshop in the fall of 2008.

There were 20 participants from 5 countries in Piscataway, including several additions to the regular working group participants. Attendees included learning technology vendors, content publishers, instructional designers, academics, software engineers, standards professionals, small companies, large companies, trade associations, and national policy organizations.

Figure 1 summarizes the results of the deliberations and status of the working groups.

Runtime Web Services

Defining a set of Runtime Web Services is LETSI's first open source pilot project, and the group is on track to release an initial spec in the next couple months. The proposed service definitions are already being implemented and tested in two shops. A software test harness showing service calls into an LMS was demonstrated.

This Phase I work, based on BBN's original R&D, will allow learning activities to communicate with SCORM LMSs using web services, which is the way modern web-based software systems exchange data. This technology could be used to explore how other applications, e.g. games or simulations, should communicate with existing LMS-based infrastructure.

Phase II of this project, already being planned, will extend the conceptual model of what can be communicated to include data not currently exchanged in the AICC or SCORM models. In Phase II the project will address the ability to report status of learning experiences (courses) that are not LMS-based. R&D on new types of learning activities and new learning platforms continues in many communities simultaneously. Subsequent project phases will address the issues and new capabilities that emerge.

LETSI Projects and Process

The Runtime Web Services pilot project has functioned quite well. The team has not only produced working code and documentation that will lead to initial drafts of a spec, but it has also help refine the process for initializing and running LETSI projects.

As the need arises, LETSI will start projects to explore areas where the community sees opportunities to work together towards new interoperability specs. The projects will include an agile, open source, software development effort to harmonize community of practice (CoP) approaches and work out the details. Rapid, agile prototyping will produce more mature, stable, software specifications. We will work with appropriate organizations to take the documentation of these projects forward into a formal standardization process. This represents the original "4-box model", as it was called, with LETSI transitioning early R&D into running software developed cooperatively by potential adopters.

Figure 1: A summary of LETSI project status after Piscataway.

	Phase I	**Practical Purpose**	**Status**	**Phase II**
Web Services				
An agreement about how to communicate data among modern learning systems is much in demand.	Working with IEEE LTSC and AICC, define web services for communication with SCORM LMSs.	Modernize learning software standards. Lower barriers for integrating new kinds of learning activities.	Preliminary WSDL implementation. Working on security. Harmonization of SCORM and AICC under discussion.	Extend the range of communication beyond CMI variables, based on emerging standards
Orchestration				
How can designers express control of what resources to assemble during delivery of training across delivery platforms? How can modular "learning objects" be orchestrated at runtime?	Explore alternative methods for describing runtime decisions. Allow CoP's to adopt their own control regime ideas via some kind of delegation mechanism.	Allows modular content to be ported across delivery systems, individualized delivery. Impacts lifecycle costs for CoPs interested in content economies based on learning objects.	Possible project proposal to implement the simple Declarative Orchestration model. Continued exploration of delegation mechanism, alternative schemes.	A joint project, perhaps with multiple K-12 CoPs, to implement a design that accommodates several aggregation schemes and control regimes.
Architecture				
Create a compelling vision of data interoperability standards across product categories and across market sectors.	Develop a "big picture" understanding of the products and services that will be used by teachers and trainers in 5 years.	LETSI's vision of the future product space. Facilitates exchange of innovations across communities. Must accommodate extensive CoP variability.	Exploring a proposed project with the international OER community: Lifecycle management of structured content across multiple XML packaging formats and delivery platforms (mobile).	Build community consensus around a compelling and extensible software platform for integrating standards-based eLearning systems.

The LETSI process is intended to provide an alternative to the typical standards process under which a standards development organization spends two years developing a written specification, which is then implemented independently by multiple software teams. Early prototyping helps identify real-word issues and ambiguities and, since it results in working code, accelerates the formation of a critical mass of adopters.

Several new projects have been proposed (see below). Based on experience with the Runtime Web Services pilot, LETSI's evolving Development Methodology now requires that new projects present a written proposal supported by three LETSI sponsors. There is also an implicit requirement of participation by multiple implementing organizations and by organizations that will take up subsequent specification development and standardization, when appropriate.

Proposed AICC-SCORM Convergence Project

In developments related to the runtime web services definitions, an effort to finally harmonize the SCORM and AICC implementations of the underlying CMI model is under discussion by the AICC, ADL, IEEE LTSC, and LETSI. The idea is to regress the current complicated situation back to the time when the AICC submitted CMI to the IEEE LTSC for standardization and move forward from that basis.

If ADL can participate, the thought is to develop an updated IEEE CMI standard as the convergence point between ADL SCORM and AICC CMI. The design will allow for alternative data models and CoP extensions. Harmonization will please vendors and adopters and is long overdue. ADL would keep the name SCORM as the name for the ADL community of practice adaptation of the CMI standard.

The details and roles of the various organizations are to be determined. For example, LETSI could host the collaboration and undertake related R&D to work out the details. The AICC would develop needed specifications. The IEEE LTSC would perform related standardization and, through the IEEE/ISO collaboration agreement, work with SC36 to achieve ISO standardization in due course.

Orchestration

The Orchestration working group has reviewed several alternative schemes for allowing designers to specify the way resources are assembled and deployed during delivery of instruction. Crispin Weston presented a new "declarative" scheme for describing the runtime decisions. Instructional designers at the Workshop felt the simple scheme was natural and appealing. Software and learning content developers in the Workshop judged it simple enough to be easily implemented. There was enough enthusiasm for this idea at the Workshop that a project proposal to explore Crispin's scheme is expected.

There was an extended discussion about whether a control scheme was needed at all. Many people feel that good instructional design requires a level of control that will never be portable across LMSs. They felt that we should stick to the one-SCO, SCORM 1.2 model. Others argue they achieve significant economic benefits through lifecycle management of

their learning content at a sub-course level. The K-12 and corporate training markets may differ on the issue of learning objects and LMS-independent orchestration.

One way to deal with CoP differences is to allow extensions to the basic control framework. The second orchestration topic discussed at the Workshop was a way of *delegating* runtime control to a SCO or to an arbitrary software application. This would allow the delegated application to take over control but maintain communications with the originating SCO and the LMS. A basic framework was presented. This mechanism could be used to allow communities of practice to specify their own orchestration schemes as plug-ins. For example, individualized instruction could be based on CoP infrastructure that supplies the student's background info, CoP competency maps, and content metadata at runtime.

Software Architecture

Architecture is the key to LETSI's vision of taking interoperability beyond content and LMSs. In order to promote a wide range of data interoperability standards across market sectors, LETSI has to work with many different organizations and offer an overall vision of the product space of the future. Allyn Radford proposed a project he has been exploring with several potential partner organizations in the Open Educational Resources space. The project focuses on the lifecycle management of structured content across multiple content aggregation schemes and multiple delivery platforms, including mobile. This kind of project will help work out the details of future systems interoperability and CoP variation. A project proposal is pending.

LETSI's Future

With ADL's new management now planning future releases of SCORM, LETSI is looking beyond SCORM to broader interoperability issues and seeking to secure new sponsors and support from organizations that see the need for dramatic change in the learning technology landscape. Meanwhile, the LETSI community has developed an innovative, open, and collaborative process that is proving to be productive. The presentations in Piscataway reflected team efforts sustained over months on the problems identified at the Pensacola Workshop. In addition to the technical progress made by the three working groups, LETSI has evolved a rational, innovative governance structure and a modern approach to promoting standards-based software.

LETSI continues to build its reputation and actively engage in projects. Several additional financing ideas were discussed, including meetings and project funding. There is no doubt that these difficult economic times are not optimal for growing a young organization – many established standards and specification groups in this space are experiencing declines in membership and participation. To achieve our goals of openness and inclusion, LETSI has been exploring alternative funding models instead of the traditional "pay to play" arrangement. While proposing a new finance/governance model creates some initial difficulties, these innovations are needed to create an open organization that is not tied to the elearning status quo.

Since the LETSI Workshop was being held at the IEEE Corporate Operations Center in Piscataway, NJ, we arranged a meeting between LETSI representatives and representatives from several IEEE organizations (the IEEE Standards Association, the IEEE Computer Society, IEEE ISTO, ICAP and the IEEE LTSC). The topic of discussion was the changing nature of the standards process, especially in software, and the stresses on standards organizations and their funding models. The IEEE, for instance, is a business based largely on publishing and subscription – a problematic business model in the digital age. LETSI discussed its model of working in conjunction with SDOs, for example, working with the LTSC on the runtime web service definitions, and of expediting adoption by delivering shared software along with emergent standards.

Future Projects and PitchFest

Several LETSI projects were proposed at the Workshop:

- Runtime Web Services project, which is expected to complete Phase I and continue into Phase II this fall.
- The proposed CMI harmonization project with AICC, ADL, and IEEE LTSC.
- The Declarative Orchestration projects: simple orchestration and delegation.
- The cross-platform architecture exploration with the OER community.

Additional project ideas were floated as well. To involve the community in planning and prioritizing, a Pensacola-style white paper solicitation was proposed, leading to a conclave early next year. For this "PitchFest," the white papers would propose solutions or approaches to known or envisioned interoperability issues that can be addressed based on existing R&D specs or formal standards. LETSI would initiate projects for some of these ideas to build working code, work out the details, and promote adoption by the various communities of practice. The details are to be determined.

LETSI's Value Proposition

Several of the Workshop participants produced an updated statement of the value proposition for LETSI. It is included below.

LETSI Value Proposition – July 2009

The following bullet points describe the "What" and "How" of LETSI.

WHY: The work of LETSI will:

- Enable best practices in technology-assisted learning developed by one community to be effectively shared by others
- Reduce the time and cost of implementing technology so that investment can be made in competitive innovation instead of re-inventing basic components
- Reduce the cost of conformance to interoperability standards
- Provide examples and demonstrators that can be used to model and evaluate LET technology and services
- Provide guidance concerning interoperability requirements to policy makers, implementers and end users.

WHAT & HOW: To do this LETSI will:

- Initiate, support, and disseminate projects that result in freely and openly available documentation and software components that
    o Implement existing interoperability standards or
    o Implement new methods developed by one or more communities of practice and that could potentially benefit other communities
- Establish a first stage 'demonstrator' as a means to show aspects of standards-based interoperability that will enable the LET communities to derive some immediate benefit. The initial focus will be on the use of structured content in LET.
- Establish meaningful liaison relationships with SDOs and initiatives producing standards of interest.

DIFFERENTIATORS: Why LETSI is different:

LET Systems Interoperability is a large problem with a lot at stake. Without it, we cannot hope to achieve a global knowledge-driven society, provide equal access to education, avoid vendor lock-in, or achieve more effective performance, just to name a few things. Therefore, it is not surprising that there are many approaches and many organizations looking at the problem. Among them are numerous standards groups, consortia, government organizations and corporate entities. We acknowledge them and believe that one of LETSI's strengths will be its ability to draw from – and contribute to – all of these efforts. LETSI's differentiators are:

- **Total dedication to openness and transparency**
- **Rapid prototyping, agile software process**
- **Cross-community of practice problems and solutions**
- **Providing services to support adoption, not the formal standards themselves**