Supporting the Take-up of Specifications with Application Profiles and Conformance Testing

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There seems to be wide agreement that the key objective of specifications is to support interoperability. There seems to be less agreement which entities are supposed to interoperate. As long as interoperability of humans is the objective, more or less precise descriptions of the specification supported with a lot of best practice examples may do the job. This is no longer the case if interoperability of systems is the objective.

Systems interoperate by exchanging data in specified formats using specified protocols. Agreed data formats, while not being sufficient for interoperability, are certainly a necessary prerequisite. A specification without a normative binding in a machine readable format, say XML, cannot be expected to be useful for machine interoperability.

Systems interoperate by sending data from a sender to a receiver. Therefore, sender and receiver have to agree on a specified data format. As trivial as this statement is – its social, technical and even financial consequences for the development and take-up of specifications are high:

The first thing to note is a fundamental conflict of interests between sender and receiver. The sender is naturally interested in a specification of a data format which is as broad as possible in order to allow expression of all issues that might occur in the future. Contrary to this, the receiver has a natural interest to restrict the variety of data that it is supposed to handle.

Much specification development in the past has been dominated by the interests of the senders (data producers). The resulting specifications are very expressive. Often only a fraction of the features foreseen is widely used. Consequently, data producer use only a subset of the specification and data consumer (receiver) develop systems which also implement only a subset of the specification. It is only by accident that both subsets coincide – the specification has lost its normative power needed to support interoperability. Of course, the result for interoperability would have been the same had the receiver’s interests dominated the specification process.

However there is a way out of this dilemma which can even utilize the generality of the many existing specifications. It requires a paradigmatic change of focus in specification activities: Instead of trying to support all current and future needs for a data format, existing widely supported real world practice needs to be taken into the focus. This attitude promises a large community (and market) ready to take up the specification and it promises a much more restricted hence more simple and more cheap work to fully implement the specification.

The immediate objection is that such a specification, which reflects current wide practice, will strangle eLearning development. However specifications can be designed in an extensible way thus
leaving room for specific experiments which can stimulate the further development of the specification. Also the current practice of additional bilateral agreements between data producer and data consumer is not disabled.

There is, however, a need to continuously monitor the development of practice and to adapt the specification accordingly. This requires a continuous provision of resources to maintain contact with users and to work on updated versions of the specification. The time of fire-and-forget specifications is over! For these new versions backward compatibility shall be a main issue.

For most parts of the eLearning domain comprehensive but nevertheless extensible specifications exist. These can be utilized for the approach described here by profiling them down to cover what is found to be current practice. Application profiles – or domain profiles in the case of simultaneous use of several specifications – become a central tool for the specification development process.

It is an obvious necessary criterion for relevance of a specification for “current practice” that at least two data provider and two data consumer can be found who are willing to commit own resources to the full implementation of the proposed specification. In order to achieve system interoperability such implementations should be provided already during the specification process. This allows for early testing and improvement of the profile.

To do this implementation in a precise and efficient way it is helpful to have a conformance test system available. Such a profile specific conformance test system can be created on the fly whenever the profile changes, provided that the profile is captured in a machine readable format using the IMS Approved Schemaprof Tool which is available from the IMS Global Learning Consortium web site at http://www.imsglobal.org/profile/profileapproach.cfm. Capturing a profile by SchemaProf as a set of modifications of the base specification additionally eliminates the risk of violating backwards compatibility.

Following the specification development cycle as described above provides users for their current needs with tested reference implementations, sample data and a conformance test system to ease adoption.