**SIF Data Model Extension Proposal**

**Data Model: Assessment**

**Topic Area: Assessment Definition and Structure**

**Table of Contents**

[1 Identification 4](#_Toc311446894)

[2. Proposal 5](#_Toc311446895)

[2.1 Rational for Extension 6](#_Toc311446896)

[2.2 Business Case 7](#_Toc311446897)

[3. Use Cases 8](#_Toc311446898)

[3.1 Use Cases - Assessment 8](#_Toc311446899)

[Use Case Title: A-1 Assessment Identifiers 8](#_Toc311446900)

[Use Case Title: A-3 Assessment Descriptor Permitted Values 8](#_Toc311446901)

[Use Case Title: A-4 Assessment Item Bank 9](#_Toc311446902)

[Use Case Title: A-5 Assessment Subjects 10](#_Toc311446903)

[Use Case Title: A-6 Assessment Grade Levels 10](#_Toc311446904)

[Use Case Title: A-7 Assessment Language 11](#_Toc311446905)

[Use Case Title: A-8 Assessment Learning Standards 11](#_Toc311446906)

[Use Case Title: A-9 Assessment Provider 12](#_Toc311446907)

[3.2 Use Cases – AssessmentForm 13](#_Toc311446908)

[Use Case Title: AF-1 Assessment Form Versioning 13](#_Toc311446909)

[Use Case Title: AF-2 Assessment Form Number Type 13](#_Toc311446910)

[Use Case Title: AF-3 Assessment Form Sections 14](#_Toc311446911)

[Use Case Title: AF-4 Assessment Form Platforms 15](#_Toc311446912)

[Use Case Title: AF-5 Assessment Form Assets 15](#_Toc311446913)

[Use Case Title: AF-6 Assessment Form Accommodations 16](#_Toc311446914)

[Use Case Title: AF-7 Assessment Form Subjects 17](#_Toc311446915)

[Use Case Title: AF-8 Assessment Form Languages 17](#_Toc311446916)

[3.3 Use Cases – AssessmentItem 18](#_Toc311446917)

[Use Case Title: AI-1 Assessment Item Form Usage Attributes 18](#_Toc311446918)

[Use Case Title: AI-2 Assessment Item Identifiers 19](#_Toc311446919)

[Use Case Title: AI-3 Assessment Item Subjects 19](#_Toc311446920)

[Use Case Title: AI-4 Assessment Item Grade Levels 20](#_Toc311446921)

[Use Case Title: AI-5 Assessment Item Languages 21](#_Toc311446922)

[Use Case Title: AI-6 Assessment Item Assets 21](#_Toc311446923)

[Use Case Title: AI-7 Assessment Item Rubrics 22](#_Toc311446924)

[Use Case Title: AI-8 Assessment Item Item Banks 23](#_Toc311446925)

[Use Case Title: AI-9 Assessment Item Platforms 23](#_Toc311446926)

[Use Case Title: AI-12 Assessment Item Feedback 25](#_Toc311446927)

[Use Case Title: AI-13 Assessment Item Versioning 25](#_Toc311446928)

[Use Case Title: AI-14 Assessment Item Hint 26](#_Toc311446929)

[3.4 Use Cases – AssessmentSection 27](#_Toc311446930)

[Use Case Title: AS-1 Assessment Section Construction 27](#_Toc311446931)

[Use Case Title: AS-2 Assessment Section Adaptive Tests 28](#_Toc311446932)

[3.5 Use Cases – AssessmentAsset 28](#_Toc311446933)

[Use Case Title: AA-1 Assessment Asset Content 28](#_Toc311446934)

[3.6 Use Cases – AssessmentItemReference 29](#_Toc311446935)

[Use Case Title: AIR-1 Assessment Item Enemies 29](#_Toc311446936)

[Use Case Title: AIR-2 Assessment Item Derivatives 30](#_Toc311446937)

[4. Impact Assessment 32](#_Toc311446938)

[4.1 External Object Dependencies and Relation Map 33](#_Toc311446939)

[4.1.1 Object Dependencies and Relationship Map 33](#_Toc311446940)

[Publishing Assessment Definition Objects 39](#_Toc311446941)

[4.2 Infrastructure / International Dependencies and Relation Map 39](#_Toc311446942)

[5 Detailed Design 41](#_Toc311446943)

[5.1 Assessment (modified object) 41](#_Toc311446944)

[5.2 AssessmentForm (modified object) 43](#_Toc311446945)

[5.3 AssessmentItem (modified object) 46](#_Toc311446946)

[5.4 AssessmentSection (new object) 50](#_Toc311446947)

[5.5 AssessmentAsset (new object) 52](#_Toc311446948)

[5.5 AssessmentItemReference (new object) 54](#_Toc311446949)

[6 Migration Plan (for proposed changes to existing objects only) 55](#_Toc311446950)

[7 Issues 57](#_Toc311446951)

[8 XML Example(s) 58](#_Toc311446952)

[8.1 Assessment 58](#_Toc311446953)

[8.2 AssessmentForm 59](#_Toc311446954)

[8.3 AssessmentItem 61](#_Toc311446955)

[8.4 AssessmentSection (new object) 62](#_Toc311446956)

[8.5 AssessmentAsset (new object) 63](#_Toc311446957)

[8.5 AssessmentItemReference (new object) 64](#_Toc311446958)

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| Extension Proposal Version Control | | | |
| Version | Date: | Author/Organization: | Comments |
| 1.0 | July 6, 2011 | Wayne Ostler / Pearson | Initial Proposal |
| 1.1 | July 19, 2011 | Wayne Ostler / Pearson | Modifications after first AWG review.   1. All links to learning standards should include all standards levels, not just parent levels. 2. The addition of item bank elements to the assessment object as an open issue. 3. Determine list of valid accessibility options in form definition – use test accommodations object as example. 4. All sub-tests links in the assessment form should be identified, not just parent levels. 5. The section and sequence pairs on the assessment form are not directly linked.    1. There are several other places where lists were added and not properly binding multiple attributes – fixed all of them. 6. Add “clicker” to platform option list in form definition. |
| 1.2 | Aug 23, 2011 | Wayne Ostler / Pearson | Modifications after second AWG review   1. Add “other” to section sequence choices 2. Make time limit a duration type and add to issue list for discussion 3. Add “no” to re-entry list of values 4. Clarify description of section assets 5. Add metadata and extended elements to end of new object definitions (they were missing) 6. Expand list of values for asset type 7. Refine learning standard reference definitions 8. Move asset reference up to where stimulus was located 9. Add “other” type to asset type list of values 10. Made section code (identifier) a list to be consistent with other local identifier implementations. 11. Add migration plan details |
| 1.3 | Aug 30, 2011 | Wayne Ostler / Pearson | 1. Added an “out of scope” item to address certification tests. 2. Added a discussion concerning required object relationships in relation to publishing an assessment definition. |
| 1.4 | Sept 19, 2011 | Wayne Ostler / Pearson | Added the following.   1. Added form subject and form language to the form object with associated use cases. |
| 1.5 | Sept 20, 2011 | Wayne Ostler / Pearson | Added XML examples for new elements just added in version 1.4.  Made the form language a list element as a form can support multiple languages |
| 1.6 | Dec 6, 2011 | Wayne Ostler / Pearson | Track changes is now on.  Changes are from the tech board design review on Dec 5, 2011.   * Determine if NCES code for identifying assessment subject and grade level exists (Jill Abbott to research) * Verify that the assessment platform is known on the student registration record (Yes it is!) * Make the relationships for enemies and derivative items a separate table. * Should versioning move easily support the use cases for a) identifying the latest version and b) identifying all versions of a form or item? * Making the assessment ID and form ID a list should be represented as an element delete and add in the proposed object definition changes.   Changes are from the second tech board design review on Dec 8, 2011.   * Add “hint” to the feedback section of the item definition. |
| 1.7 | Feb 22, 2012 | Wayne Ostler / Pearson | Added comment in migration plan about sif3 prefix. |

# **1 Identification**

|  |  |
| --- | --- |
| Proposed Extension Name | Assessment Definition Objects |
| Submitted by (Project Team or Individual) | Assessment Working Group |
| Date of initial submittal | July 6, 2011 |
|  |  |
| What existing SIF object(s) if any will be affected? | Assessment  AssessmentForm  AssessmentItem |
| What is the name of any new object(s)? | AssessmentSection  AssessmentAsset |

**Status Tracker Phase 1: Documentation and Approval**

*The steps in this initial phase document the proposed extensions to the SIF Data Model to the point where they can be reviewed and approved by the Tech Board as deserving of further effort. Completion of the detailed design and evaluation of the dependencies and migration impacts are left until Phase II.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Template Section** | **Initial Draft Completed**  **(Owner / Date)** | **Reviewed (R) or Accepted (A)**  **(Owner / Date)** | **Comments** |
| Rational and Business Case | Wayne Ostler  **Date:** | Tech Board (A)  **Date:** | Assign to relevant Project Team(s) |
| Use Case(s) | Assessment Working Group  **Date:** | Assessment Working Group  **Date:** |  |
| Proposal approval | Assessment Working Group  **Date:** | Tech Board (A)  **Date:** | Placed in Fast Track or Object Pipeline |

# **2. Proposal**

*This section should be completed by the “Proposal Champion”. A champion is usually one of the authors of the business case (although it may be SIF staff). This individual is responsible for driving the proposal through the qualification and acceptance cycle.*

*The following two subsections must be completed before the process can begin.*

## 2.1 Rational for Extension

*In order to completely represent assessments throughout their lifecycle, the current SIF specification must be expanded. The assessment life cycle consists of the process areas illustrated in the diagram below.*

**Content**

**Development**

**Pre-Test**

**Administration**

**Test**

**Administration**

**Scoring**

**Reporting**

**Post-Test**

**Administration**

* **Content and data reviews**
* **Test form construction**
* **Field testing**
* **Item banking & statistics**
* **Content exchange / interoperability**
* **Planning & blueprinting**
* **Item types**
* **Content development & universal design**
* **Learning standard alignment**
* **Administration planning & scheduling**
* **Registration, assignment,**
* **Form sampling**
* **Online infrastructure readiness assessment**
* **Pre-session planning (paper / online) & setup**
* **Alternate form assignment**
* **Test form delivery**
* **Platform (paper, online, mobile) presentation**
* **Item content & tools**
* **Adaptive testing**
* **Response collection**
* **Proctoring controls**
* **Form content security**
* **Desktop security**
* **Accessibility**
* **Testing anomalies**
* **Computer scoring**
* **Professional scoring**
* **Algorithmic (AI) scoring**
* **Portfolio scoring**
* **Sub test / strand scoring**
* **Attemptedness**
* **Performance levels**
* **Scaling / norming**
* **Growth scores**
* **Range finding**

Assessment

Life Cycle

* **Individual reporting**
* **Diagnostic reporting**
* **Informing & personalizing instruction**
* **Performance on   
  standards**
* **Dashboard / summary   
  reporting**
* **Aggregation / disaggregation**
* **Exchanging results / data**
* **Psychometric analysis**
* **Equating**
* **Score tables - scaling, norming**
* **Performance levels / cut   
  scores**
* **Field test analysis**
* **Aligning results with curriculum / instruction**
* **Program and teacher effectiveness**



*The process areas that this document (Assessment definition objects) most closely aligns are: 1) Content Development, and 2) Representation.*

*The recent focus of the education industry on open industry standards dictates that assessments become interoperable. The Race-to-the-Top and Common Core Assessment initiatives both suggest that all future developments are based on open industry standards. For Common Core Assessment state consortia (SMARTER Balanced and PARC), the call for fully interoperable content that can be shared across states, vendors, and delivery platforms is being written into RFI/RFPs as a mandatory requirement. Vendors are being asked to describe how their solutions will implement industry standards to support the desired level of interoperability. In order for the SIF specification to provide a viable alternative for representing item and form content, changes must be made.*

*The current 2.x SIF assessment specification has the following limitations that are being addressed by the changes proposed in this document:*

* *Does not include all of the information and metadata necessary to support item banking and test form construction.*
* *Does not support versioning of key content objects such as form and item.*
* *Supports only sequentially delivered test items and not adaptive testing structures.*
* *Does not support structuring an assessment into “sections” to support different item delivery sequences, timing, security, or testing break parameters.*
* *Does not support the ability to define sharing non-item resources (such as reading passages, art work, or toolsets) for all items within a section.*

*While the changes proposed in this document are not completely comprehensive, they do represent a significant step forward in supporting common assessment structures and processes that exist today and the standard will be well positioned for future expansion. Primarily due to the time commitments required and the planned release schedule, the following areas will continue to remain as open issues and will limit the level of true interoperability that the SIF specification can support.*

* *The current item content specification is limited to 6 item types. The item types currently supported do cover most of the large-scale assessments that are in use today in paper-based platforms. However, this limitation will need to be overcome in future iterations of the specification. Online item types, such as drag-and-drop, hotspot and even more interactive item types such as simulations will ultimately need to be supported.*
* *The current item content specification does not provide the necessary content detail in order to support true content interoperability. Some industry standards go further to break down item content into the sufficient detail to enhance interoperability. The current specification supports simple stem and distracter structures with no further specification to structure content to increase interoperability nor to support more item types.*
* *The current item content specification does not support the ability to define all of the necessary accessibility components associated with item, section, or form content.*
* *The current SIF assessment specification does not consider the necessary data and relationships required to support a certification test.*

## 2.2 Business Case

*In order to fully represent a structure of an assessment, it is critical that all types and forms of assessment be accommodated by the assessment specification.*

*Assessments are not always simple, sequentially delivered sets of items that make up a simple form. Assessments can measure many constructs and be delivered in a variety of formats and item sequences. Adaptive tests, as an example, deliver items to students based on performance on prior items and the path through the test is not pre-determined. In addition, assessments are often organized into sections to accommodate various timing, testing breaks, or subject/domain boundaries. Any robust assessment specification in the market today, supports various assessment form constructs using sections. The use of sections to organize an assessment form is common practice in the assessment market. Adding the section construct to the SIF assessment specification is a key step forward to enabling the SIF assessment specification in a broader assessment market.*

*In order to support a robust item banking and test form construction system that can be used by teachers and industry professionals alike, the specification must support providing the user sufficient data and metadata to categorize, align, search, and select content that is appropriate for their particular uses. Adding the appropriate information (such as subjects, grade levels, learning standards, languages, accessibility information, etc.) to the various content elements and structures is critical to enable tools for users to build sound assessment instruments.*

*Assessment content is complex. In order to increase the level of interoperability between item banking systems, the structure of the content must be well understood by all parties. Adding shared content elements (called Assets in this document) is one step forward to enabling this structure. As mentioned earlier, more work will need to occur in this area in future iterations.*

# 3. Use Cases

## 3.1 Use Cases - Assessment

### Use Case Title: A-1 Assessment Identifiers

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | In order to properly identify an assessment, the assessment may be known by multiple system and user defined identifiers. A publisher may have a unique identifier that is used internally within an item banking systems and the same assessment may also be known by the customer with a unique identifier that may appear on reports or data files. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Reporting System, Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment creates a new assessment within the Assessment Content Management System. 2. The system will typically generate an internal unique identifier. 3. The author will provide alternate identifiers for the assessment – such as a customer identifier. 4. The object add event will provide all internal and “natural” identifiers in the AssessmentIdentifiers list element. Each identifier is also provided with a “type”. |
| **Alternative Sequence of Events / Action Steps** | 1. The natural keys are not unique    1. This should most likely generate a warning within the Assessment Content Management System. Whether or not this is prevented would be an implementation decision of the assessment program. 2. Natural keys are added or updated after the original add event is complete.    1. An update event should be triggered by the Assessment Content Management System |
| **Post Conditions** | An Assessment has been added or updated with all possible identifiers |
| **SIF Mandatory Objects** | Assessment |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

### Use Case Title: A-3 Assessment Descriptor Permitted Values

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | Adding additional permitted values to support CommonCore and National assessments. Common Core assessments are being developed by the PARCC and SMARTER Balanced consortia. National assessments can include NAEP, SAT, ACT, etc. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The assessment author identifies the descriptor type. 2. The choices for assessment descriptor now includes National and Common Core values. 3. The Assessment Content Management System provides all descriptors in the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The assessment author updates the assessment with new descriptors.    1. The Assessment Content Management System publishes an update. 2. The assessment author removes a descriptor from the assessment.    1. The Assessment Content Management System publishes an update. |
| **Post Conditions** | An Assessment has been assigned one or move valid descriptors. |
| **SIF Mandatory Objects** | AssessmentDescriptors/AssessmentDescriptor |
| **SIF Optional Objects** | AssessmentDescriptors (list) |
| **Open Issues** |  |

### Use Case Title: A-4 Assessment Item Bank

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | Assessment vendors may offer assessments from multiple banks. Being able to identify which bank an assessment is a member, for actions such as a search, is an important data point. Some systems (such as Pearson’s) may manage security of assessment access using the item banking relationship. An assessment can be associated with one or more item banks and generally reflects the item banks that own the items that make up an assessment. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. When the author creates an assessment, the author selects the item banks from which items can be selected. 2. The Assessment Content Management System adds the item bank information to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. A new form of the assessment is created and new item banks are selected.    1. The Assessment Content Management System updates the item bank information to the object definition. 2. An existing form is updated and new items are selected form a new item bank.    1. The Assessment Content Management System updates the item bank information to the object definition. |
| **Post Conditions** | An Assessment has been associated with one or more Item Banks |
| **SIF Mandatory Objects** | AssessmentItemBankId |
| **SIF Optional Objects** | AssessmentItemBanks (list)  AssessmentItemBankName |
| **Open Issues** | NOTE: The AWG leaders recognize that this relationship can be derived by visiting all items that make up an assessment form. This was put into the assessment object more from an access convenience perspective. If the working group deems this unnecessary, then this use case and supporting data elements can be removed. |

### Use Case Title: A-5 Assessment Subjects

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment is typically designed for use with a specific or set of subjects. The ability to identify the subjects that the assessment is designed is an important data point. This is useful when assigning an assessment to a test taker through an LMS or gradebook type of application. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies which subjects the assessment is targeted. 2. The Assessment Content Management System adds the subjects to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of subjects after the assessment has been created. |
| **Post Conditions** | An Assessment has been associated one or more subjects |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentSubjects |
| **Open Issues** |  |

### Use Case Title: A-6 Assessment Grade Levels

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment is typically designed for use at a specific or set of grade levels. The ability to identify the levels that the assessment is designed is an important data point. This is useful when assigning an assessment to a test taker through an LMS or gradebook type of application. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies which grade levels the assessment is targeted. 2. The Assessment Content Management System adds the grade levels to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of grade levels after the assessment has been created. |
| **Post Conditions** | An Assessment has been associated one or more grade levels |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentGradeLevels |
| **Open Issues** |  |

### Use Case Title: A-7 Assessment Language

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment may be available in one or more languages. The ability to identify the languages that the assessment is available in is an important data point. This is useful when assigning an assessment to a test taker (such as an ELL student) through an LMS or gradebook type of application. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies which languages the assessment is being developed in. 2. The Assessment Content Management System adds the languages to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of languages after the assessment has been created. |
| **Post Conditions** | An Assessment has been associated one or more languages |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentLanguages |
| **Open Issues** |  |

### Use Case Title: A-8 Assessment Learning Standards

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment is typically designed to measure one or more learning standards. The ability to identify the learning standards that the assessment is designed to measure is an important data point. This is useful when assigning an assessment to a test taker through an LMS or gradebook type of application. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies which learning standards the assessment is targeted. 2. The Assessment Content Management System adds the learning standards to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of learning standards after the assessment has been created. |
| **Post Conditions** | An Assessment has been associated one or more learning standards |
| **SIF Mandatory Objects** | LearningStandardItemRefId |
| **SIF Optional Objects** | LearningStandardItems (list) |
| **Open Issues** |  |

### Use Case Title: A-9 Assessment Provider

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF Implementation Specification 2.6 |
| **Summary Description** | If an assessment is developed and made available by an assessment provider, this will provide method for identifying the provider. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created. |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies the provider of the assessment. 2. The Assessment Content Management System adds the provider to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the provider after the assessment has been created. |
| **Post Conditions** | The provider of an Assessment has been identified on the Assessment object |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentProvider |
| **Open Issues** |  |

## 3.2 Use Cases – AssessmentForm

### Use Case Title: AF-1 Assessment Form Versioning

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | As forms are modified, each new form version will generate a new RefId and therefore a new object. In order to properly identify the version of the form, a version number has been added to the object definition. The publisher of the form will be responsible for identifying the version of the form. The form version number and publish date are optional so if a content management system does not maintain versions, then these elements can be missing. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Scoring System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm has been created, published, and used by test takers. After administration, the form is subsequently modified and republished. |
| **Main Sequence of Events / Action Steps** | 1. The provider of the assessment has determined that “substantive” changes to the assessment form are required that may impact scoring or reporting of results. 2. The changes to the form have been made in the Assessment Content Management System. 3. The Assessment Content Management System updates the form version information and assigns a new RefId to the version of the form. 4. A new form object is published. |
| **Alternative Sequence of Events / Action Steps** | Depending upon the nature of the changes made, re-scoring or new reports may need to be generated. These decisions would be determined by the assessment provider and customer. |
| **Post Conditions** | A new AssessmentForm RefId is generated and a new object created. The new object is labeled with the appropriate version number. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | FormVersion |
| **Open Issues** |  |

### Use Case Title: AF-2 Assessment Form Number Type

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | The SIF 2.5 implementation specification supported a form having multiple form numbers – a good thing. However, there was no way to identify what the form number represents if multiple form numbers exists. In order to properly identify the form number, a form type is being added to the form number list with a standard set of values to help identify what the form number represents. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System, Assessment Scoring System  Assessment Content Management System |
| **Pre Conditions** | An Assessment Form is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The Assessment Content Management System will likely generate an internally unique identifier. 2. The author identifies the other “natural” form numbers that are associated with the form. 3. The author or the Assessment Content Management System determines the type of each form number. 4. The Assessment Content Management System adds the form number and type information to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing form with new form number information. 2. The natural form numbers are not unique. |
| **Post Conditions** | An Assessment Form has been updated with all possible identifiers |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentFormNumbers (list)  AssessmentFormNumberType |
| **Open Issues** |  |

### Use Case Title: AF-3 Assessment Form Sections

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment form is generally made up of one or more sections. Sections support form structure, item sequence, security, and timing. For example a form may have section 1 being sample items, section 2 being a short placement test, section 3 being an adaptive section and section 4 a final survey. Simple tests, such as quizzes, most likely wouldn’t require section structure, but having a single section to include items is supported. Sections can also be pre-built outside of an assessment form construct process and included later into a form. AssessmentSection is a new object being added with the release of the data model. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System, Student Information System or other external system  Assessment Content Management System |
| **Pre Conditions** | An AssessmentSection has been created.  An AssessmentForm is being or has been created. |
| **Main Sequence of Events / Action Steps** | 1. The assessment author is creating a form and is selecting one or more sections to include in the form. 2. Each section is positioned in the form by specifying form sequence or with a GUI to sequence sections. 3. The Assessment Content Management System publishes the form with associated section information include. |
| **Alternative Sequence of Events / Action Steps** | 1. The assessment author modifies an existing form and add or removes a section from the form (also see the Form Versioning use case). |
| **Post Conditions** | An AssessmentSection has been included on an AssessmentForm and its sequence identified. |
| **SIF Mandatory Objects** | AssessmentSectionRefId  AssessmentSectionSequence |
| **SIF Optional Objects** | AssessmentSections (list) |
| **Open Issues** | This structure could support testlets in their most basic use cases but sections would not likely accommodate all testlet use cases. |

### Use Case Title: AF-4 Assessment Form Platforms

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment form may be designed for a specific delivery platform. For example, a form that contains items that requires a drag-and-drop interface to collect a student response would not work in a paper assessment. Identifying which platforms the form is designed to support is a critical data point for selecting an assessment for delivery to a group of test takers in a particular environment. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System, Learning Management System, Student Information System, or similar.  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm is being or has been created . |
| **Main Sequence of Events / Action Steps** | 1. The author identifies the platforms that the form is being targeted. 2. The Assessment Content Management System adds the platform information to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing form with platform information. |
| **Post Conditions** | An AssessmentForm has been associated one or more platforms that support this item. |
| **SIF Mandatory Objects** | AssessmentFormPlatform |
| **SIF Optional Objects** | AssessmentFormPlatforms (list) |
| **Open Issues** |  |

### Use Case Title: AF-5 Assessment Form Assets

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment form may use one or more assessment assets to build the final presentation form for the test taker. Form assets could include globally available resources such as formula sheets or tools that are not dependent upon a specific item or section of the form. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm is being or has been created . |
| **Main Sequence of Events / Action Steps** | 1. The author identifies assets that are needed to support the delivery of the form to the test taker. 2. The Assessment Content Management System publishes the object definition with the asset references included. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing form and adds or removes assets from the form definition.    1. The Assessment Content Management System publishes the object definition with the asset references included. 2. The author selects assets that are already included in items or sections used on the form.    1. The Assessment Content Management System should alert the user to this situation. It would be the determination of the ACMS if this is allowed. |
| **Post Conditions** | An AssessmentForm has been associated with one or more global assets. |
| **SIF Mandatory Objects** | AssessmentAssetRefId |
| **SIF Optional Objects** | AssessmentAssets (list) |
| **Open Issues** | While these references support the identification of assets necessary to complete the form, these references do not identify how the assets are to be presented to the test taker (either online or on paper). This will need to be addressed when presentation information for items and forms are tackled. |

### Use Case Title: AF-6 Assessment Form Accommodations

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | A form may be designed to provide certain accessibility features for a test taker. This list will identify the specific accessibility features that are enabled with the form definition. This can be used when assigning a specific form to a test taker that may require a specific accommodation. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Processing System, Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm is being or has been created . |
| **Main Sequence of Events / Action Steps** | 1. The author identifies assets that are needed to support the delivery of the form to the test taker. 2. The Assessment Content Management System publishes the object definition with the asset references included. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing form and adds or removes assets from the form definition.    1. The Assessment Content Management System publishes the object definition with the asset references included. 2. The author selects assets that are already included in items or sections used on the form.    1. The Assessment Content Management System should alert the user to this situation. It would be the determination of the ACMS if this is allowed. |
| **Post Conditions** | An AssessmentForm has been associated with one or more accessibility options. |
| **SIF Mandatory Objects** | FormAccommodationType |
| **SIF Optional Objects** | FormAccommodations (list) |
| **Open Issues** |  |

### Use Case Title: AF-7 Assessment Form Subjects

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | A form may be designed for specific subject areas. This list will identify the specific subjects that the form can be used to assess. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Processing System, Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm is being or has been created . |
| **Main Sequence of Events / Action Steps** | The author identifies the form subjects. |
| **Alternative Sequence of Events / Action Steps** | The ACMS may default the subjects based on those identified by the assessment. |
| **Post Conditions** | An AssessmentForm has been associated with one or more subject areas. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

### Use Case Title: AF-8 Assessment Form Languages

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | A form may be designed for specific languages. This list will identify the specific languages that the form supports. Note that multiple languages may be supported by a form that includes items written in multiple languages – in some scenarios fully translated items may be available and the test taker can swap between languages. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Processing System, Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentForm is being or has been created . |
| **Main Sequence of Events / Action Steps** | The author identifies the form languages. |
| **Alternative Sequence of Events / Action Steps** | The ACMS may default the languages based on the language of the items included in the form. |
| **Post Conditions** | An AssessmentForm has been associated with one or more languages. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

## 3.3 Use Cases – AssessmentItem

### Use Case Title: AI-1 Assessment Item Form Usage Attributes

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Manditory |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | The current AssessmentItem object contains a mandatory relationship to a single form. This relationship implies that any item can only be used on one form (unless you duplicate the item). In addition, the current model contains an ItemLabel element. Item labels will also be variable based on the form where the item is used. Most item banking systems allow items to appear on multiple forms. Using the current model, the item would have to be duplicated for each form where the item appears. Removing the Assessment Form relationship and the ItemLabel element will allow the item to exist independent from the forms where it may be used. |
| **Actors:**  **Requesting Service**  **Responding Service** | N/A  Assessment Content Management System |
| **Pre Conditions** | Not applicable. |
| **Main Sequence of Events / Action Steps** | Not applicable. |
| **Alternative Sequence of Events / Action Steps** | Not applicable. |
| **Post Conditions** | Not applicable. |
| **SIF Mandatory Objects** | @AssessmentFormRefId  ItemLabel |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

### Use Case Title: AI-2 Assessment Item Identifiers

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary** | The current Assessment Item definition does not provide for any customer, natural, or system identifiers to be included with the item definition. Only RefIds and Names are offered. An item often may have several identifiers within an item banking system. The customer may have an item numbering system, the item bank may have internal identifiers, or the publisher may have a numbering system. To properly allow for users to identify items, an item identifier list is being added. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Content Management System |
| **Pre Conditions** | An Assessment Item is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment item creates a new assessment item within the Assessment Content Management System. 2. The system will typically generate an internal unique identifier. 3. The author will provide alternate identifiers for the assessment item – such as a customer identifier. 4. The object add event will provide all internal and “natural” identifiers in the AssessmentItemIdentifiers list element. Each identifier is also provided with a “type”. |
| **Alternative Sequence of Events / Action Steps** | 1. The natural keys are not unique    1. This should most likely generate a warning within the Assessment Content Management System. Whether or not this is prevented would be an implementation decision of the assessment program. 2. Natural keys are added or removed after the original add event is complete.    1. An update event should be triggered by the Assessment Content Management System |
| **Post Conditions** | An Assessment Item has been updated with all possible identifiers |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentItemIdentifiers (list)  AssessmentItemIdentifier  AssessmentItemIdentifierType |
| **Open Issues** |  |

### Use Case Title: AI-3 Assessment Item Subjects

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment item is typically designed for use with a specific or set of subjects. The ability to identify the subjects that the assessment item is designed is an important data point. This is useful when building an assessment from an item bank to be able to select items for a particular subject. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System or similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment item identifies which subjects the assessment item is targeted. 2. The Assessment Content Management System adds the subjects to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of subjects after the assessment item has been created. |
| **Post Conditions** | An AssessmentItem has been associated one or more subjects |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentItemSubjects |
| **Open Issues** |  |

### Use Case Title: AI-4 Assessment Item Grade Levels

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment item is typically designed for use at a specific or set of grade levels. The ability to identify the levels that the assessment item is designed is an important data point. This is useful when building an assessment from an item bank to be able to select items for a particular grade level. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System to similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment item identifies which grade levels the assessment item is targeted. 2. The Assessment Content Management System adds the subjects to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates the list of grade levels after the assessment item has been created. |
| **Post Conditions** | An AssessmentItem has been associated one or more grade levels |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentItemGradeLevels |
| **Open Issues** |  |

### Use Case Title: AI-5 Assessment Item Languages

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment item will be developed in a specific language. The ability to identify the language that the assessment item was developed is an important data point. This is useful when building an assessment from an item bank to be able to select items written in a particular language. This is also useful when building a form that may provide an alternate language of the items as an accommodation (such as ELL). |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System to similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem is being created. |
| **Main Sequence of Events / Action Steps** | 1. The author of the assessment identifies which language the assessment is targeted. 2. The Assessment Content Management System adds the language to the object definition. |
| **Alternative Sequence of Events / Action Steps** |  |
| **Post Conditions** | The AssessmentItem language has been set |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | AssessmentItemLanguage |
| **Open Issues** |  |

### Use Case Title: AI-6 Assessment Item Assets

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment may use or access content that is not directly part of the item. Examples may include reading passages, charts, maps, tables, tools, or other content “assets”. The current item model simply allowed for a single “stimulus” element. Not only did this restrict the use of shared content elements to a single element, it also embedded the content in the item making reusability of a shared content elements across multiple items less optimal. With this version of the assessment model, we are adding a new object named “AssessmentAsset”. The object will allow the Assessment Content Management System the ability to define and store assets separately from the item content and when used by an item, a reference link can be included. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An Assessment is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. The author identifies assets that are needed to support the delivery of the item to the test taker. 2. The Assessment Content Management System publishes the object definition with the asset references included. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing item and adds or removes assets from the item definition.    1. The Assessment Content Management System publishes the object definition with the asset references included. |
| **Post Conditions** | An Assessment has been associated one or more learning standards |
| **SIF Mandatory Objects** | AssessmentItemAssetRefId |
| **SIF Optional Objects** | Stimulus (removed)  AssessmentItemAssets (list) |
| **Open Issues** |  |

### Use Case Title: AI-7 Assessment Item Rubrics

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | Some types of assessment items cannot be scored through simple matching, lookup or answer key techniques. These items typically require human or artificial intelligence type of algorithms to score. These items may also require scoring across multiple traits, not just a single item score. The ‘rules’ for how an assessment item is evaluated to determine a score is called a rubric. The rubric will define the score points possible as well as what is expected in the response to receive a particular score point. Scoring may also support special codes for things like off topic, foreign language, or intervention required. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Scoring System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem is being or has been created and the item scoring requires a rubric.  The AssessmentRubric has been created |
| **Main Sequence of Events / Action Steps** | 1. The author identifies rubrics that are needed to score the item response from the test taker. 2. The Assessment Content Management System publishes the object definition with the rubric references included. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing item and adds or removes rubrics from the item definition.    1. The Assessment Content Management System publishes the object definition with the rubric references included. |
| **Post Conditions** | An AssessmentItem has been associated one or more rubrics that define the scoring rules. |
| **SIF Mandatory Objects** | AssessmentItemRubricRefId |
| **SIF Optional Objects** | AssessmentItemRubrics (list) |
| **Open Issues** |  |

### Use Case Title: AI-8 Assessment Item Item Banks

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | Items are typically managed in item banks. An item bank is a logical container that typically groups items together for specific use or application, customer program, subject, grade levels or other organizing characteristics. Item banks provide convenient methods for selecting items to build tests as well as a way to secure access to only specific items. |
| **Actors:**  **Requesting Service**  **Responding Service** | Learning Management System to similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem is being or has been created |
| **Main Sequence of Events / Action Steps** | 1. When the author creates an assessment item, they are operating within the context of an item bank. 2. The Assessment Content Management System adds the item bank information to the item object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author is creating an item off-line from any item bank. 2. The author uploads the item into an item bank.    1. The Assessment Content Management System updates the item bank information to the item object definition. 3. The item is moved or copied from one item bank to another – such as a high-stakes item is now release and available for classroom use in practice tests. |
| **Post Conditions** | An AssessmentItem has been associated with one or more Item Banks |
| **SIF Mandatory Objects** | AssessmentItemBankId |
| **SIF Optional Objects** | AssessmentItemBanks (list)  AssessmentItemBankName |
| **Open Issues** |  |

### Use Case Title: AI-9 Assessment Item Platforms

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment item may be designed for a specific delivery platform. For example, an item that requires a drag-and-drop interface to collect a student response would not work in a paper assessment. Identifying which platforms the item is designed to support is a critical data point for selecting items to put on an assessment. If you plan to deliver a test using paper-and-pencil format, then you cannot select items designed for online delivery. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System, Learning Management System to similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created . |
| **Main Sequence of Events / Action Steps** | 1. The author identifies the platforms that the item is being targeted. 2. The Assessment Content Management System adds the platform information to the object definition. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing item and adds or removes platform information. |
| **Post Conditions** | An AssessmentItem has been associated one or more platforms that support this item. |
| **SIF Mandatory Objects** | AssessmentItemPlatform |
| **SIF Optional Objects** | AssessmentItemPlatforms (list) |
| **Open Issues** |  |

### Use Case Title: AI-12 Assessment Item Feedback

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | It is often useful to provide a student addition feedback based upon their response or based on if the item was answered correctly or not. For multiple choice items, each choice may identify specific strengths or misconceptions about the item. For non-multiple choice items, feedback can be provided base on the correctness of the item response. Feedback can be provided while the student is testing for online delivered tests or can be provided later in reporting for paper-based tests. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Scoring System, Learning Management System to similar  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem is being or has been created. |
| **Main Sequence of Events / Action Steps** | 1. The author provides item feedback information for the whole item and/or all choice options available for this item. 2. The Assessment Content Management System updates the item object definition with the new feedback information. |
| **Alternative Sequence of Events / Action Steps** | 1. The author selects an existing item and adds, removes, or makes updates to the feedback information. 2. The Assessment Content Management System automatically associates the new item as a derivative of the existing item. |
| **Post Conditions** | The item definition now provides feedback for the item choices and/or for the overall item. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | ResponseChoices/Choice/Feedback  ItemFeedbackCorrect  ItemFeedbackIncorrect |
| **Open Issues** |  |

### Use Case Title: AI-13 Assessment Item Versioning

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | As items are modified, each new item version will generate a new RefId and therefore a new object. In order to properly identify the version of the item, a version number has been added to the object definition. The publisher of the item will be responsible for identifying the version of the form. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Scoring System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created, published, and subsequently modified. |
| **Main Sequence of Events / Action Steps** | 1. An item was published and is available for use. 2. An issue with the item has been discovered and requires a revision. 3. The existing item is selected from the bank and modified. 4. The ACMS updates the version number on the item and generates a new RefID for the version. 5. The ACMS publishes a new item object for the new version of the item. |
| **Alternative Sequence of Events / Action Steps** | 1. It will be the determination of the assessment provider and/or customer if previous administrations of the item on existing sections are to be republished and/or reprocessed.    1. If existing sections are to be republished, then new versions of the sections that use this item are updated to link to the new version’s refid.    2. If the change impacted item scoring, then rescoring may need to occur. |
| **Post Conditions** | The new item object has been labeled with the appropriate version number. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** | ItemVersion |
| **Open Issues** |  |

### Use Case Title: AI-14 Assessment Item Hint

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | A hint is a special type of feedback, typically provided to the test taker while they are testing (online tests) either on request from the test taker or after the item has been answered incorrectly and the test is designed to allow the test taker multiple attempts to get the item correct. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created and the item author is providing a hint to be used by the delivery system. |
| **Main Sequence of Events / Action Steps** | 1. The author adds or updates the item with the item hint. |
| **Alternative Sequence of Events / Action Steps** | The Assessment Delivery System has displayed the item to the student and:   * 1. The test taker has responded to the item and the response is incorrect and the delivery system provides a hint to the test taker, or   2. The test taker is unable to answer the question and has requested a hint.   Note: the test must be defined to allow for this type of interaction with the test taker. |
| **Post Conditions** | The item object has been added or updated with the hint applied. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

## 3.4 Use Cases – AssessmentSection

### Use Case Title: AS-1 Assessment Section Construction

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Version** | SIF 2.6 Implementation Specification |
| **Summary Description** | Most formal or large-scale assessments are constructed into sections. Sections can provide structure, alternate item sequence options, timing options, access to supporting non-item content resources, and section navigation and security controls within an assessment. For small-scale assessments that may not have the need for multi-section assessment construction can still utilize all of the section controls within a single section assessment. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | The AssessmentItems necessary to build an AssessmentSection exist  The AssessmentAssets necessary to build an AssessmentSection exist |
| **Main Sequence of Events / Action Steps** | 1. The author creates a new section. 2. The author selects all items to be included in the section. 3. The author selects any additional assets that are to be included with the section. 4. The author populates all other section controls and metadata. 5. The ACMS creates object with all information provided. |
| **Alternative Sequence of Events / Action Steps** | None |
| **Post Conditions** | An AssessmentSection object is created  An AssessmentSection can be associated with an AssessmentForm |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

### Use Case Title: AS-2 Assessment Section Adaptive Tests

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** |  |
| **SIF Version** | SIF 2.6 Implementation Specification |
| **Summary Description** | For an adaptive test section, the section will identify the algorithm and pool of items that are to be available for selection by the algorithm. It is common that a test design may start with a sequential section of sample items followed by an adaptive section that selects items from a pool based on student performance as they respond to questions. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | The AssessmentSection is being or has been created. |
| **Main Sequence of Events / Action Steps** | 1. The section author identifies the adaptive algorithm that is to be used to select items during a test administration to a test taker. 2. The ACMS updates the section information with the algorithm name and location. |
| **Alternative Sequence of Events / Action Steps** | 1. An existing section is selected and the algorithm is updated. 2. The ACMS generates a new version of the section. 3. The ACMS creates a new section object with a new version number. 4. It is the responsibility of the assessment provider and/or customer to determine if previously administered adaptive sections are to be reprocessed.    1. If so, then the forms affected must be republished with new versions to link to the new section.    2. If scoring information is affected due to the change in the algorithm, rescoring information may need to occurs. |
| **Post Conditions** | The AssessmentSection identifies the adaptive algorithm by name and location. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

## 3.5 Use Cases – AssessmentAsset

### Use Case Title: AA-1 Assessment Asset Content

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** |  |
| **SIF Version** | SIF 2.6 Implementation Specification |
| **Summary Description** | Many assessment may utilize shared content elements or non-item content elements or tools as part of constructing an item, section, or form. Shared item content may be reading passages, art work, charts, maps, tools, etc. that are common to many items. Section content elements are non-item content elements that may be resources (such as periodic tables), tools (such as calculators or dictionaries) that the author has determined should be available to the student that may not be included on any specific item. Form content, similar to section content, are non-item content elements that will be available to the test taker across all sections and items. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System  Assessment Content Management System |
| **Pre Conditions** | None. |
| **Main Sequence of Events / Action Steps** | 1. The asset author creates a new asset. 2. The asset author identifies the type of asset and all other data and metadata about this object. 3. The ACMS publishes the Asset with all information. |
| **Alternative Sequence of Events / Action Steps** | None |
| **Post Conditions** | An AssessmentAsset has been created and is now available for use. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

## 3.6 Use Cases – AssessmentItemReference

### Use Case Title: AIR-1 Assessment Item Enemies

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | Within an item bank, there may be items that are either so similar or provide clues for each other so that if they appear on the same test together, their measurement characteristics could be compromised. It is typical that these items are identified as “enemies” of each other. When items are enemies, the test builder cannot select more than one item that are enemies of each other. Also, in adaptive testing, the algorithm may also consider the item enemy list when selecting items from a pool. |
| **Actors:**  **Requesting Service**  **Responding Service** | Assessment Delivery System (adaptive)  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created . |
| **Main Sequence of Events / Action Steps** | 1. The author identifies other items that are enemies of the item. 2. The Assessment Content Management System adds the enemy item references to the object definition. 3. The Assessment Content Management System automatically adds reverse references in the enemy items. |
| **Alternative Sequence of Events / Action Steps** | 1. The author updates an existing item by adding or removing item enemies.    1. If enemies are removed, the associated reverse reference is also updated in the enemy item. |
| **Post Conditions** | Multiple AssessmentItems have been identified as enemies and the appropriate links have been created.. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

### Use Case Title: AIR-2 Assessment Item Derivatives

|  |  |
| --- | --- |
| **Type (Mandatory or Optional)** | Optional |
| **SIF Versions and References** | SIF Implementation Specification 2.6 |
| **Summary Description** | An assessment item may be derived from another item. Common examples of this would be an item that is in an alternate or simplified language. It is important to know that these items are related so that changes to item content will likely impact multiple items that have been derived from each other. In addition, knowing that an item is a language alternative to another item is useful when building a test with accessibility options for ELL or other language learners. |
| **Actors:**  **Requesting Service**  **Responding Service** | N/A  Assessment Content Management System |
| **Pre Conditions** | An AssessmentItem has been created by deriving the item from another existing item. |
| **Main Sequence of Events / Action Steps** | 1. The author selects an existing item and makes a copy of the item to start development of a new item. 2. The Assessment Content Management System automatically associates the new item as a derivative of the existing item.   OR   1. The author develops a new item that is manually adapted from an existing item and selects the existing item as a derivative. 2. The Assessment Content Management System automatically associates the new item as a derivative of the existing item. |
| **Alternative Sequence of Events / Action Steps** | 1. The author modifies an existing item and adds or removes derivative information on the item. 2. The Assessment Content Management System updates the item information with the new derivative references. |
| **Post Conditions** | An AssessmentItem has been associated the item that it was derived from. |
| **SIF Mandatory Objects** |  |
| **SIF Optional Objects** |  |
| **Open Issues** |  |

**Status Tracker Phase 2: Execution of Proposed Changes**

*At this point the initial Data Model extension proposal has been accepted by the Tech Board and is either in the object pipeline, or being fast-tracked. The following sections have to be completed and (where indicated) reviewed and approved before this proposal can be reflected in the SIF specification.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Template Section** | **Initial Draft Completed**  **(Owner / Date)** | **Reviewed I or Accepted (A)**  **(Owner / Date)** | **Comments** |
| Dependencies | Project Team / Staff  **Date:** | Internal Project Team review |  |
| Object Definition Table | Project Team  **Date:** | Tech Board I  **Date:** |  |
| Migration Plan | Staff / Project Team  **Date:** | Tech Board (A)  **Date:** | TB Approval is part of SIF Release cycle |
| Sample XML | Staff / Project Team  **Date:** | Optional | Generally provided as part of published specification |

## 4. Impact Assessment

*This section is the first to consider the actual implementation which will address the use cases previously identified. It requires assessing the impacts to both the existing objects and infrastructure, and to previously deployed applications. It would normally be produced by the Project Team (new or existing) assigned to this data model extension by the Tech Board at the time this proposal was approved.*

*In cases where a legacy object (one with no owning Project Team), is being changed, the task of assessing impact may be assigned to a Staff member to drive its completion.*

*The following two subsections must be completed.*

## 4.1 External Object Dependencies and Relation Map

The following is a global view of the Assessment data domain.

### 4.1.1 Object Dependencies and Relationship Map

*The relationship arrows originate in the object that contains the RefId. Orange relationships are proposed new relationships. Red relationships are proposed to be removed. Red objects are new objects.*

#### 4.1.1.1 Assessment



#### 4.1.1.2 Assessment Form



#### 4.1.1.3 Assessment Item



#### 4.1.1.4 Assessment Section



#### 4.1.1.4 Assessment Asset



## Publishing Assessment Definition Objects

*Publishing an assessment definition would very depending upon the use cases needing to be satisfied. These relationship will be best described in the assessment services discussion that will be provided in later releases of the SIF specification. The following simple use scenarios are provided to help any publisher of assessment details.*

|  |  |
| --- | --- |
| *Scenario* | *Objects required* |
| *List of assessments returned from a search. Supports use cases for a teacher using a gradebook or LMS application to find an assessment to assign to his/her class.* | *Assessment* |
| *List of assessment forms. Supports use cases for teacher wanting to review form details for choosing a form or ensuring proper forms are available for a specific assessment.* | *Assessment, AssessmentForm* |
| *Assessment definition without item details. Supports use cases for reviewing a test definition to determine length, item difficulty, etc.* | *Assessment, AssessmentForm, AssessmentSection, AssessmentSubTest* |
| *Assessment definition with item details. Supports use cases for reviewing a test definition to determine specific item details included on the assessment.* | *Assessment, AssessmentForm, AssessmentSection, AssessmentSubTest, AssessmentItem* |
| *Full assessment definition. Supports use cases for publishing an assessment for delivery, scoring, and reporting.* | *Assessment, AssessmentForm, AssessmentSection, AssessmentSubTest, AssessmentItem, AssessmentAsset, AssessmentItemRubric, AssessmentScoreTable, ItemCharacteristics* |

*Objects not discussed in this document are highlighted in green text above.*

*The above table is only listing objects that are required. Other objects may be included based upon you specific scenario or customer requirements.*

## 4.2 Infrastructure / International Dependencies and Relation Map

*Identify any dependencies on infrastructure technologies and / or deliverables from the International Technical Board (ITB) which are planned for a future release.*

*This could include requiring or relying on specific functionality from one or more of the following:*

* *Transport (ex: SOAP conventions)*
* *SIS Functional Profiles*
* *Identity Management Profiles*
* *Global Data Model Metadata*
* *Central Administration or Smart Zone*
* *Zone Services (ex: Assessment)*

*No dependencies…*

|  |  |  |
| --- | --- | --- |
| **Proposed new Object, Element or Attribute** | **Infrastructure or International technology dependency** | **Specifics of dependency** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# **5 Detailed Design**

*Place the detailed element by element, attribute by attribute breakdown of the Data Model Extension here. This work is normally done by members of the assigned Project Team.*

*The values of the “Char” column include one or more of the following:*

* ***M – Mandatory****. Item must appear in every Add Event and Response message for the object*
* ***R – Required****. Item must either appear in an Add Event or “eventually” be included in an Add Event.*
* ***S – Supported****. Item may or may not appear in any message relating to the object. However if its value is supplied / available, it must be included by the sender in Event and Response messages.*
* ***C******– Conditional.*** *Item is required if the included conditions are satisfied*
* ***I –******Immutable.*** *Item value cannot be changed once supplied.*
* ***U –******Unique.*** *Item value is unique from all other objects containing that item (ex: RefId)*
* ***O – Optional****. Item may or may not appear in any message relating to the object. It need not be supported by the sender*

*The “type” of each item is either an XML type (ex: integer) or a named SIF Global Type.*

*XML Facets can help to further define the value of an item. These can include length, range, and per-type value restrictions. They should be specified if known.*

*Fill out a separate copy of the following table for each affected new or existing SIF object.*

## 5.1 Assessment (modified object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **Assessment** | **An assessment measures a student’s progress and learning on specific academic standards.** | | | |
| Element/@Attribute | Char | Description | Type | Other Comments |
| @ RefId | M | The GUID that uniquely identifies this object. | RefIdType |  |
| Name | M | Name of the test. | Xs:normalizedString |  |
| ~~AssessmentId~~ | ~~O~~ | ~~The state, local or publisher unique Id for the assessment.~~ | [~~xs:normalizedString~~](http://www.w3.org/TR/xmlschema-2/#normalizedString) | Use case A-1  Making this element a list attribute. |
| AssessmentIdentifiers | O | A list of all assessment identifiers that may be associated with this assessment. | List | Use case A-1 |
| AssessmentIdentifiers/ AssessmentIdentifier | MR | Container to bind the ID and Type element together. |  | Use case A-1 |
| AssessmentIdentifiers/ AssessmentIdentifier/ AssessmentId | MR | The state, local or publisher unique Id for the assessment. | [xs:normalizedString](http://www.w3.org/TR/xmlschema-2/#normalizedString) | Use case A-1  Making this element a list attribute. |
| AssessmentIdentifiers/ AssessmentIdentifier/ AssessmentIdType | MR | Identifies the type of identifier. | Values are:  Client = assigned by the client – such as a state  Local = assigned by the local entity  Publisher = assigned by the owner  Internal = internal assessment service provider identifier  Other = custom | Use case A-1 |
| AssessmentPackageRefId | O |  | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) |  |
| AssessmentDescriptors | O | Describes what type of assessment this represents. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) |  |
| AssessmentDescriptors/AssessmentDescriptor | ~~OR~~  MR |  | union of:  [NCES0067AssessmentTypeType](http://specification.sifinfo.org/Implementation/2.4/ExternalCodeSets.html#NCES0067AssessmentTypeType)  additional values:  Statewide  Formative  Local Summative  Diagnostic  Benchmark  CommonCore  National | Change to mandatory for consistency in use of optional lists.  Use case A-3  0075 Achievement test  0076 Advanced placement test  0077 Alternate assessment/grade-level standards  0079 Attitudinal test  0081 Cognitive and perceptual skills test  0082 Developmental observation  0083 Interest inventory  0084 Language proficiency test  0087 Manual dexterity test  0088 Mental ability (intelligence) test  0089 Performance assessment  0090 Personality test  0092 Portfolio assessment  0093 Psychological test  0094 Psychomotor test  0095 Reading readiness test  3461 Alternatve assessment/modified standards  3462 Alternate assessment/ELL  3463 Aptitude test  9999 Other |
| AssessmentProvider | O | Identifies the provider or publisher of the assessment. | Xs:normalizedString | Use case A-9 |
| AssessmentItemBanks | O | An assessment may be part of one or more item banks. | List | Use case A-4 |
| AssessmentItemBank | MR | The bundles the identifier and name. |  |  |
| AssessmentItemBanks/  AssessmentItemBank/ AssessmentItemBankId | MR | If the assessment is provided with an item bank, then this will identify the item bank –a unique code or number used by the item banking system. | Xs:normalizedString | Use case A-4 |
| AssessmentItemBanks/ AssessmentItemBank/ AssessmentItemBankName | OR | If the assessment is provided with an item bank, then this will be the name of the item bank. | Xs:normalizedString | Use case A-4 |
| AssessmentSubjects | O | The assessment may be designed to measure specific subject areas. Note that grade levels are also on the form. Specific forms of an assessment may have more granularity. | SubjectAreaList  NOTE: I am not sure about the usage of the “list” types for subject, grade levels, languages, someone should confirm I have this right. | Use case A-5 |
| AssessmentGradeLevels | O | The assessment may be designed for specific grade levels. Note that grade levels are also on the form. Specific forms of an assessment may have more granularity. | GradeLevels | Use case A-6 |
| AssessmentLanguages | O | The assessment may be available in multiple languages. This list will indicate which languages are available. | LanguageList | Use case A-7 |
| LearningStandardItems | O | This identifies all learning standards that may be measured by this assessment | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | Use case A-8 |
| LearningStandardItems/ LearningStandardItemRefId | MR | Reference to all learning standards that can be measured by this assessment. Note that a specific form of an assessment may measure all or a subset of the learning standards. If the assessment measures all standards under a parent standard, then the parent and all children should be identified. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) | Use case A-8 |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

## 5.2 AssessmentForm (modified object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **AssessmentForm** | **Represents the unique set of questions or stimuli that can be given to a set of test takers. A physical correlate of the assessment form is the test booklet given to students during an assessment. For an adaptive test, the form would become a container for the structure and pool of items that are available to be selected by the adaptive algorithm. However, this object does not contain the questions, it only contains elements that describe the form for use in scoring the questions.**  **No use case, expanded description for clarification only.** | | | |
| Element/@Attribute | Char | Description | Type | Values or additional comments |
| @ RefId | M | The GUID that uniquely identifies an instance of the object. | [RefIdType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#RefIdType) |  |
| @ AssessmentRefId | M | The RefId of the assessment related to this form. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) |  |
| FormVersion | O | This will identify the version of the form that this object represents. Note that new versions of forms must generate new RefIds and therefore a new form object. The format of the version numbering system is determined by the assessment provider. | Xs:normalizedString | Use Case AF-1 |
| FormPublishDate | O | This will identify the date that this version of the form was published (published means made available for use). If a FormVersion is provided, then this element should also be provided. | xs:dateTime | Use Case AF-1 |
| AssessmentType | O | Indicates whether this assessment (form) is a standard administration or alternate (accommodations). | values:  standard  alternate | No use case, clarification only.  Suggest amending description to define alternate. The term “alternate” can also mean forms that are to be used when a main form is compromise. In this context, we understand this to mean alternate “accommodations”. |
| FormName | M | Text description for this particular arrangement of questions, etc. | [xs:normalizedString](http://www.w3.org/TR/xmlschema-2/#normalizedString) |  |
| ~~FormNumber~~ | ~~MR~~ | ~~Reference number for the form.~~ | [~~xs:token~~](http://www.w3.org/TR/xmlschema-2/#token) | Use Case AF-2  Making for number a list. |
| FormIdentifiers | O | Reference numbers for the form. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | Use Case AF-2 |
| FormIdentifier | MR | Bundles the number and type. |  | Use Case AF-2 |
| FormIdentifiers/  FormIdentifer/  FormNumber | MR | Reference number for the form. | [xs:token](http://www.w3.org/TR/xmlschema-2/#token) | Use Case AF-2 |
| FormIdentifiers/ FormIdentifier/ FormNumberType | OR | Identifies the type of form number that this represents. | Values:  Client = a client assigned number  Publisher = assigned by the owner  Internal = assigned by the assessment service provider – can be a machine readable number  Other = custom | Use Case AF-2 |
| FormAccommodations | O | This will provide a list of accessibility options that are available in this form. | List | Use Case AF-6 |
| FormAccommodations/ FormAccommodationType | MR | This will identify the specific accommodation available. If no accommodations are provided, then this list will not be present. | Values are:  Braille  Text-to-speech  Audio  Sign Language  Alternate Language  Simplified Language | Use Case AF-6 |
| Level | O | Indicates the level of the form.  Examples Grade 3 Leveling System | [xs:token](http://www.w3.org/TR/xmlschema-2/#token) | I will leave this in but it seems redundant with GradeLevels…what does leveling system mean? |
| Period | O | The time period in which the form is intended to be administered. For example, if this form is only to be used during the spring administration, then this element can specify that. | xs:token | No use case, clarification only.  Expanded the element description. |
| GradeLevels | O | Grade levels this assessment is designed to evaluate. | [GradeLevels](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#GradeLevels) | PK Pre-Kindergarten/Preschool  KG Kindergarten  01  02  03  04  05  06  07  08  09  10  11  12  PG Postgraduate/Adult  UN Ungraded  Other  Unknown |
| AssessmentFormSubjects | O | This identifies the subjects that that form is designed for. | SubjectAreaList | Use case AF-7 |
| AssessmentFormLanguages | O | This identifies the list of languages that the form was designed to support. For example, a form may include items in both English and Spanish and the delivery system provides methods for the test taker to switch between languages. | List | Use case AF-8 |
| AssessmentFormLanguages/ AssessmentFormLangauge | MR | This identifies a specific language that the form supports. | NISOZ3953LanguageCodesType | Use case AF-8 |
| AssessmentSubTestRefIds | O | Associated subtests (sometimes referred to as strands). Each form can provide scores in one or more subtests and each subtest can generate one or more scores (score metrics such as raw and scale scores and performance levels). If a subtest is defined as parent and child hierarchy and all child sub-tests are used by the form, then the parent and all children subtests should be identified. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | No use case, clarification only.  Reworded description of this element. |
| AssessmentSubTestRefIds/ AssessmentSubTestRefId | OR | A subtest identified by RefId. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) |  |
| AssessmentSections | O | This will list all sections that make up the assessment form. Sections support form structure and sequence. For example a form may have section 1 being sample items, section 2 being a short placement test, section 3 being an adaptive section and section 4 a final survey. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | Use case AF-3  Section is a new object in the model. |
| AssessmentSection | MR | The bundles the section refid and sequence. |  |  |
| AssessmentSections/ AssessmentSection/ AssessmentSectionRefId | MR | The reference to the specific section definition for this form. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) | Use case AF-3 |
| AssessmnetSections/  AssessmnetSection/ AssessmentSectionSequence | MR | The numeric sequence that a section will be presented to the test taker. This should be a simple sequence number (1,2,3, etc.) but can be other values that can be sorted into sequence (ex S-A, S-B, S-C, etc). | xs:token | Use case AF-3 |
| AssessmentPlatforms | O | This list will identify all delivery platforms that this form design will support. | List | Use case AF-4 |
| AssessmentPlatforms/ AssessmentPlatform | MR | This will identify the specific delivery platform that this form will support. | Values:  Paper  Computer  Mobile  Clicker  Other | Do we need to get even more granular (ex: Mac vrs PC or iPhone vrs Blackberry)? Imaging a test on an iPad that has an item that makes you shake the device! |
| AssessmentAssets | O | This will list all assets used on the assessment form that are not related to any specific section or item. These are assets that are “global” to the form. Examples of form assets may include headers/footers, navigation tools, formula sheets, etc. that are available to the test taker at all times. This list should not duplicate any section or item level assets if possible. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | Use case AF-5  Asset is a new object. |
| AssessmentAssets/ AssessmentAssetRefId | MR | The reference to the specific asset that is used on this form. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) | Use case AF-5 |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

## 5.3 AssessmentItem (modified object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **AssessmentItem** | **This object is designed to allow software systems to provide item detail information such as the stem of the item, the distractors, the stimuli, etc. This initial version of the object does not deal with presentation aspects of the item. Instead it focuses on the item content and characteristics needed to enable interoperability and the usage of item-level information in the improvement of learning and instruction.** | | | |
| Element/@Attribute | Char | Description | Type | Values or additional comments |
| @ RefId | M |  | [RefIdType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#RefIdType) |  |
| ~~@ AssessmentFormRefId~~ | ~~M~~ | ~~This RefId points to the assessment form of which the item is a part.~~ | [~~IdRefType~~](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) | Use case AI-1  Removing this reference to make the item independent from the form of the test the item is used on. |
| @ ResponseType | M | A value that indicates the response type for the item. | values:  multiple-choice  multiple-multiple choice  true-false  fill-in-the-blank  short-answer  essay | Other common item types include:  Hot Spot  Matching  Ranking/Ordering  Graphing  Etc…  At this time, we will not add new item types. |
| ~~ItemLabel~~ | ~~M~~ | ~~An item number or other identifier for the item. It may be used to indicate the order or grouping of items.~~ | [~~xs:token~~](http://www.w3.org/TR/xmlschema-2/#token) | Use case AI-1  Moving this to the section object as the item label is dependent upon which form of the test an item occurs. Again allowing the item to be an independent object. |
| ItemVersion | O | This will identify the version of the item that this object represents. New versions of the item will generate new RefIds and therefore new instances of the object. The format of the version number is defined by the assessment provider. | [xs:normalizeString](http://www.w3.org/TR/xmlschema-2/#string) | Use case AI-13 |
| ItemPublishDate | O | This is the date that this version of the item was published (published means made available for use). If the ItemVersion is provided, then this date should also be provided. | xs:dateTime | Use case AI-13 |
| ItemName | O | Name or short description of the item. | [xs:string](http://www.w3.org/TR/xmlschema-2/#string) |  |
| AssessmentItemIdentifiers | O | This will support a list of item identifiers. | List | Use case AI-2 |
| AssessmentItemIdentifier | MR | Groups the identifier and type |  |  |
| AssessmentItemIdentifiers/ AssessmentItemIdentifier/  AssessmentItemCode | MR | This will be the item identifier. | xs:string | Use case AI-2 |
| AssessmentItemIdentifiers/ AssessmentItemIdentifier/ AssessmentItemCodeType | MR | This will identify the type of item identifier. | Values are:  Client = assigned by the client – generally a smart number that indicates subject, grade, etc.  Publisher = assigned by the owner  Internal = internal assessment service provider identifier  Other = custom | Use case AI-2 |
| AssessmentItemSubjects | O | This identifies the subjects that that item is designed for. | SubjectAreaList | Use case AI-3 |
| AssesmentItemGradeLevels | O | This identifies the grade levels that this item is designed for. | GradeLevels | Use case AI-4 |
| AssessmentItemLanguage | O | This identifies the language that the item was developed in. | NISOZ3953LanguageCodesType | Use case AI-5 |
| LearningStandardItems | O | This object contains information related to curriculum standards statements "standards" or "benchmarks" or the like within the document. This object primarily focuses upon state department curriculum standards, published curriculum standards and local education agency learning standards. Each LearningStandardItemRefId reflects an individual standard statement and may occur at several levels within a hierarchically structured document. | [List](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) |  |
| LearningStandardItems/ LearningStandardItemRefId | MR | Reference to all learning standards that can be measured by this assessment item. Note that a specific form of an assessment may measure all or a subset of the learning standards. If the assessment item measures all standards under a parent standard, then the parent and all children should be identified. | [IdRefType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#IdRefType) | No use case, clarification only. |
| ~~Stimulus~~ | ~~C~~ | ~~A piece of content to be used by the test taker in responding to the stem. Examples include a reading passage, a video, a diagram, or a picture.~~  ~~Note: The Stimulus element only is included when a Stem element exists.~~ | [~~AbstractContentElementType~~](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#AbstractContentElementType) | Use case AI-6  Making this a reference to assets. |
| AssessmentItemAssets | O | This identifies all content assets that are associated with the item. Assets could include stimuli such as reading passages, charts, maps, etc. as well as supporting material such as formula sheets. | List | Use case AI-6 |
| AssessmentItemAssets/ AssessmentItemAssetRefId | MR | This identifies the specific asset used by this item | IdRefType | Use case AI-6 |
| Stem | O | The question, task, or statement that prompts a response from the test taker. | [AbstractContentElementType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#AbstractContentElementType) |  |
| ResponseChoices | C | This complex element will not be included in the object if @ResponseType is:   * fill-in-the-blank * short-answer * essay   Other cases will be added in the future. |  | Will need to amend this description as new item types are added in future releases. |
| ResponseChoices/Choice | MR |  |  |  |
| ResponseChoices/Choice/ChoiceLabel | O | A choice number or other identifier for the choice. It may be used to indicate the order or grouping of the choices. | [xs:normalizedString](http://www.w3.org/TR/xmlschema-2/#normalizedString) |  |
| ResponseChoices/Choice/ChoiceContent | M | The text of the choice, such as true, 27, or Important economic and social factors. | [AbstractContentElementType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#AbstractContentElementType) |  |
| ResponseChoices/Choice/CreditValue | O | A numeric value that indicates the amount of credit awarded for choosing the choice. | [xs:float](http://www.w3.org/TR/xmlschema-2/#float) |  |
| ResponseChoices/Choice/Feedback | O | Feedback can be provided for each choice. If a test taker selects this choice, this can provide addition feedback to the student if the choice is correct or not. | xs:string | Use case AI-12 |
| ItemFeedbackCorrect | O | Feedback can be provide for the item if the item is correct. | xs:string | Use case AI-12 |
| ItemFeedbackIncorrect | O | Feedback can be provided for the item if the item is incorrect. | xs:string | Use case AI-12 |
| ItemFeedbackHint | O | A hint is provided to the test taker during testing, either on request or upon an incorrect response as determined by the test design. | xs:string | Use case AI-14 |
| ItemScoreMaximum | O | The maximum item score possible for this item. | [xs:token](http://www.w3.org/TR/xmlschema-2/#token) |  |
| ItemScoreMinimum | O | The minimum item score possible for this item. | [xs:token](http://www.w3.org/TR/xmlschema-2/#token) |  |
| ~~PerformanceLevels~~ | ~~O~~ | ~~Performance Levels are an ordered set of categories that indicate the achievement level of a person on an assessment.~~ | [~~List~~](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#List) | Use case AI-7  Removing all performance level data at item level as this is not relevant. Item rubric references are being added. |
| ~~PerformanceLevels/PerformanceLevel~~ | ~~OR~~ | ~~Defines cut scores for placing students in an appropriate performance level.~~ |  | Use case AI-7 |
| ~~@ LevelName~~ | ~~M~~ | ~~The name of the performance level.~~ | [~~xs:normalizedString~~](http://www.w3.org/TR/xmlschema-2/#normalizedString) | Use case AI-7 |
| ~~PerformanceLevels/PerformanceLevel/ CutScores~~ | ~~O~~ | ~~Score bounds for the performance level.~~ |  | Use case AI-7 |
| ~~@ ScoreMetric~~ | ~~M~~ | ~~The metric or scale used to report the scores.~~ | [~~NCES0056AssessmentReportingMethodType~~](http://specification.sifinfo.org/Implementation/2.4/ExternalCodeSets.html#NCES0056AssessmentReportingMethodType) | Use case AI-7 |
| ~~PerformanceLevels/PerformanceLevel/      CutScores/LowerCut~~ | ~~O~~ | ~~Lower bound for the performance level.~~ | [~~xs:token~~](http://www.w3.org/TR/xmlschema-2/#token) | Use case AI-7 |
| ~~PerformanceLevels/PerformanceLevel/      CutScores/UpperCut~~ | ~~O~~ | ~~Upper bound for the performance level.~~ | [~~xs:token~~](http://www.w3.org/TR/xmlschema-2/#token) | Use case AI-7 |
| AssessmentItemRubrics | O | This identifies all rubrics that may be used to evaluate an item response. Typically used for open ended items (such as essays). | List | Use case AI-7 |
| AssessmentItemRubrics/ AssessmentItemRubric | MR | If this item is scored using a rubric, this will identify the specific rubric used. | IdRefType | Use case AI-7 |
| AssessmentItemBanks | O | An assessment may be part of one or more item banks. | List | Use case AI-8 |
| AssessmentItemBank | MR | Groups the bank id and name |  |  |
| AssessmentItemBanks/ AssessmentItemBank/ AssessmentItemBankId | MR | If the assessment is provided with an item bank, then this will identify the item bank – potentially a unique code or number. | xs:normalizedString | Use case AI-8 |
| AssessmentItemBanks/ AssessmentItemBank/ AssessmentItemBankName | OR | If the assessment is provided with an item bank, then this will be the name of the item bank. | xs:normalizedString | Use case AI-8 |
| AssessmentItemPlatforms | O | This will identify all delivery platforms that this item design will support. | List | Use case AI-9 |
| AssessmentItemPlatforms/ AssessmentItemPlatform | MR | This will identify the specific delivery platform that this item will support. | Values:  Paper  Computer  Mobile  Clicker  Other | Use case AI-9.  Should there be more detail to this, such as PC or MAC, or iPhone or Blackberry, etc. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

## 5.4 AssessmentSection (new object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **AssessmentSection** | **This object will represent a section within an assessment form. Section are used to establish breaks in tests, define item sequencing rules, as well as identifying other assets that may be necessary to successfully present a test to a student. Sections provide the presentation information for the items within the section.** | | | |
| Element/@Attribute | Char | Description | Type | Other Comments |
| @ RefId | M | The GUID that uniquely identifies an instance of the object. | RefId |  |
| SectionVersion | O | This will identify the version of the section that this object represents. New versions of the section will generate new RefIds and therefore new instances of the object. The format of the version number is defined by the assessment provider. | [xs:normalizeString](http://www.w3.org/TR/xmlschema-2/#string) |  |
| SectionPublishedDate | O | This is the date that this version of the section was published (published means made available for use). If the SectionVersion is provided, then this date should also be provided. | xs:dateTime |  |
| SectionIdentifiers | O | This will support a list of section identifiers. | List |  |
| SectionIdentifier | MR | Groups the identifier and type |  |  |
| SectionIdentifiers/ SectionIdentifier/  SectionCode | MR | If the authoring system provides for a unique identification system for sections then this element is used to store that information. | xs:string |  |
| SectionIdentifiers/ SectionIdentifier/ SectionCodeType | MR | This will identify the type of section identifier. | Values are:  Client = assigned by the client – generally a smart number that indicates subject, grade, etc.  Publisher = assigned by the owner  Internal = internal assessment service provider identifier  Other = custom |  |
| SectionName | O | If the authoring system provides for a section name then this element is used to store that information. | Xs:string |  |
| SectionItemSequenceType | M | This specifies how items are presented to the test taker. | Values:  Sequential  Random  Adaptive  Other |  |
| SectionItemSelectionAlgorithmName | O | If the section is a Random or an Adaptive section, then this will identify the name of the algorithm used to select items. | Xs:string |  |
| SectionItemSelectionAlgorithm | O | If this section is a Random or an Adaptive section, then this will specify the location of the Algorithm. | URI |  |
| SectionTimeLimit | O | If this section is timed, then this will identify the maximum amout of time the test taker can spend within this section. | Duration |  |
| SectionSealed | O | Indicates this section is sealed, meaning the test taker cannot enter the section until authorized by the proctor. | Values are:  Y = section is sealed  N = section is not sealed |  |
| SectionReentry | O | Indicates that this section can be re-entered, meaning the test taker can return to this section after they have left the section. A common example of this is a two section test where one section does not allow the use of a calculator and the other does. Typically the test taker cannot return to the non-calculator section after they have used a calculator. | Values are:  Y = section can be re-entered.  N = section cannot be re-entered. |  |
| SectionAssets | O | If this section requires any specific assets that are not defined as part of the items that make up the section and are shared by all items in the section, then they are included here. Examples may be specific tools or informational resources that need to be available to the student such as charts, maps, formulas, etc. that were not defined with any of the items in the section. | List |  |
| SectionAssets/AssessmentAssetRefId | MR | This identifies the specific asset to be included in the section. | RefID |  |
| SectionItems | M | The list will identify all possible items that can be delivered to the student in this section. If this is a sequential section, the only those items in the list will be delivered in sequence. If this is an adaptive section, then all possible items from the item pool available for selection are listed. | List |  |
| SectionItem | MR | This group the elements RefId, sequence and the asset list together. |  |  |
| SectionItems/  SectionItem/ AssessmentItemRefId | MR | This identifies the item to be included in the section. | RefID |  |
| SectionItems/  SectionItem/  ItemSequence | OR | If the section is a sequential section, then this will specify the sequence that this item will appear within the section. Should start at 1 and increment by 1. | xs:token |  |
| SectionItems/  SectionItem/ SectionItemAssets | O | This will list all assets that are unique to this item in this section. This list should not duplicate any assets listed in the SectionAssets list as those will be include with all items. | List |  |
| SectionItems/  SectionItem/ SectionItemAssets/  AssessmentAssetRefId | MR | This will identify the specific asset to be used on this item. | RefID |  |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

## 5.5 AssessmentAsset (new object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **AssessmentAsset** | **This object will represent a content asset that is used to compose an item, referenced by the item but not part of the item content itself, or is content element that is included as part of a section within an assessment form. Assets can be static content elements such as art work or dynamic assets such as tools (calculators as an example).** | | | |
| Element/@Attribute | Char | Description | Type | Other Comments |
| @ RefId | M | The GUID that uniquely identifies an instance of the object. |  |  |
| AssetVersion | O | This will identify the version of the asset that this object represents. New versions of the asset will generate new RefIds and therefore new instances of the object. The format of the version number is defined by the assessment provider. | [xs:normalizeString](http://www.w3.org/TR/xmlschema-2/#string) |  |
| AssetPublishedDate | O | This is the date that this version of the asset was published (published means made available for use). If the AssetVersion is provided, then this date should also be provided. | xs:dateTime |  |
| AssetIdentifiers | O | If the authoring system provides for a unique coding system for assets then this element is used to store that information. | [List](http://www.w3.org/TR/xmlschema-2/#normalizedString) |  |
| AssetIdentifiers/ AssetIdentifier | MR | Groups the id and type together |  |  |
| AssetIdentifiers/ AssetIdentifier/  AssetId | MR | This is will be the specific identifier for this asset. | xs:string |  |
| AssetIdentifiers/ AssetIdentifier/  AssetIdType | OR | This will designate the type of identifier that is provided for this asset. | Values are:  Client = assigned by the client.  Publisher = assigned by the asset owner.  Internal = internal assessment service provider identifier  Other = custom |  |
| AssetName | O | This will provide a name for the asset | xs:string |  |
| AssetType | M | This identifies the type of asset that this object represents. Because there is no industry standard for identifying types of assessment assets, this will be implementation specific. Other custom types should be articulated in your implementation profile. | Values are:   * Reading Passage * Graphic Art * Map * Formula Sheet * Table * Chart * Audio * Video * Scenario * Simulation * Story Board * Lab Set * Periodic Table * Dictionary * Thesaurus * Translation Dictionary * Basic Calculator * Standard Calculator * Scientific Calculator * Graphing Calculator * Protractor * Metric Ruler * English Ruler * Units Ruler * Reading Line * Line Draw * Highlighter * Other Interactive * Other Non Interactive * Other |  |
| AssetOwner | O | The name of the owner (publisher) of the asset. | xs:string |  |
| AssetSubjects | O | This will list all subjects that this asset can be applied. | SubjectAreaList |  |
| AssetGradeLevels | O | This will list all grade levels that this asset can be applied. | GradeLevels |  |
| AssetLanguage | O | This will list the language that this asset is written (if applicable). | NISOZ3953LanguageCodesType |  |
| AssetLearningStandards | O | This will list all learning standards that this asset aligns with. | List |  |
| AssetLearningStandards/  LearningStandardItemRefId | MR | This will identify a specific learning standard for the asset. If the asset is linked to all children learning standards in a hierarchy, then the parent learning standard should also be linked. | RefId |  |
| AssetContent | M | This will contain the actual asset content. Content could be text, images, audio/video, interactive tools, etc. | [AbstractContentElementType](http://specification.sifinfo.org/Implementation/2.4/CommonTypes.html#AbstractContentElementType) |  |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

## 5.5 AssessmentItemReference (new object)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object Name:** | **Object Description:** | | | |
| **AssessmentItemReference** | **This object will allow two items to be “linked” together for various uses. The relationship type element can be used to indicate the purpose of the relationship. Relationships can be used by content management or test delivery systems.** | | | |
| Element/@Attribute | Char | Description | Type | Other Comments |
| @ RefId | M | The GUID that uniquely identifies an instance of the object. | IDRefType |  |
| AssessmentItemRefID | M | This will identify the first item in the relationship. | [RefIDType](http://www.w3.org/TR/xmlschema-2/#string) |  |
| RelatedAssessmentItemRefID | M | This is the item that is related to the first item. | RefIDType |  |
| RelationshipType | M | Indicates the type of relationship. | [Values](http://www.w3.org/TR/xmlschema-2/#normalizedString) are:  Enemy = indicates that the two items are enemies and should not appear on the same test together  Derivative = indicates that the two items were derived from one another (such as language translation) |  |
| SIF\_Metadata | O |  | [SIF\_Metadata](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_Metadata) |  |
| SIF\_ExtendedElements | O |  | [SIF\_ExtendedElements](http://specification.sifinfo.org/Implementation/2.4/DataModel.html#SIF_ExtendedElements) |  |

# **6 Migration Plan (for proposed changes to existing objects only)**

*One of the mandatory components of every Data Model Change proposal is the Migration Plan. This section describes the impact of the proposed change to legacy SIF Zones and the techniques, best practices and deployment guidelines designed to minimize that impact. It is normally filled out in coordination with SIF Staff or an experienced SIF Data Modeler.*

*All migration plans have the same overarching goal: allow an existing SIF Zone to migrate to the new change incrementally ... by changing only one component at a time while maintaining at least the previous level of functionality, and “breaking” nothing in the process.*

*Several common strategies (in order of desirability) are:*

***1. Add new elements rather than modify old ones***

*This places a requirement on new agents to support duplicate entries in order to maintain backwards compatibility with agents conforming to earlier versions of the standard. To use this strategy, there must be a clear mapping provided for agent writers to utilize. This would include mapping any new code set values to the collection of previously existing ones.*

***2. Constrain the impact to the ZIS***

*In this case the ZIS will transparently “bridge” between agents supporting this change and earlier versions. To use this strategy, there must be a clear mapping provided for ZIS vendors to utilize, and at least two vendors must “sign off” on this section of the proposal.*

***3. Reduce the impact***

*This approach is effective for changing only those parts of the SIF specification which have been minimally adopted. Start by mapping the set of changed elements against the CSQ matrices to determine the number of existing SIF-certified applications that will be affected. Work with SIF Staff to alert impacted vendors (those with certified, and where known, uncertified products) and identify the number of sites which will be affected. Depending upon the size of the impact, the change may be accepted for a minor release.*

***4. Extended Elements***

*Use the extended element construct to add the new changes. This has the advantage that it standardizes how the functionality will be introduced, but suffers from the disadvantage that conformance to the changes cannot be easily verified, and a further change will be required when moving forward to the next major release. It is the least desirable way to introduce changes into a minor release, and a strong justification for this approach should be prepared.*

***5. Wait until the next major release***

*Defer the proposed change until the next major release because a clear incremental migration strategy for it cannot be constructed.*

*No certified applications using assessment objects or services.*

**Migration Plan:**

*Using the above techniques or alternative ones, specify the recommended series of incremental component upgrades or deployments (of application, agent or ZIS) which must be performed before the data model changes introduced by this proposal can be successfully incorporated into an existing SIF Zone.*

*The SIF technical board had determined that the proposed breaking changes to the SIF assessment objects in the 2.6 release will be handled as follows:*

1. *The current 2.5 objects will be deprecated in the 2.6 release. Any implementations of the 2.5 objects will continue to work when the 2.6 specification is released.*
2. *The new 2.6 objects will be released as a complete set of new objects and they will all be prefixed with a “sif3:” namespace tag.*

*The following table highlights the breaking changes in 2.6 for those applications that may be “upgrading” from 2.5 to 2.6.*

|  |  |  |
| --- | --- | --- |
| **Component Replaced** | **Increased Functionality (if any)** | **Effect on Legacy components (if any)** |
| Assessment | Making identifiers a list and adding an identifier type. | Any agent or service publishing this object and that is using state, local or publisher identifiers will need to put those identifiers in the list container and add the type designation. |
| AssessmentForm | Making form identifiers a list and adding an identifier type. | Any agent or service publishing this object and that is using form identifiers will need to put those identifiers in the list container and add the type designation. |
| AssessmentItem | Removing mandatory relationship attribute to the AssessmentFormRefId. This will allow the item to stand-alone and be reusable across multiple forms. | Any agent or service publishing this object will need to remove this reference. |
| AssessmentItem | Removing mandatory element ItemLabel. | Any agent or service publishing this object will need to remove this element. |
| AssessmentItem | Removing conditional element Stimulus (should now use reference to AssessmentAsset). | Any agent or service publishing this object will need to remove this element and replace it (if necessary) with reference to the AssessmentAsset. |
| AssessmentItem | Removing option performance level elements (list and associated elements). | Any agent or service publishing this object will need to remove these elements. |

# **7 Issues**

*List any issues surrounding this proposal which the reviewers or approvers may need to consider.*

1. *We have proposed adding the item bank references to the Assessment object. This identification is primarily to support convenience in searching for an assessment (ex: A teacher may want to search for assessments built from the SAT practice item bank). Secondarily, the item bank is a method for securing assessments as well as items. It is common that pre-built assessments may be packaged with an item bank. Users authorized (or licensed) to access the item bank can then use the pre-built assessments. The argument to remove the item bank references from the Assessment object is that they are redundant and can be derived from the item used to build the forms of the assessment. In addition, adding new items to an assessment from a different item bank would cause a change to the Assessment object.*
2. *The SectionTimeLimit values in the AssessmentSection object are being defined of “Duration” type. This will support a variety of time representations. Would a better solution be to make it an integer and require it to be defined in a common metric, suggesting seconds. Would that improve interoperability?*
3. *The proposed changes for versioning of forms, items, sections, and assets do not easily support the ability to 1) find the latest version of an object or 2) find all versions of an object. The author of this proposal did not feel these use cases were necessary for this iteration. During the tech board design review, this topic was resurfaced. The proposed model, as it stands, would require the requesting system to ask for a set of objects by querying on a natural key for the object (all versioned objects support multiple natural keys) and interrogate the published date associated with the version (all versioned objects provide a published date). To get the most recent version, the most recent published date would need to be requested. After further consideration, the author continues to feel that these proposals are sufficient given that:*
   1. *Any additional changes would likely further complicate implementation.*
   2. *That there is likely a high degree of variability between vendor implementations of versioning / numbering.*
   3. *That content management system will likely import content and not leverage SIF traditional events or request/response techniques for obtaining up to date content.*
   4. *The proposed changes satisfy the use cases for knowing which version of objects the student was administered and scored/reported..*

*However, the author will yield to the best thinking of the tech board.*

1. *At the tech board review on Dec 8, 2011 it was requested that we again give further consideration for the “what is the current version” use case. Beyond using the “latest date” technique discussed above, the only other option is to add an addition attributes that designate this occurrence of the object is the most current version. This would require when a new version of an object is published that prior versions also be updated to remove the “current” designation (however that would be identified). The author of this document was trying to reduce the number of touch points for implementing versioning in the applications. After further consideration, the author continues to contend that we implement what has been proposed and then get feedback for those who have implemented versioning to guide future iterations.*

# **8 XML Example(s)**

*One or more examples of XML instances representing the items in the proposed extension should be placed here, as part of work done during the detailed design process.*

*The items in green are either new or altered from the prior version. Items highlighted in yellow were elements that existed in the prior version of the specification but have been added to the sample XML for clarity.*

## 8.1 Assessment

<Assessment RefId="CC2834DE9138FAB032EF399BA72A8234">

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</AssessmentIdentifier>

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</Assessment>

## 8.2 AssessmentForm

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<FormVersion>V1.9</FormVersion>

<FormPublishedDate>2011-12-31T15:23:01</FormPublishedDate>

<AssessmentType>standard</AssessmentType>

<FormName>Form A</FormName>

<FormIdentifiers>

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</AssessmentForm>

## 8.3 AssessmentItem

<AssessmentItem RefId="C294F3E190F019AD8E1DFC8367537EC8"

~~AssessmentFormRefId="9372CB8EA910FF87D5672CAEF01387AA"~~

ResponseType="multiple-choice">

~~<ItemLabel>5</ItemLabel>~~

<ItemVersion>4.13</ItemVersion>

<ItemPublishedDate>2011-12-31T15:23:01</ItemPublishedDate>

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Express the length of side C in terms of A and B.

</TextData>

</Stem>

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</ChoiceContent>

<CreditValue>1.0</CreditValue>

<Feedback>This option is correct, congratulations</Feedback>

</Choice>

<Choice>

<ChoiceLabel>D</ChoiceLabel>

<ChoiceContent>

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</ChoiceContent>

<CreditValue>0.5</CreditValue>

<Feedback>This option is partially correct for reasons xyz</Feedback>

</Choice>

</ResponseChoices>

<ItemFeedbackCorrect>You seem to have a good understanding of xyz concepts

</ItemFeedbackCorrect>

<ItemFeedbackIncorrect>You missed this item and should review xyz concepts

</ItemFeedbackIncorrect>

<ItemFeedbackHint>Consider how the xyz positively impacts abc

</ItemFeedbackHint>

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## 8.5 AssessmentItemReference (new object)

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