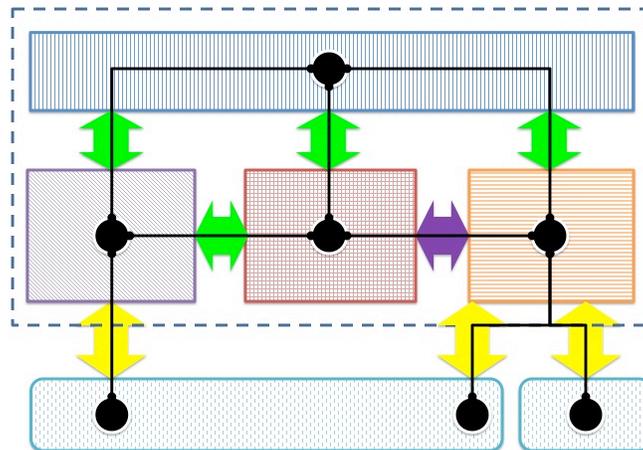


Assessment Interoperability Framework



Use Cases

June 2012

Contents

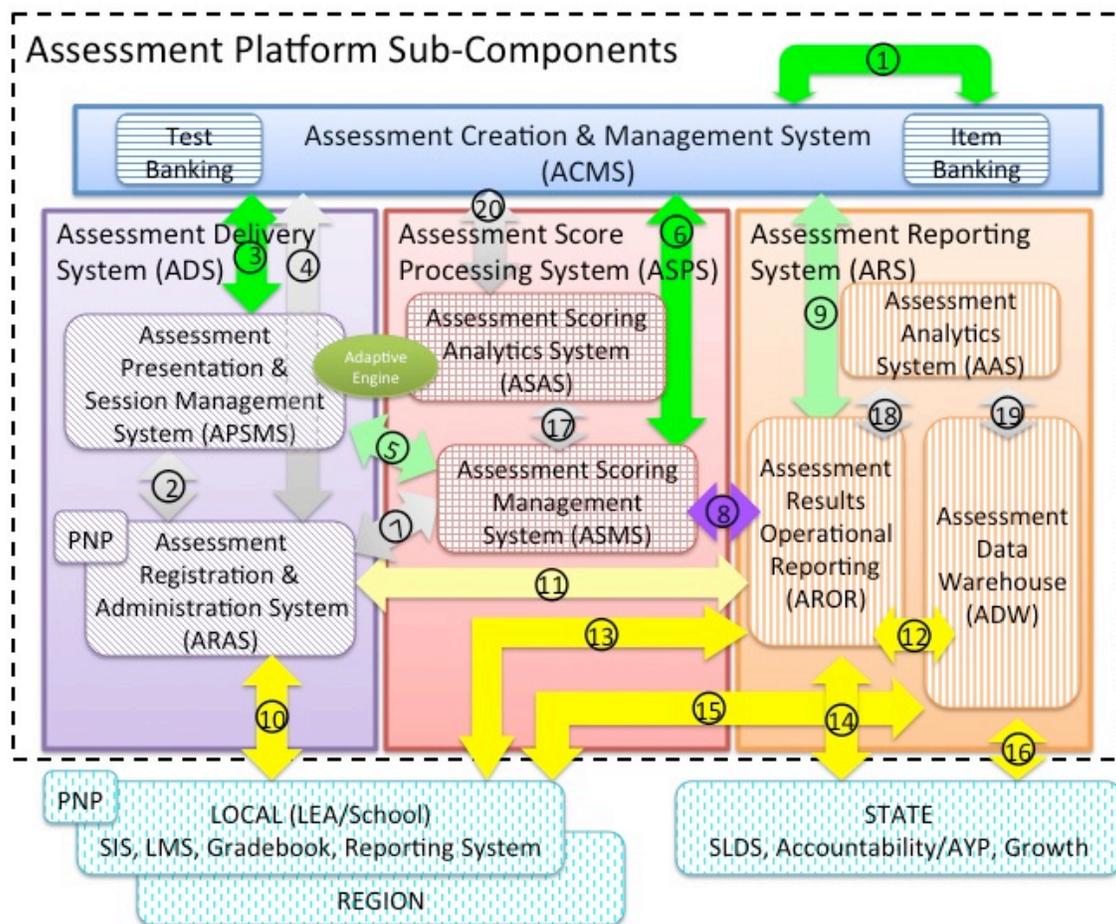
Overview	3
References	3
Assumptions.....	4
Interoperability Use Cases	6
UCAIF-0010 Assessment Item Bank Interoperability.....	6
UCAIF-0020 Assessment Registration.....	9
UCAIF-0030 Assessment Instrument Scoring.....	11
UCAIF-0040 Assessment Results Distribution to Local Information Systems.....	14
UCAIF-0050 Assessment Results Distribution to State Information Systems.....	16
UCAIF-0060 Assessment Scoring Results distributed to Assessment Reporting System	18
UCAIF-0070 Assessment Content distributed to delivery platform	20
UCAIF-0080 Assessment Response information distributed to the Scoring Process (full test submission)	22
UCAIF-0090 Assessment Individual Item Response Scoring (automated score)	24
UCAIF-0091 Assessment Individual Item Response Scoring (professional score)	26
UCAIF-0100 Assessment Delivery Adaptive Scoring Algorithm	28
UCAIF-0110 Updating the Assessment Data Warehouse with Assessment Reporting Results.....	31
UCAIF-0120 Distributing Aggregated Assessment Results to Local Information Systems	33
UCAIF-0130 Distributing Aggregated Assessment Results to State Information Systems.	35
UCAIF-0140 Reporting Detailed Student Registration Data with Assessment Results.....	37
UCAIF-0145 Reporting Most Recent Local Student Record Data with Assessment Results.....	39
UCAIF-0150 Reporting Assessment Content Details with Assessment Results.....	41
UCAIF-0160 Reporting Analytics Recommending Instruction based on Student Performance	43
UCAIF-0170 Reporting Analytics for Teacher Effectiveness	45
UCAIF-0180 Reporting Analytics Determine Program / Course / Curriculum Effectiveness	47
UCAIF-0190 Scoring Analytics Determining Scale Tables, Cut Scores, etc.....	49
UCAIF-0200 Scoring Analytics Determining Scoring Keys/Algorithms are Correct.....	51
Definitions.....	53

Overview

Use Cases for the Assessment Interoperability Framework (UCAIF) are specific interoperability use cases derived from the end-user use cases and system architectures developed by the SBAC and PARCC consortia that will be addressed by the AIF working group when determining how interoperability standards will be applied. Interoperability use cases are generally use cases that identify specific system interactions or interfaces that are required to enable the modular or component-based implementations of assessment platforms in support of RTTA. In other words, the actors in interoperability use cases are more likely to be systems rather than people/humans.

References

The following AIF wiring diagram (from the AIF definition and requirements document) is used to cross reference use cases to specific system connection points (i.e. arrows). The diagram is provided below for convenience.



The arrows are color coded as follows:

Bright Green Arrows (#s 1, 3, 6) – Where IMS APIP Assessment Content standards are to be applied for content portability. The transport layer for these exchanges will likely use existing techniques and

Assessment Interoperability Framework Use Cases

technologies. For arrow 1, this will likely be manually triggered and will utilize sFTP or other batch oriented transport technologies for Phase 1.

Light Green Arrows (#s 5, 9) – Where IMS APIP Assessment Content standards are likely to be applied but may not be a priority for phase 1 of this framework. Transport techniques/technologies will be determined in subsequent phases.

Bright Yellow Arrows (#s 10,12,13,14,15,16) – Where the SIF data model and the SIF transport standards are to be applied for data interoperability. Application of the SIF transport will be optional.

Light Yellow Arrows (# 11) – Where the SIF data model and optionally the SIF transport standards are likely to be applied but may not be a priority for phase 1 of this framework.

Bright Purple Arrows (# 8) – Determined to be a priority interoperability point in the framework but consensus was not achieved by the small working group. Possible candidate standards for this interoperability point are:

- 1) The IMS QTI Results Reporting Standard (http://www.imsglobal.org/question/qtiv1p2/imsqti_res_bestv1p2.html) and
- 2) The SIF Assessment Reporting standards (<http://specification.sifassociation.org/Implementation/US/2.5/html/AssessmentWorkingGroup.html#AssessmentWorkingGroup>).

For a discussion on these options, see the arrow 8 item in the Interoperability Requirements Statements section of this document.

Light Gray Arrows (#s 2,4,7) – Not a priority for phase 1 and was not discussed in enough detail to determine best interoperability standard options. All supporting documentation is available on the AIF collaboration site.

Other source documents can be found at:

Document	Link
Assessment Interoperability Framework	http://community.sifinfo.org/sites/aif/Shared Documents/Current Documents
SBAC use cases	http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/02/Smarter_IT-Systems_WorkshopDeliverables_120120.pdf
SBAC architecture	http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/03/SmarterBalanced_ArchitectureReport_120321.pdf
PARCC use cases	Estimated release in June 2012
PARCC architecture	Yet to be released

Assumptions

The list below contains the overall assumptions used to form these use cases.

- The use cases will not prescribe specific technical implementations.

Assessment Interoperability Framework Use Cases

- The use cases will define requirements that can be used by designers/implementers to determine best-fit technologies.
- The use cases will not define every data element or attribute that must be exchanged in the interoperability interface unless that level of specificity is necessary to clearly define the use case. In general, categories or domains of data will be listed with some examples to provide clarity.

Interoperability Use Cases

The following interoperability use cases are identified by the working group.

Note: each use case will contain a diagram illustrating the use case. The use case is represented by a green dog eared box. The number of the use case is repeated in the box. Related use cases may also be represented in a single diagram. Use case boxes that are grey represent use cases that may be “activated” or follow the use case being described.

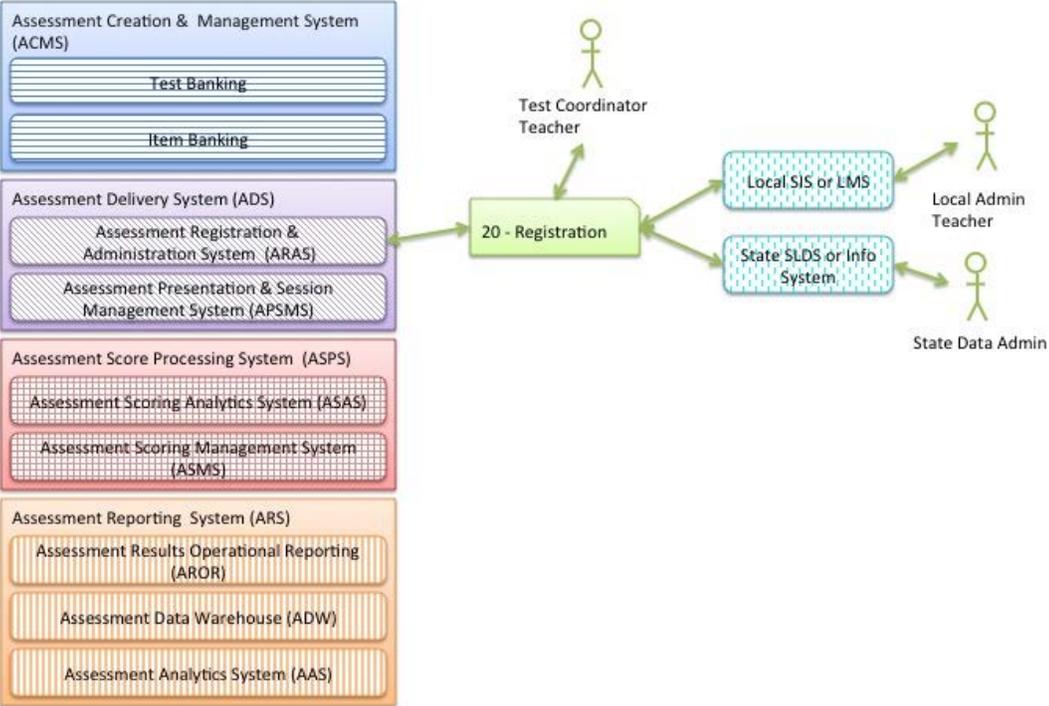
Use Case ID and Name	UCAIF-0010 Assessment Item Bank Interoperability
Use Case Description	Assessment content can be efficiently exchanged between item banking solutions with minimal manual intervention or editing of the content. The exchange may include all or portions of the data and content identified below.
Diagrams	
Applicable Scenarios	<ul style="list-style-type: none"> • Organization A is developing items that will be administered by Organization B. A sends B the items after they have been developed. • Organization A sub-contracts with organization B to add accessibility extensions to items. A send B items, B adds accessibility information, B sends A updated items. • The consortium provides a centralized item bank that each state can pull from (or the consortia can push to the state) for inclusion in their state programs.

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • A consortium has a contract with Organization A's item banking capability. At the end of the contract, the consortium awards a new contract to organization B. A sends B all items, assessments, statistics, etc. • The consortium releases items from the summative item bank for use in local assessments. LEA pulls items from the consortium's centralized item bank (or the consortia pushes items to the local item bank) for inclusion in their local benchmark platform.
Actors	<ul style="list-style-type: none"> • Sending Item Bank • Receiving Item Bank
Pre-Condition	<ul style="list-style-type: none"> • Assessment content (items, instruments, etc.) is ready to be transferred in the sending item bank.
Processing	<ul style="list-style-type: none"> • The sending item bank exports and packages desired content into the desired interoperable exchange format. • Content packages are transmitted from sending item bank host system to receiving item bank host system. • Receiving item bank host system inspects content for adherence to interoperability exchange format and handles anomalies appropriately. • Receiving item bank imports content into item bank.
Post-Conditions	<ul style="list-style-type: none"> • Content is now ready for use including reviews, edit, extensions, assessment instrument creation, passing of instruments to delivery system, etc.
Triggers	This process is likely triggered manually when an item bank or content is ready for exchange.
Exceptions	<ul style="list-style-type: none"> • Content packages are malformed <ul style="list-style-type: none"> ○ Receiving item bank import process will identify and handle malformed content appropriately for that application • Content is not supported by current standards and custom extensions have been implemented <ul style="list-style-type: none"> ○ Exchanging parties have identified the custom extensions and both parties have agreed on how to handle and process. • Content is not supported by current standards and a proprietary format is exchanged. <ul style="list-style-type: none"> ○ Exchanging parties have identified the proprietary content and both have agreed on how to handle and process.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	The SBAC architecture does not specifically address item bank to item bank interactions but does address item bank to test bank interactions.
AIF framework references	This is represented by Arrow 1 of the AIF wiring diagram
Expected Use of Interoperability Standard	APIP
Expected Data or Content Requirements	<p>Note: depending upon the nature of the exchange, some or all of the following may be included.</p> <ul style="list-style-type: none"> • Default item content • Accessibility extensions to default item content

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • Shared content (passages, charts, art, etc.) • Accessibility extensions to shared content • Feedback (correct, incorrect, distracter, diagnostic, etc.) • Assessment section definitions and packages • Assessment instrument definitions and packages • Scoring information for items (keys, rubrics, etc.) • Scoring information for assessments and sub-tests (item to sub-test composition, weights, performance levels, score tables, etc.) • Assessment and sub-test to learning standard alignment/references • Item to learning standard alignment/references • Content author, copyright, etc. • Item performance statistics
Expected Transport Requirements	<ul style="list-style-type: none"> • Asynchronous file exchanges. SFTP could be used. • Must be a secure transfer (content cannot be intercepted). • Likely very large content packages (audio, video, graphic art, etc.).
Other assumptions or issues	

Use Case ID and Name	UCAIF-0020 Assessment Registration
Use Case Description	To identify all students that will be participating in an assessment administration, the assessment registration data will be collected from all LEAs/schools participating in the administration.
Diagrams 	
Applicable Scenarios	<ul style="list-style-type: none"> • LEA SIS provides necessary registration information to the assessment registration system for an interim assessment. • LEA SIS provides necessary registration information to the SEA data warehouse. The SEA data warehouse then provides the registration information to the assessment registration system.
Actors	<ul style="list-style-type: none"> • Local Information System (SIS) • SEA Data Warehouse • Assessment Registration System
Pre-Condition	<ul style="list-style-type: none"> • All of the student, school, LEA and teacher information have been entered into the SIS and/or Data Warehouse. • An administration of an assessment(s) has been identified.
Processing	<ul style="list-style-type: none"> • The necessary information for registration has been captured by the local SIS or the state data warehouse. • Assessment administration system queries the local SIS or the state data warehouse for students ready to take the assessment. • Necessary registration information is transmitted from the local SIS or the state data warehouse.

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • The assessment registration system accepts the data and information. • The assessment registration system notifies the assessment administration system the students that will be taking which administration of which assessment.
Post-Conditions	<ul style="list-style-type: none"> • The students are registered for a specific administration(s) of an assessment.
Triggers	<ul style="list-style-type: none"> • This process is most likely triggered after the administration of an assessment(s) has been identified.
Exceptions	<ul style="list-style-type: none"> • A student shows up for the assessment and has not been registered (e.g. A new student). This student would have to be manually entered into the registration system.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • SBAC – Test Delivery (p. 42 of SMARTER Balanced Architecture Workshop Deliverables)
AIF framework references	This is represented by Arrow 10 of the AIF wiring diagram
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student Demographic Information • Student Personal information – first name, last name, id, grade, etc. • School and LEA ID • IDEA, Title1, Economic Disadvantage, ELL, Section 504, Immigrant • Assessment Administration Information – name, form, date, time, etc. • Staff information • Student accommodations needed for assessment
Expected Transport Requirements	<ul style="list-style-type: none"> • Must be a secure transfer (content cannot be intercepted). • SIF Infrastructure (ZIS) or Bulk transport
Other assumptions or issues	That the assessment registration system will house the student information as the “official record” (snapshot) of the student at the time of testing.

Use Case ID and Name	UCAIF-0030 Assessment Instrument Scoring
Use Case Description	<p>To support the scoring and analysis of an assessment instrument, appropriate data must be exchanged between the item banking system, scoring analytics, and scoring systems. The data typically includes information about the assessment instrument, delivery modes , configuration data for packages, forms, and items and item groups, sub-test or strand item relationships, score tables for score conversions, cut-scores and performance levels, as well as score calculation data.</p>
Diagrams	
Applicable Scenarios	<ul style="list-style-type: none"> • Assessment, forms, and items with their scoring and historical performance information need to be shared by multiple organizations that jointly provide the item banking, analytics and scoring functions. • Organization A is subcontracted by a state or consortia to provide assessment analysis, and needs to import historical assessment performance and statistical data from Organization B. • Organization A needs to export historical assessment performance and statistical data to Organization B at the end of the contract of Organization A.
Actors	<ul style="list-style-type: none"> • Assessment Creation and Management System (Item banking system) • Assessment Score Processing System • Assessment Scoring Analytics System
Pre-Condition	<ul style="list-style-type: none"> • New assessment, forms, items have been added to the item banking

Assessment Interoperability Framework Use Cases

	<p>system and approved for operational use.</p> <ul style="list-style-type: none"> All scoring information and rules have been created and are available with the items and assessment instrument in the item banking system.
Processing	<p>For Post-Equated Assessments:</p> <ol style="list-style-type: none"> Item banking system provides scoring information to a scoring process based on pre-determined scoring process. Online delivery or paper-based imaging system sends test responses to the scoring system. Scoring system creates raw scores and invokes analytics system. Analytics system performs scaling and returns scale score tables and weights to scoring system Analytics system establishes cut scores for performance levels and returns those to the scoring system Scoring system calculates scaled score and performance levels for each test taken. <p>For Pre-Equated Assessments:</p> <ol style="list-style-type: none"> Analytics system receives historical test performance and statistical data and calculates weights. Item banking system sends notification to analytics system notifying it of new assessment entity (item/form/package). Analytics system sends weights to item banking system for a given item/form. Scoring system retrieves items, keys and weights from item banking system, and is ready to produce raw and scaled scores for the assessment.
Post-Conditions	<ul style="list-style-type: none"> Scales are created and tests can be scored. All scores have an individual assessment have been determined and are available for reporting.
Triggers	<ul style="list-style-type: none"> Item banking system sends notifications to scoring and analytics systems regarding significant events. Systems receiving the notification can choose to invoke relevant interface hosted by item banking system to pull data, or item banking system could push data by invoking interfaces hosted by such systems. Scoring system has all necessary assessment, form, and item scoring data (ex: pre-equated) and receives a new set of responses from a test taker. The scoring system immediately scores the assessment.
Exceptions	<ul style="list-style-type: none"> Content is not supported by current standards and a proprietary format is exchanged. Exchanging parties have identified the proprietary content and both have agreed on how to handle and process. Scoring process has received response data from the delivery system but does not have all scoring information necessary to score the assessment (ex: post-equated). The scoring system should hold responses until scoring can be completed. Scoring process may generate preliminary results before all scoring is final. Scoring process may need to hold scores and not release them to the

Assessment Interoperability Framework Use Cases

	reporting system until scores have been approved.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • A Consortium selects one vendor to support centralized item banking and another to support scoring/analytics. • A Consortium selects multiple scoring vendors (for example one to do multiple choice and another to score constructed response items).
AIF framework references	This is represented by Arrow 6 of the AIF wiring diagram
Expected Use of Interoperability Standard	APIP
Expected Data or Content Requirements	<p>Note: depending upon the nature of the exchange, some or all of the following may be included.</p> <ul style="list-style-type: none"> • Test and form code(s) or identifiers (All Tests supported by the program) • Delivery mode(s) (All delivery modes supported by the program) • Configuration data for packages • Configuration data for forms • Configuration data for items • Item response and scoring rules, keys, sub-test definitions, etc. information • Weights • Admin info (ex: start date, end date, name, description) • Data concerning problematic Items that have been removed from form (ex: reason, action, etc) and their associated replacement Item data
Expected Transport Requirements	<ul style="list-style-type: none"> • Secure Synchronous and Asynchronous interfaces for file-based and real-time transactions
Other assumptions or issues	

<p>Use Case ID and Name</p>	<p>UCAIF-0040 Assessment Results Distribution to Local Information Systems</p>
<p>Use Case Description</p>	<p>To disseminate results from an assessment(s) that students have taken. All information will be distributed from the Assessment Results Operational Reporting.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • Interim assessment data is sent to the local instructional management system for instructional planning. • Summative assessment data is sent to the local reporting system for longitudinal analysis.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Results Operational Reporting System • Local Information Systems (SIS, Grade book, LMS, etc.)
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The students have taken the assessment, the assessment has been scored and the results have been processed in the Assessment Results Operational Reporting System.
<p>Processing</p>	<ul style="list-style-type: none"> • The scores are received from the Assessment Scoring Management System. • Additional data is received from the Assessment Registration & Administration System and the Assessment Creation and Management System and the Assessment Analytics System. • The scores are analyzed and transformed into needed reports. • The reports are sent to Local and State Information Systems.
<p>Post-Conditions</p>	<ul style="list-style-type: none"> • Operational reports are generated and sent to the appropriate information systems for reporting out and use of data.

Assessment Interoperability Framework Use Cases

Triggers	<ul style="list-style-type: none"> • Upon completion of assessment scoring, the Assessment Scoring Management System sends scores to the Assessment Results Operational Reporting System. • In addition, upon completion of the assessment, the Assessment Registration & Administration System and the Assessment Creation and Management System and the Assessment Analytics System send the data to the Assessment Results Operational Reporting System.
Exceptions	
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • Student Epic – p.14 of SMARTER Balanced Architecture Workshop Deliverables
AIF framework references	This is represented by Arrow 13 of the AIF wiring diagram
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student Scores • Student responses • Student personal information (name, etc.) • Assessment Registration • Assessment Administration • Sub test Reporting information (statistics, summary information, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> • Must be a secure transfer (content cannot be intercepted). • SIF Infrastructure (ZIS) or Bulk transport
Other assumptions or issues	<ul style="list-style-type: none"> • Different reports and data will be sent to the Local and State Information Systems.

<p>Use Case ID and Name</p>	<p>UCAIF-0050 Assessment Results Distribution to State Information Systems</p>
<p>Use Case Description</p>	<p>To disseminate results from an assessment(s) that students have taken. All information will be distributed from the Assessment Results Operational Reporting.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • Assessment data is sent to the SLDS for accountability purposes. • Assessment data is sent to the SLDS for graduation requirements. • Assessment data is sent to the SLDS for end of course exams.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Reporting System • State Information System (SLDS, Accountability)
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The students have taken the assessment, the assessment has been scored and the results have been processed in the Assessment Results Operational Reporting System.
<p>Processing</p>	<ul style="list-style-type: none"> • The scores are received from the Assessment Scoring Management System. • Additional data is received from the Assessment Registration & Administration System and the Assessment Creation and Management System and the Assessment Analytics System. • The scores are analyzed and transformed into needed reports. • The reports are sent to Local and State Information Systems.
<p>Post-Conditions</p>	<ul style="list-style-type: none"> • Operational reports are generated and sent to the appropriate information systems for reporting out and use of data.

Assessment Interoperability Framework Use Cases

Triggers	<ul style="list-style-type: none"> • Upon completion of assessment scoring, the Assessment Scoring Management System sends scores to the Assessment Results Operational Reporting System. • In addition, upon completion of the assessment, the Assessment Registration & Administration System and the Assessment Creation and Management System and the Assessment Analytics System send the data to the Assessment Results Operational Reporting System.
Exceptions	<ul style="list-style-type: none"> •
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	TBD
AIF framework references	This is represented by Arrow 14 of the AIF wiring diagram
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student Scores • Student responses • Student personal information (name, etc.) • Assessment Registration • Assessment Administration • Sub test Reporting information (statistics, summary information, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> • Must be a secure transfer (content cannot be intercepted). • SIF Infrastructure (ZIS) or Bulk transport
Other assumptions or issues	Different reports and data will be sent to the Local and State Information Systems.

<p>Use Case ID and Name</p>	<p>UCAIF-0060 Assessment Scoring Results distributed to Assessment Reporting System</p>
<p>Use Case Description</p>	<p>After an individual test taker assessment has been scored, the resulting data will be shared with the reporting systems for further analysis and distribution.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • For formative assessments, assessments results are typically available for reporting immediately after scoring is complete. • For summative assessments scores may be held for review and approval prior to distribution to the reporting system. • For some programs, the scoring system may release “preliminary” results prior to final results being available. In other words, there would be two or more “waves” of results.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Scoring System • Assessment Reporting System
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The assessment has been administered to a test taker. • The assessment has been scored (either preliminary or final).
<p>Processing</p>	<ul style="list-style-type: none"> • The assessment scoring process packages the assessment results for delivery to the reporting systems. • The assessment scoring process transmits the assessment results to the reporting system. • The reporting system receives the results.
<p>Post-Conditions</p>	<ul style="list-style-type: none"> • The assessment results are ready for reporting.

Assessment Interoperability Framework Use Cases

Triggers	<ul style="list-style-type: none"> • When an individual assessment has been scored – formative • After approval of scoring has occurred – summative
Exceptions	
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • User Roles and Goals of SMARTER Balanced Architecture Workshop Deliverables
AIF framework references	This is represented by Arrow 8 of the AIF wiring diagram
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Test taker identifiers and demographics • Assessment, form, item identifiers • Applicable Scores - Raw, Scale, Percentiles, or other derives scores • Total test scores and sub-test or strand scores • Performance levels/indicators • Links/references to learning standards • Feedback • Recommendations for remediation
Expected Transport Requirements	<ul style="list-style-type: none"> • For formative assessments or summative assessment where real-time results are provided <ul style="list-style-type: none"> ○ Secure ○ Synchronous ○ Guaranteed delivery • For summative assessment where scores are held for approval or scores are held until all assessments are scored <ul style="list-style-type: none"> ○ Secure ○ Asynchronous
Other assumptions or issues	<ul style="list-style-type: none"> • In the case of summative assessments where scores are held for approval prior to be released in reports or data files, which component is responsible for “holding” the results until approvals have been made may be an implementation decision. Possible examples are that the scoring system holds the scores and does not provide them to reporting. Alternatively, scoring could provide the results to the reporting system and the reporting system is responsible for holding results until approvals have been made.

<p>Use Case ID and Name</p>	<p>UCAIF-0070 Assessment Content distributed to delivery platform</p>
<p>Use Case Description</p>	<p>After assessment items have been developed and assessment instruments (tests/forms) have been created using the assessment authoring capabilities of the Assessment Creation & Management System (ACMS), the ACMS must prepare and package the assessment content and assessment instrument structural information and transfer it to the Assessment Presentation System for delivery to the test taker. Content packages will be “optimized” for each delivery platform, be that a computer, tablet, clickers, mobile, or paper-based delivery system.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The consortia assessment content providers have created all summative assessment content and instrument structures. The consortia provide all information to the target delivery platform providers for administration. • States have received assessment content from the consortia and have imported that content to their proprietary assessment platform. The states extend the assessment to meet their own needs. The states then package their content for the target delivery platform.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Creation and Management System • Assessment Presentation (i.e. delivery) System
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • All item content, with required accessibility extensions, has been developed.

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • All shared content, with required accessibility extensions, has been developed. • All necessary item/test performance information (statistics) that is needed for delivery are available. • All necessary tools (calculators, rulers, compass, etc.) have been identified and developed. • Assessment instruments (tests/forms), with required accessibility extensions, have been developed. • Any necessary formatting templates or style guides are developed.
Processing	<ul style="list-style-type: none"> • The ACMS collects all necessary content required for the assessment instrument from the item bank. • The ACMS prepares and packages the assessment content, instrument structural information, tools, and templates/style guides. • The ACMS provides the packaged information to the target delivery platform.
Post-Conditions	<ul style="list-style-type: none"> • The delivery system has all required content, structure, data/meta-data about the content, formatting information, and scoring information (for adaptive testing) necessary to delivery the assessment
Triggers	<ul style="list-style-type: none"> • This is typically triggered when an assessment has been built and is ready for deployment (delivery).
Exceptions	<ul style="list-style-type: none"> • Not all content, data, or meta-data elements are available to complete the test package.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • Interoperability Discussion of SMARTER Balanced Architecture Workshop Deliverables
AIF framework references	This is represented by Arrow 3 of the AIF wiring diagram
Expected Use of Interoperability Standard	TBD
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Item content plus accessibility extensions • Item data and meta-data (statistics) • Item scoring information (adaptive) • Assessment structure (sections, navigation, tools, etc.) • Formatting information (templates, style guides, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> • For summative assessments, asynchronous processing would be acceptable. • For formative assessments, teachers may author tests and wish to deliver them immediately.
Other assumptions or issues	<ul style="list-style-type: none"> • At this time, it is not expected that the standards would support the full composition of an assessment in one organizations item bank to publish directly to another organizations delivery system without very close coordination between the two organizations. The more likely scenario is that the content will be exchanged between each organizations item banks and then published to the delivery system for each organization.

<p>Use Case ID and Name</p>	<p>UCAIF-0080 Assessment Response information distributed to the Scoring Process (full test submission)</p>
<p>Use Case Description</p>	<p>After a test taker has worked their way through the assessment and has submitted their test for scoring, all response data collected from the test taker will be transmitted to the scoring process for evaluation. Note that the delivery system may perform some scoring such as in the case of an adaptive test.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> This process is used when the delivery system does not perform all scoring and a separate post-test scoring process completes the scoring activity. NOTE: if the delivery system performs all scoring, including scaling, performance level determination, etc. and no further scoring is required, then this use case may not be applicable.
<p>Actors</p>	<ul style="list-style-type: none"> Assessment Presentation (i.e. delivery of SMARTER Balanced Architecture Workshop Deliverables of SMARTER Balanced Architecture Workshop Deliverables System Assessment Scoring Process
<p>Pre-Condition</p>	<ul style="list-style-type: none"> The test taker has taken the assessment and has submitted their assessment for scoring.
<p>Processing</p>	<ul style="list-style-type: none"> The delivery system collects all response data and including other response related data (such as time-on-task, number of attempts, tools used, etc.) The delivery system collects any item or assessment level scoring

Assessment Interoperability Framework Use Cases

	<p>information that may have been derived while testing (ex: adaptive tests).</p> <ul style="list-style-type: none"> • All information is packaged into standard exchange format. • The delivery system transmits the responses to the scoring process.
Post-Conditions	<ul style="list-style-type: none"> • The scoring process has received all response (and score) data from the delivery system and is ready to begin the scoring process.
Triggers	<ul style="list-style-type: none"> • The test taker submitting their assessment for final scoring. • The proctor (or other administrator) has marked the test as complete on behalf of the test taker and has submitted the assessment for final scoring (this may be in the case of cheating or the test taker got sick and had to leave before submitting).
Exceptions	<ul style="list-style-type: none"> • For paper administered tests, it may not be possible to determine the form of test taken and therefore a “best form” score option is provided.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • Test Creation and Delivery of SMARTER Balanced Architecture Workshop Deliverables
AIF framework references	<p>This is represented by Arrow 5 of the AIF wiring diagram</p>
Expected Use of Interoperability Standard	<p>TBD</p>
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Item response data (choices, text, dragger positions, hot spots selected, line graphs, etc.) • Item interaction data (time-on-task, number of attempts, tools used) • Item score data (right/wrong, score) • Assessment score data (ex: ability level, confidence interval, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> • Synchronous message • Guaranteed delivery • Not intercept able or modifiable
Other assumptions or issues	<ul style="list-style-type: none"> • For summative assessments, it is expected that the delivery platform will not perform all scoring activities, even for adaptive testing. It is expected that, at a minimum, final score scaling and performance level cut scoring will occur post-test. • Any items requiring human evaluation will require post-test scoring • AI scoring may be performed by the delivery platform but it is expected that some percentage of items will not be score-able by the algorithm and will require human evaluation.

<p>Use Case ID and Name</p>	<p>UCAIF-0090 Assessment Individual Item Response Scoring (automated score)</p>
<p>Use Case Description</p>	<p>When the assessment program is using an automated scoring engine (such as an AI engine) to evaluate individual test taker responses, the delivery or scoring process must present the test taker response for that item to the scoring engine for evaluation. After evaluation, the scoring engine must return the resulting scores or status values to the delivery or scoring process.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The test taker is taking a test and enters an essay and the delivery system submits the essay for scoring engine immediately and provides feedback before proceeding to the next item – likely the formative assessment model. • The test taker has taken an assessment which includes an essay and is submitting the entire assessment for scoring. The scoring process submits the essay to the scoring engine for processing. This is likely the summative assessment model. <p>Note: these scenarios discuss essay scoring but this use case is for any open ended item that can be scored using an automated (AI) scoring engine. This could include short responses, math equations, or other types of responses.</p>
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Presentation (i.e. delivery) System • Assessment Scoring Process • Automated (AI) scoring engine
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The item has been developed and a scoring rubric has been built

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> The scoring engine has been “trained” on the scoring item and rubric. This may require human scoring to identify sample paper for each score point. An individual item response is ready to be scored.
Processing	<ul style="list-style-type: none"> The delivery or scoring process packages the item response and other item identification information The item response is submitted to the scoring engine for evaluation The scoring engine evaluates the response The scoring engine returns the score to the originating system
Post-Conditions	<ul style="list-style-type: none"> The delivery or scoring system has received the score from the scoring engine and is ready to proceed to the next step
Triggers	<ul style="list-style-type: none"> Scenario 1: the test taker has entered a response while taking a test and has submitted that response for scoring Scenario 2: the scoring process has submitted a response for scoring
Exceptions	<ul style="list-style-type: none"> The scoring engine could not score the item The scoring engine has noted an alert situation (abuse, suicide, etc.)
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> Smarter Balanced Architecture Report p. 49 swim lane diagram
AIF framework references	<ul style="list-style-type: none"> For adaptive testing or where the delivery platform is also performing scoring, then this is represented by arrow 5 in the AIF wiring diagram. For post-test delivery scoring (after test taker has submitted test for scoring) this is not specifically addressed by the AIF wiring diagram. This interoperability interface lives within the Assessment Scoring Management System component.
Expected Use of Interoperability Standard	TBD
Expected Data or Content Requirements	<ul style="list-style-type: none"> Item (or prompt) identifiers Test taker identifiers Test attempt identifiers Item response data Item interaction data (time on task) Item scoring rubric
Expected Transport Requirements	<ul style="list-style-type: none"> For scoring during delivery <ul style="list-style-type: none"> Near real-time scoring Synchronous Secure For post-test scoring process <ul style="list-style-type: none"> Asynchronous Secure
Other assumptions or issues	

<p>Use Case ID and Name</p>	<p>UCAIF-0091 Assessment Individual Item Response Scoring (professional score)</p>
<p>Use Case Description</p>	<p>When the assessment program is using a distributed human scoring process to evaluate individual test taker responses, the delivery or scoring process must present the test taker response for that item to the distributed scoring process for evaluation by a human reader. After evaluation, the scoring process must return the resulting scores or status values to the delivery or scoring process.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The test taker has taken an assessment which includes an essay and is submitting the entire assessment for scoring. The scoring process submits the essay to the distributed scoring process for evaluation. • The teacher is evaluating student responses. <p>Note: these scenarios discuss essay scoring but this use case is for any open ended item. This could include short responses, math equations, or other types of responses.</p>
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Presentation (i.e. delivery) System • Assessment Scoring Process • Distributed scoring process
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The item has been developed and a scoring rubric has been built • The human readers have been “trained” on the scoring item and rubric. • An individual item response is ready to be scored.
<p>Processing</p>	<ul style="list-style-type: none"> • The delivery or scoring process packages the item response and other

Assessment Interoperability Framework Use Cases

	<p>item identification information</p> <ul style="list-style-type: none"> • The item response is submitted to the distributed scoring process for evaluation • The distributed scoring process presents the response to a human reader for evaluation • The human reader enters a score • The distributed scoring process returns the score to the originating system
Post-Conditions	<ul style="list-style-type: none"> • The scoring system has received the score from the distributed scoring process and is ready to proceed to the next step
Triggers	<ul style="list-style-type: none"> • The scoring process has submitted an individual item response for scoring
Exceptions	<ul style="list-style-type: none"> • The assessment program requires 2 readers to score the item. • The assessment program requires 2 readers plus adjudication. • The item response contains content that requires alerting (abuse, suicide, etc.)
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> • SMARTER Balanced Architecture Workshop Deliverables p. 16
AIF framework references	<ul style="list-style-type: none"> • This is not specifically addressed by the AIF wiring diagram. This interoperability interface lives within the Assessment Scoring Management System component. However, arrows 5 and 17 may have relationships to this use case.
Expected Use of Interoperability Standard	TBD. Must identify what the delivery system needs to output to deliver to the professional scoring process to complete successfully.
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Item (or prompt) identifiers • Test taker identifiers • Test attempt identifiers • Item response data • Item interaction data (time on task)?? • Item scoring rubric?? • Item statistics (characteristics)??
Expected Transport Requirements	<ul style="list-style-type: none"> • Asynchronous • Secure
Other assumptions or issues	

<p>Use Case ID and Name</p>	<p>UCAIF-0100 Assessment Delivery Adaptive Scoring Algorithm</p>
<p>Use Case Description</p>	<p>For adaptive testing, the test delivery system must call upon an adaptive algorithm to determine the next item to present to the test taker. Different assessments or assessment programs may call upon various algorithms that are optimal for each assessment. The delivery system must provide a standard interface so that different algorithms can be easily connected and called upon by the delivery system.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The consortia have contracted with organizations to develop adaptive algorithms and wishes to field test different algorithms on the assessments • The consortia have developed math and reading adaptive algorithms. • A state wishes to use a different algorithm than the consortia have provided. • A new/improved algorithm was developed and the consortia wish to replace the algorithm without changing the delivery platform or item bank.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Presentation (i.e. delivery) System • Assessment Scoring Process – Adaptive engine
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The algorithm(s) have been developed • The item banks have been built with the necessary number of items and the items have the necessary performance (statistical) information and

Assessment Interoperability Framework Use Cases

	<p>this is available to the delivery platform</p> <ul style="list-style-type: none"> • The delivery system has “connected” with the algorithm and the connection has been tested/verified • The test taker has started the assessment and has entered an adaptive section of the assessment
Processing	<ul style="list-style-type: none"> • The delivery system initializes the algorithm • The delivery system determines the first item to present to the test taker • The test taker answers the question • The delivery system determines item correctness/score • The delivery system calls the adaptive algorithm to determine next item to present to test taker or if stopping conditions have been met • The delivery system presents the next item to the test taker • If stopping conditions have not been met, repeat at test taker answers the question step
Post-Conditions	<ul style="list-style-type: none"> • The adaptive section is complete and any score information from the adaptive section is available
Triggers	<ul style="list-style-type: none"> • The test taker has started an assessment and has entered an adaptive section.
Exceptions	<ul style="list-style-type: none"> • Some adaptive tests may allow for test takers to review answers at different intervals throughout the test. • Adaptive testlets will behave in a similar manner but each individual item is substituted with a small fixed set of items.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by arrow 5 in the AIF wiring diagram.
Expected Use of Interoperability Standard	There is some concern that this interaction is too complex and too variable across implementations to standardize and should not be attempted at this time.
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Item identifiers • Item meta-date (ex: learning standard alignment) • Item performance data (statistics – such as 3 parameter model) • Algorithm configuration data (ex: stopping conditions, item exposure rules, content balancing rules, field test item insertion rules, etc.) • Item exposure controls (this might include any prior assessment administrations for this individual test taker – i.e. the test taker cannot see the same item twice across administrations). • Current score (ability level) • Item score (as each item is answered and scored by the delivery system)
Expected Transport Requirements	<ul style="list-style-type: none"> • Real-time • Secure
Other assumptions or issues	<p>Assumptions:</p> <ul style="list-style-type: none"> • The adaptive engine does not score the individual items, the algorithm receives a score value from the delivery platform.

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none">• The adaptive algorithm may or may not determine how field test items are selected/inserted into the test.
--	---

<p>Use Case ID and Name</p>	<p>UCAIF-0110 Updating the Assessment Data Warehouse with Assessment Reporting Results</p>
<p>Use Case Description</p>	<p>If the assessment reporting system provides for a data warehouse that is a separate data store from the operational reporting data store, then data will need to be provided to the data warehouse. The data warehouse may be populated on a given frequency (ex: daily, weekly, etc.) and build data structures (such as start schemas, cubes, etc.) to support BI style reporting.</p>
<p>Diagrams</p>	
<p>The diagram illustrates the data flow for use case UCAIF-0110. It shows a vertical stack of systems: Assessment Creation & Management System (ACMS) at the top, followed by Assessment Delivery System (ADS), Assessment Score Processing System (ASPS), Assessment Reporting System (ARS), and Assessment Analytics System (AAS) at the bottom. The ARS is further divided into Assessment Results Operational Reporting (AROR), Assessment Data Warehouse (ADW), and Assessment Analytics System (AAS). The ASPS is divided into Assessment Scoring Analytics System (ASAS) and Assessment Scoring Management System (ASMS). The ADS is divided into Assessment Registration & Administration System (ARAS) and Assessment Presentation & Session Management System (APSMS). The ACMS is divided into Test Banking and Item Banking. Arrows indicate data flow: from ASMS to AROR and ADW; from AROR to AROR and ADW; and from ADW to AROR and ADW. Two green boxes on the right represent '60 - Results to Report' and '110 - Results to Data Warehouse', with arrows pointing to them from the AROR and ADW components respectively.</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The assessment reporting system has a separate data warehouse application for aggregation and longitudinal tracking. • The consortia have licensed the use of the data warehouse for BI reporting.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Results Operational Reporting (AROR) • Assessment Data Warehouse (ADW)
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • Assessment results are available for reporting
<p>Processing</p>	<ul style="list-style-type: none"> • The AROR system exports detailed student results data • The AROR transfer the data to the ADW • The ADW validates and loads the AROR
<p>Post-Conditions</p>	<ul style="list-style-type: none"> • The ADW has been loaded with assessment results
<p>Triggers</p>	<ul style="list-style-type: none"> • Scheduled trigger is most likely • Manual trigger

Assessment Interoperability Framework Use Cases

Exceptions	<ul style="list-style-type: none"> The results are malformed.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by arrow 12 in the AIF wiring diagram
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> Student identification, demographic, and registration data Assessment and form identification and description Item identifiers Item response data (choices, text, dragger positions, hot spots selected, line graphs, etc.) Item interaction data (time-on-task, number of attempts, tools used) Item score data (right/wrong, score) Sub-test score data (ex: strands) Item and sub-test standards alignment data Assessment score data (ex: ability level, confidence interval, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> Asynchronous bulk transfer
Other assumptions or issues	<ul style="list-style-type: none"> If the AROR and ADW are implemented as a single integrated data solution, then this interface is likely absent.

<p>Use Case ID and Name</p>	<p>UCAIF-0120 Distributing Aggregated Assessment Results to Local Information Systems</p>
<p>Use Case Description</p>	<p>The assessment reporting data warehouse may derive various summaries or aggregations from the underlying detailed results data. For example, various average scores (school, LEA, or state averages) may be provided to the local systems for reporting and comparisons. The data warehouse may also disaggregate the data on several dimensions (such as race/ethnicity, gender, etc.) that may also be share with local systems for reporting.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The consortia produce aggregated summary information and wish to distribute that data to local systems for use.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Data Warehouse • Local information systems
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • Assessment results are available and have been aggregated so that summaries can be produced.
<p>Processing</p>	<ul style="list-style-type: none"> • The ADW exports summary information • The ADW packages the summary information for transport • The ADW delivers the data to the local information system • The local information system imports the summary data
<p>Post-Conditions</p>	<ul style="list-style-type: none"> • The local information system has summary data loaded
<p>Triggers</p>	<ul style="list-style-type: none"> • Likely to be schedule driven

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> Manual trigger may also be required
Exceptions	<ul style="list-style-type: none"> Some summary data may not be shared to protect personally identifiable information. For example, if less than 5 individuals make up a summary, it may be easy to discern who the individuals are. Summaries may be excluded in these situations. Sometimes referred to as “small cell” rules.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	<ul style="list-style-type: none"> Component interfaces of SMARTER Balanced Architecture Workshop Deliverables
AIF framework references	This is represented by Arrow 15 of the AIF wiring diagram.
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> LEA/school information Assessment identifiers and names Sub test identifiers and names Standards alignment Demographic dimensions (race, gender, etc.) Summary scores (means, percentages, counts, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> Asynchronous bulk transportation is likely.
Other assumptions or issues	<ul style="list-style-type: none"> In some implementations, summary data may also be “imbedded” in the individual results data exchanges (arrows 13 & 14).

Use Case ID and Name	UCAIF-0130 Distributing Aggregated Assessment Results to State Information Systems.
Use Case Description	<p>The assessment reporting data warehouse may derive various summaries or aggregations from the underlying detailed results data. For example, various average scores (school, LEA, or state averages) may be provided to the state systems for reporting or inclusion in their own data warehousing systems. The data warehouse may also disaggregate the data on several dimensions (such as race/ethnicity, gender, etc.) that may also be share with state systems for reporting.</p>
Diagrams	
Applicable Scenarios	<ul style="list-style-type: none"> • The consortia produce aggregated summary information and wish to distribute that data to state systems for use.
Actors	<ul style="list-style-type: none"> • Assessment Data Warehouse • State information systems
Pre-Condition	<ul style="list-style-type: none"> • Assessment results are available and have been aggregated so that summaries can be produced.
Processing	<ul style="list-style-type: none"> • The ADW exports summary information • The ADW packages the summary information for transport • The ADW delivers the data to the local information system • The state information system imports the summary data

Assessment Interoperability Framework Use Cases

Post-Conditions	<ul style="list-style-type: none"> The state information system has summary data loaded
Triggers	<ul style="list-style-type: none"> Likely to be schedule driven Manual trigger may also be required
Exceptions	<ul style="list-style-type: none"> Some summary data may not be shared to protect personally identifiable information. For example, if less than 5 individuals make up a summary, it may be easy to discern who the individuals are. Summaries may be excluded in these situations. Sometimes referred to as “small cell” rules.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by Arrow 16 of the AIF wiring diagram.
Expected Use of Interoperability Standard	SIF
Expected Data or Content Requirements	<ul style="list-style-type: none"> LEA/school information Assessment identifiers and names Sub test identifiers and names Standards alignment Demographic dimensions (race, gender, etc.) Summary scores (means, percentages, counts, etc.)
Expected Transport Requirements	<ul style="list-style-type: none"> Asynchronous bulk transportation is likely.
Other assumptions or issues	<ul style="list-style-type: none"> In some implementations, summary data may also be “imbedded” in the individual results data exchanges (arrows 13 & 14).

<p>Use Case ID and Name</p>	<p>UCAIF-0140 Reporting Detailed Student Registration Data with Assessment Results</p>
<p>Use Case Description</p>	<p>When the reporting system receives the assessment results from the scoring system, not all student detail data may be provided with the scoring results. In other words, not all registration data may be passed through the delivery system to the scoring system. In these cases, it is often necessary to match the assessment result with the registration data to provide a full results record for reporting. It is also common for the registration and reporting system to keep a snapshot of the student data with the assessment results as the official record.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The assessment delivery and scoring services do not pass through all student registration data and the reporting system needs all registration data to provide meaning information to reporting users.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Registration & Administration System (ARAS) • Assessment Results Operational Reporting (AROR)
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • The registration information has been collected. • The assessment results are available.
<p>Processing</p>	<ul style="list-style-type: none"> • The assessment registration system exports all student registration data • The assessment registration system transports the data to the assessment

Assessment Interoperability Framework Use Cases

	<p>reporting system</p> <ul style="list-style-type: none"> • The assessment reporting system validates the data and matches it with the assessment results data • The combined information is stored in the assessment reporting system
Post-Conditions	<ul style="list-style-type: none"> • The assessment reporting system has all information necessary to generate reports and provide meaningful information to the users.
Triggers	<ul style="list-style-type: none"> • The assessment reporting system could request the information from the registration system when results are received.
Exceptions	<ul style="list-style-type: none"> • There is an assessment results that does not have a corresponding registration.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by Arrow 11 in the AIF wiring diagram.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student identifiers and demographics • Student program data • Student enrollment data • Student class data • Student teacher data
Expected Transport Requirements	<ul style="list-style-type: none"> • May be a bulk transfer • May be a request/response or web service • Secure
Other assumptions or issues	<ul style="list-style-type: none"> •

<p>Use Case ID and Name</p>	<p>UCAIF-0145 Reporting Most Recent Local Student Record Data with Assessment Results</p>
<p>Use Case Description</p>	<p>The assessment reporting system will typically report student details based on the data collected when the student tested. It may also be beneficial for the reporting system to provide historical assessment results data with the current student record. The most common example is to provide historical student performance data to the teacher for the incoming class (often call re-rostering).</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • The assessment reporting system is providing additional reporting services for re-rostering. • The assessment reporting and assessment analytics components are used to evaluate current student performance by combining historical assessment data with current student information.
<p>Actors</p>	<ul style="list-style-type: none"> • Local student information system (SIS) or learning management system (LMS) • Assessment reporting system
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • Assessment results are available • Student identifiers are available in both the assessment reporting system and the local information system

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • Student data has changed since the assessment registration data was collected
Processing	<ul style="list-style-type: none"> • The assessment reporting system requests or the local information system publishes the latest student demographic data • The assessment reporting system receives updated student demographic data • The assessment reporting system matches the current student information with the historical assessment data
Post-Conditions	<ul style="list-style-type: none"> • The assessment reporting system contains both current and historical student data and can analyze and report against that data.
Triggers	<ul style="list-style-type: none"> • Would most likely be based on calendar schedules such as the start of a new school year or semester/trimester, etc. • Could be manually triggered
Exceptions	<ul style="list-style-type: none"> • The student has moved out of the reporting region (i.e. state) and no new demographic data is available. • A new student has enrolled and there is no historical data in the assessment reporting system.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by Arrow 13 in the AIF wiring diagram.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student identifiers • Student demographics • Student program information • Student class/schedule/grade information • Student teacher information
Expected Transport Requirements	<ul style="list-style-type: none"> • Likely bulk asynchronous transfers • Secure
Other assumptions or issues	<ul style="list-style-type: none"> •

<p>Use Case ID and Name</p>	<p>UCAIF-0150 Reporting Assessment Content Details with Assessment Results</p>
<p>Use Case Description</p>	<p>It is common for an assessment reporting system to provide details about the assessment content when a user is viewing the results. For example, a teacher may be reviewing results from her class and notice that a high percentage of students missed a specific question on the test. The reporting system may allow the teacher to select the question to view details about the question and possible even view the question (assuming it is not secure content).</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • An online assessment reporting system allows users to selectively view the assessment content or detail metadata about the assessment content.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment content management system • Assessment reporting system
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • Assessment results are available • Assessment content is available for viewing (i.e. it is not secure content).
<p>Processing</p>	<ul style="list-style-type: none"> • User view assessment results (details or summary) • The reporting system identifies (or the user notices) a specific area of the assessment students are struggling • User views the item or part of the assessment that students were struggling to understand what is being measured and what gaps or

Assessment Interoperability Framework Use Cases

	misunderstanding the students may have.
Post-Conditions	<ul style="list-style-type: none"> The user has a clear understanding of the topics being measured and how their students may have gaps or misunderstandings
Triggers	<ul style="list-style-type: none"> User interaction
Exceptions	<ul style="list-style-type: none"> User is not allowed access to content – features should be disabled.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	This is represented by Arrow 9 of the AIF wiring diagram.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> Assessment results, scores Assessment, form, and item identifiers Assessment content
Expected Transport Requirements	<ul style="list-style-type: none"> Likely real-time access May need “previewer” type capability so user can see how item was presented to student.
Other assumptions or issues	<ul style="list-style-type: none"> With TEI items, it may be useful for the user to see how the student responded to the item.

Use Case ID and Name	UCAIF-0160 Reporting Analytics Recommending Instruction based on Student Performance
Use Case Description	<p>One use of assessment results is to use the outcome data to determine how best to tailor or personalize instruction for each student. Detailed analysis of the results, potentially at the item-by-item level, may reveal weaknesses or gaps in understanding for that student. Most assessment results will be aligned to learning standards. With instructional resources targeting those learning standards, then a recommendation engine could refer a student to those resources based on assessment performance.</p>
Diagrams	
Applicable Scenarios	<ul style="list-style-type: none"> Analytics engines are used to analyze student results data to determine where students may need assistance.
Actors	<ul style="list-style-type: none"> Assessment reporting system Assessment analytics system
Pre-Condition	<ul style="list-style-type: none"> Assessment results are available
Processing	<ul style="list-style-type: none"> Assessment results are delivered to analytics engine Analytics engine make recommendations based on student performance
Post-Conditions	<ul style="list-style-type: none"> Assessment reporting system can present recommendations for instruction to users for further action. Future assessments may be assigned after completion of additional

Assessment Interoperability Framework Use Cases

	instruction or remediation.
Triggers	<ul style="list-style-type: none"> • When assessment results become available
Exceptions	<ul style="list-style-type: none"> • Not enough information available in student results (student may not have responded to enough questions)
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	Not specifically addressed by a particular arrow but would like send results of the analysis via arrow 13.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student identifiers and demographics • Assessment results • Links to learning standards • Links to instructional resources
Expected Transport Requirements	<ul style="list-style-type: none"> •
Other assumptions or issues	<ul style="list-style-type: none"> • That all assessment and learning content repositories share a common learning standard identification system

Use Case ID and Name	UCAIF-0170 Reporting Analytics for Teacher Effectiveness
Use Case Description	<p>The ability to use assessment results as a method to evaluate teacher effectiveness is a possibility. In order to perform this analysis, it will be required to know the teacher of the student that took the assessment. Also knowing how much instruction time the teacher has with the student on a particular subject (or even standard) would also be valuable part of this analysis. One area of concern is identifying the teacher of record when multiple teachers may be involved with instructing (or counseling) the student. The analysis will likely require collection of information that may not be collected as part of the assessment registration process.</p>
Diagrams	
Applicable Scenarios	<ul style="list-style-type: none"> •
Actors	<ul style="list-style-type: none"> • Assessment Analytics System
Pre-Condition	<ul style="list-style-type: none"> • Assessment results are available • Students have been linked to “responsible” teacher in their registration data or that linkage has been provided separately
Processing	<ul style="list-style-type: none"> • Analytics system evaluates student performance based on responsible teacher assignments
Post-Conditions	<ul style="list-style-type: none"> • Comparison information is available based on student/teacher relationships

Assessment Interoperability Framework Use Cases

Triggers	<ul style="list-style-type: none"> Likely requested manually
Exceptions	<ul style="list-style-type: none"> No student/teacher assignment information is available Multiple teacher/student relationships exist and no primary “responsibility” can be determined
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	Not specifically addressed by a particular arrow but would likely receive data via arrows 18 and 19.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> Student identifier and demographic data Teacher identifier and demographic data Assessment results
Expected Transport Requirements	<ul style="list-style-type: none">
Other assumptions or issues	<ul style="list-style-type: none"> The state allows for student / teacher linkages for this purpose.

<p>Use Case ID and Name</p>	<p>UCAIF-0180 Reporting Analytics Determine Program / Course / Curriculum Effectiveness</p>
<p>Use Case Description</p>	<p>The ability to use assessment results as a method to evaluate the effectiveness of specific instructional programs, materials, resources, or other curriculum is a possibility. In order to perform this analysis, it will be required to know what instructional programs and other supports were used for each student prior to testing. The analysis will likely require collection of information that may not be collected as part of the assessment registration process.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • A LEA has implemented a new curriculum or is using new materials and wishes to determine if student’s using this new material has statistically significant changes in performance on assessment. • The state wishes to survey how assessment results compare across different curriculum across LEAs.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Analytics System
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • Assessment results are available • Students, teachers, and/or institutions have been linked to the curriculum, programs, or materials used. This is either provided as part of the registration data or provided separately

Assessment Interoperability Framework Use Cases

Processing	<ul style="list-style-type: none"> Analytics system evaluates student performance based on curriculum, programs, or materials used
Post-Conditions	<ul style="list-style-type: none"> Comparison information is available based on student/curriculum/program/materials used relationships
Triggers	<ul style="list-style-type: none"> Likely requested manually
Exceptions	<ul style="list-style-type: none"> No curriculum, program, or material information is available Student only has a partial instructional period using materials (ex: student transferred into LEA mid-semester).
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	Not specifically addressed by a particular arrow but would likely receive data via arrows 18 and 19.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> Student identifier and demographic data Curriculum, program or material data Assessment results
Expected Transport Requirements	<ul style="list-style-type: none">
Other assumptions or issues	<ul style="list-style-type: none">

<p>Use Case ID and Name</p>	<p>UCAIF-0190 Scoring Analytics Determining Scale Tables, Cut Scores, etc.</p>
<p>Use Case Description</p>	<p>For most large-scale assessment programs, analysis of student results is performed to determine how to translate raw scores to a common scale as well as determining what scores represent different levels of proficiency. This analysis is generally performed by psychometricians after a statistically significant number of student responses have been processed. Assessments may be analyzed once and score tables are set for future administrations (often referred to as pre-equated). In contrast, some assessments may be analyzed with each administration and new score table established (often referred to as post-equated).</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> • This is the first administration of the assessment and score tables / cut scores have not been determined. • Score tables or cut scores are set for each new administration (likely due to time of instruction each student has received). In other words, the assessment is scaled based on the amount of instruction received.
<p>Actors</p>	<ul style="list-style-type: none"> • Assessment Scoring Analytics Systems
<p>Pre-Condition</p>	<ul style="list-style-type: none"> • A sufficient number of assessments have been administered to perform statistical calculations.

Assessment Interoperability Framework Use Cases

	<ul style="list-style-type: none"> • A cross-section of demographics may also be needed. • Scoring has been performed on the assessments.
Processing	<ul style="list-style-type: none"> • Psychometric analysis is performed on the resulting data.
Post-Conditions	<ul style="list-style-type: none"> • Scale score conversions are available • Cut scores for performance levels are available
Triggers	<ul style="list-style-type: none"> • When sufficient number of assessments have been administered – may be a trigger value (n-count).
Exceptions	<ul style="list-style-type: none"> • Insufficient number of assessments have been administered. • Psychometric analysis determines that the scoring process (answer keys, rubrics, etc.) must be adjusted and re-scoring is required.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	Not specifically addressed by a particular arrow but would likely receive data via arrow 17. Results of analysis would likely feed the item bank – arrow is missing from diagram.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student identifiers and demographics • Assessment results
Expected Transport Requirements	<ul style="list-style-type: none"> •
Other assumptions or issues	<ul style="list-style-type: none"> •

<p>Use Case ID and Name</p>	<p>UCAIF-0200 Scoring Analytics Determining Scoring Keys/Algorithms are Correct</p>
<p>Use Case Description</p>	<p>For most large-scale assessment programs, analysis of student results is performed to determine ensure that the scoring system is functioning properly. This analysis is generally performed by psychometricians after a statistically significant number of student responses have been processed.</p>
<p>Diagrams</p>	
<p>Applicable Scenarios</p>	<ul style="list-style-type: none"> As part of the quality control process for assessment scoring, the scoring processor performs a scoring analysis prior to release scores to the reporting system.
<p>Actors</p>	<ul style="list-style-type: none"> Assessment Scoring Analytics System Psychometricians
<p>Pre-Condition</p>	<ul style="list-style-type: none"> Assessment results are available
<p>Processing</p>	<ul style="list-style-type: none"> The scoring analytics process performs a Rasch or other analysis against the results
<p>Post-Conditions</p>	<ul style="list-style-type: none"> A report is generated that provides results from analysis
<p>Triggers</p>	<ul style="list-style-type: none"> Likely manually triggered but may be triggered based on an n-count of assessment being scored.
<p>Exceptions</p>	<ul style="list-style-type: none"> The analysis has determined that adjustments to the scoring process (answer keys, rubrics, etc) must be made and the assessment must be

Assessment Interoperability Framework Use Cases

	rescored.
Identify SBAC or PARCC Use Cases or Architecture Items this use case supports	
AIF framework references	Represented by arrow 17 of the AIF wiring diagram.
Expected Use of Interoperability Standard	
Expected Data or Content Requirements	<ul style="list-style-type: none"> • Student identifiers and demographics • Assessment results
Expected Transport Requirements	<ul style="list-style-type: none"> •
Other assumptions or issues	<ul style="list-style-type: none"> •

Definitions

Term or Acronym	Definition
AIF	Assessment Interoperability Framework. The framework being developed by the joint SIF/IMS working group to define how interoperability standards should be applied for an assessment platform in support of Common Core assessments.
Equating	The process of “scaling” scores to a common scale across multiple test forms that contain different items or sets of items.
Scale Scores	A score that is derived from a raw score in order to report all tests on a common scale.
Raw Score	Typically indicates the number of questions correct on a multiple choice assessment. Items scored on a rubric would also be included in the raw score. Some item weighting can occur in a raw score but that is rare. Generally items are scored as zero for incorrect and one for correct.
Learning Standard	For the purposes of this document, a learning standard is a line item within the common core standards. (www.corestandards.org) . In general a learning standard is a statement about what a student is expected to know within a particular domain (subject/grade).
Best Form	When the form of a test that a test taker has used cannot be determined from the information provided, a best form scoring process will score the results against all possible forms and the resulting best (highest) score is used for reporting results.