

**SMARTERAPP MAPPING**  
**for**  
**SAAIF to QTI**

Updated  
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Revision History

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## Table of Contents

Purpose.....	3
References .....	3
Relationship between SAAIF dependencies and QTI dependencies .....	4
Item Element Mapping .....	5
Word List Element Mapping .....	13
Stimulus Element Mapping .....	14

### Purpose

The purpose of this document is to provide a mapping of the SmarterApp Assessment Item Format (SAAIF) item format to QTI 3 format.

This specification represents the combined work of Smarter Balanced and various vendors working on related contracts.

### References

Ref	Reference	Author	Version
1	SmarterApp Assessment Item Format (SAAIF) Specification <a href="http://www.smarterapp.org/documents/SmarterApp_Assessment_Item_Format_Specification.pdf">http://www.smarterapp.org/documents/SmarterApp_Assessment_Item_Format_Specification.pdf</a>	AIR / Smarter Balanced	1.10
2	Smarter Balanced Item and Stimulus Metadata Specification <a href="http://www.smarterapp.org/documents/Item_Metadata_Specification.pdf">http://www.smarterapp.org/documents/Item_Metadata_Specification.pdf</a>	Smarter Balanced	1.0
3	<Once QTI 3 final is release, link will go here>	IMS Global	3.0
4	Sample Content <Once QTI 3 items have been exported, a link to a sample zip file will go here>	Smarter Balanced	1.0

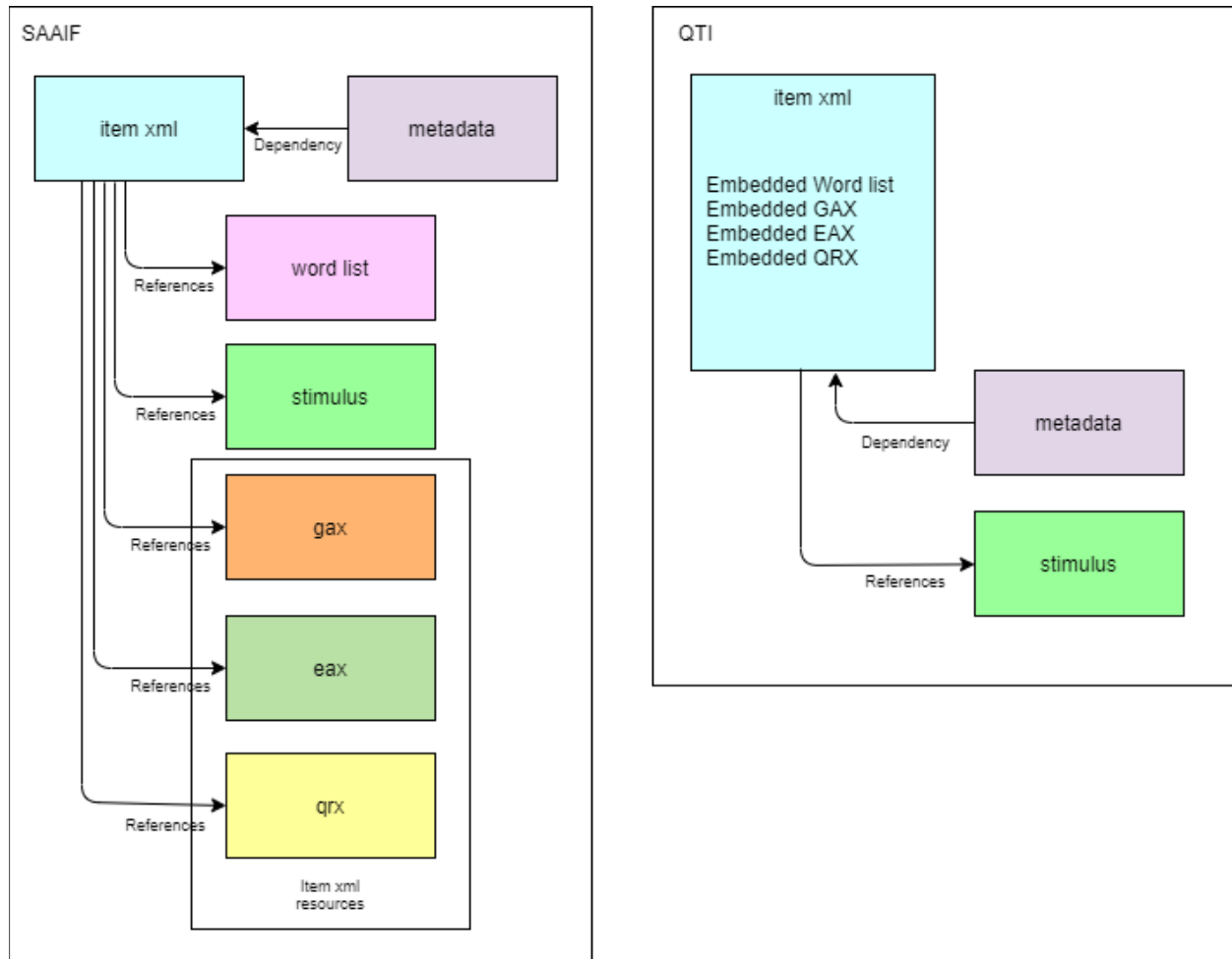
### Data Format Conventions

Table 2 provides information regarding the XML output format and its associated XSD, such as the allowable values, sizes, and descriptions, as well as any standards alignment.

The following conventions apply to Table 2 below:

- **Case sensitivity:** Field names are case sensitive and follow the guideline that the XML *Node/Element* is in UpperCamelCase, while node *attributes* are in lowerCamelCase.
- **Order sensitivity:** Fields are not order-sensitive.
- **Non-required (optional) fields:** By default, these fields do not need to be included in the XML file. A missing optional field is simply treated as not present or not applicable.
- **Cardinality:** The number of possible instances of a particular node is defined clearly in the XSD

### Relationship between SAAIF dependencies and QTI dependencies



### Item Element Mapping

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
item	id	/itemrelease/item/@id	qti-assessment-item	identifier	/qti-assessment-item/@identifier	Format of item id: sbac-item-200-123456	Mapped
			qti-assessment-item	title	/qti-assessment-item/@title	Format of item id: SBAC Item 200-123456	Mapped
	format	/itemrelease/item/@format				QTI does not have a mapping of item format. The QTI specification includes item interaction type tagging.	Include in Metadata <InteractionType> field.
	version	/itemrelease/item/@version					Include in Metadata <Version> field.
	bankkey	/itemrelease/item/@bankkey					Drop SAAIF Field
associatedpassage		/itemrelease/item/associatedpassage	qti-assessment-stimulus-ref	href	/qti-assessment-item/qti-assessment-stimulus-ref/@href	href attribute value is the relative path to the stimulus XML file	Mapped
attriblist/attrib/val	attid='itm_item_id'	/itemrelease/item/attriblist/attrib[@attid='itm_item_id']/val				QTI does not store the ITS ID of the item	Drop SAAIF Field
attriblist/attrib/val	attid='itm_item_subject'	/itemrelease/item/attriblist/attrib[@attid='itm_item_subject']/val				QTI does not store the subject value of the item	Include in Metadata <Subject> field.
attriblist/attrib/val	attid='itm_item_desc'	/itemrelease/item/attriblist/attrib[@attid='itm_item_desc']/val				QTI does not store the short description of the item	Include in Metadata <SmarterApplItemDescription> field.
attriblist/attrib/val	attid='itm_FTUse'	/itemrelease/item/attriblist/attrib[@attid='itm_FTUse']/val				QTI does not store the field test use information	Drop SAAIF Field
attriblist/attrib/val	attid='itm_OPUse'	/itemrelease/item/attriblist/attrib[@attid='itm_OPUse']/val				QTI does not store the operational use information	Drop SAAIF Field

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
attriblist/attrib/val	attid='itm_att_Answer Key'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Answer Key']/val	MC, MS, EBSR: qti-value GI, EQ: qti-rubric-block		<b>MC:</b> /qti-assessment-item/qti-response-declaration[@base-type='identifier' @cardinality='single']/qti-correct-response/qti-value <b>MS:</b> /qti-assessment-item/qti-response-declaration[@base-type='identifier' @cardinality='multiple']/qti-correct-response/qti-value <b>EBSR:</b> /qti-assessment-item/qti-response-declaration[@base-type='identifier' @cardinality='single' identifier='EBSR[1...n]']/qti-correct-response/qti-value <b>GI, EQ:</b> /qti-assessment-item/qti-item-body/qti-rubric-block[@view='scorer']	For <b>EBSR</b> items, the qti-response-declaration XML element is repeated for the number or answer options, where the value of the identifier attribute indicates which option number the answer is for.	Mapped
attriblist/attrib/val	attid='itm_att_Grade'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Grade']/val				QTI does not store the grade level of the item	Include in Metadata <IntendedGrade>
attriblist/attrib/val	attid='itm_att_Item Format'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Item Format']/val				QTI does not store the item format of the item	Include in Metadata <InteractionType>
attriblist/attrib/val	attid='itm_att_Page Layout'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Page Layout']/val	qti-item-body		/qti-assessment-item/qti-item-body/div[@class='qti-layout-row']/div[@class='qti-layout'] NOTE: there may be additional class names in the <div> element that the XPath does not account for	The layout number in SAAIF is used as part of the class names for the <div> element surrounding the item content	Mapped
attriblist/attrib/val	attid='itm_att_Response Type'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Response Type']/val				QTI does not store the response type of the item	Drop SAAIF Field

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
attriblist/attrib/val	attid='itm_att_Item Point'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Item Point']/val	qti-outcome-declaration	normal-maximum	/qti-assessment-item/qti-outcome-declaration[@normal-maximum]		Mapped
attriblist/attrib/val	attid='itm_att_Cloze Answers'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Cloze Answers']/val				QTI does not store the Cloze answers of the item	Drop SAAIF Field
attriblist/attrib/val	attid='stm_pass_id'	/itemrelease/item/attriblist/attrib[@attid='stm_pass_id']/val	qti-assessment-stimulus-ref	href	/qti-assessment-item/qti-assessment-stimulus-ref/@href	href attribute value is the relative path to the stimulus XML file	Mapped
attriblist/attrib/val	attid='itm_att_Max Choices'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Max Choices']/val	qti-choice-interaction	max-choices	/qti-assessment-item/qti-item-body//qti-choice-interaction[@max-choices]		Mapped
attriblist/attrib/val	attid='itm_att_Answer Key (Part II)'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Answer Key (Part II)']/val	qti-value		<b>EBSR:</b> /qti-assessment-item/qti-response-declaration[@base-type='identifier' @cardinality='single' identifier='EBSR[1...n]']/qti-correct-response/qti-value	For <b>EBSR</b> items, the qti-response-declaration XML element is repeated for the number options where the value of the identifier attribute indicates which option number the answer is for.	Mapped
attriblist/attrib/val	attid='itm_att_Max Choices (Part II)'	/itemrelease/item/attriblist/attrib[@attid='itm_att_Max Choices (Part II)']/val	qti-choice-interaction	max-choices	<b>EBSR:</b> /qti-assessment-item/qti-item-body//qti-choice-interaction[@max-choices]		Mapped
tutorial	id	/itemrelease/item/tutorial[@id]	qti-htm-content		/qti-assessment-item/qti-catalog-info/qti-catalog[@id='stem-catalog-ref']/qti-card[@support='ext:sbac-tutorial']/qti-card-entry/qti-html-content	The full tutorial content is stored in the QTI item	Mapped
resourceslist							Drop SAAIF Field
statistic							Drop SAAIF Field
MachineRubric	filename	/itemrelease/item/MachineRubric[@filename]	qti-response-processing		/qti-assessment-item/qti-response-processing	QRX file contents parsed and placed in QTI element	Mapped

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
qti		/itemrelease/item/qti[@spec='itembody']	<b>MI:</b> qti-match-interaction		<b>MI:</b> /qti-assessment-item/qti-item-body//qti-match-interaction	The SAAIF qti element is mapped to the QTI-specific <qti-match-interaction> element	Mapped
stem		/itemrelease/item/content[@language='ENU']/stem	qti-item-body		/qti-assessment-item/qti-item-body	HTML5 content placed natively in the QTI element. No need to encapsulated in CDATA. Any images in the content are handled with HTML <img> tags, where the src attribute can be the relative image file, or the base64 encoded image. MathML is natively embedded in the HTML content	Mapped
attachment	id	/itemrelease/item/content/attachmentlist/attachment[@id]			<b>ASL:</b> /qti-assessment-item/qti-catalog-info/qti-catalog/qti-card[@support='sign-language']/qti-card-entry/qti-html-content/video/source  <b>Braille Files:</b> /qti-assessment-item/qti-catalog-info/qti-catalog/qti-card[@support='ext:sbac-braille-files']/qti-card-entry[@data-type=['BRF' or 'PRN']/qti-file-href[@mime-type='application/braille']	<b>Braille Files:</b> individual qti-card elements are created for each braille file	Drop SAAIF Field



SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
attachment	type	/itemrelease/item/content/attachmentlist/attachment[@type]	<b>ASL:</b> source  <b>Braille Files:</b> qti-card-entry	<b>ASL:</b> type  <b>Braille Files:</b> data-type	<b>ASL:</b> /qti-assessment-item/qti-catalog-info/qti-catalog/qti-card[@support='sign-language']/qti-card-entry/qti-html-content/video/source[@type='video/webm' or 'video/mp4']  <b>Braille Files:</b> /qti-assessment-item/qti-catalog-info/qti-catalog/qti-card[@support='ext:sbac-braille-files']/qti-card-entry	<b>ASL:</b> type attribute of the source element  <b>Braille Files:</b> In order to support the subtype, concatenate the type and subtype with a delimiter	Mapped
attachment	subtype	/itemrelease/item/content/attachmentlist/attachment[@subtype]					<b>Braille Files:</b> Mapped with the type attribute

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
attachment	file	/itemrelease/item/content/attachmentlist/attachment[@file]	<b>ASL:</b> source  <b>Braille Files:</b> qti-file-href	<b>ASL:</b> src  <b>Braille Files:</b> mime-type='application/braille'	<b>ASL:</b> /qti-assessment-item/qti-catalog-info/qti-catalog[@id='stim-catalog-ref']/qti-card[@support='sign-language']/qti-card-entry[@default='true' @lang='ase']/qti-html-content/video[@controls='true' height='240' width='320']/source[@type='video/mp4']  <b>Braille Files:</b> /qti-assessment-item/qti-catalog-info/qti-catalog[@id='stem-catalog-ref']/qti-card[@support='ext:sbac-braille-files']/qti-card-entry[@default='true' @lang='en']/qti-file-href[@mime-type='application/braille']	<b>ASL:</b> QTI stores the relative path from the root folder to the items in the video file  <b>Braille Files:</b> QTI stores the relative path from the root folder to the braille file	Mapped
audioShortDesc		/itemrelease/item/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>'/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/readAloud/audioShortDesc	qti-item-body		/qti-assessment-item/qti-item-body/.../span[@data-iatts='<audio short desc text>']		Mapped

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
audioText		/itemrelease/item/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>'/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/readAloud/audioText	qti-item-body		/qti-assessment-item/qti-item-body/.../span[@data-iatts='<audio text>']		Mapped
textToSpeechPronunciation		/itemrelease/item/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>'/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/readAloud/textToSpeechPronunciation	qti-card-entry		/qti-assessment-item/qti-catalog-info/qti-catalog[@id='item_<internal id>_Stem']/qti-card[@support='spoken']/qti-card-entry[@data-reading-type='computer-read-aloud']		Mapped
textToSpeechPronunciationAlternate		/itemrelease/item/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>'/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/readAloud/textToSpeechPronunciationAlternate				QTI does not store this element	Drop SAAIF Field

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differences for SAAIF (refer to the Metadata specification for those relevant fields)
brailleTextString		/itemrelease/item/content[@language='ENU']/apiAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>'/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/brailleText/brailleTextString	qti-card-entry		/qti-assessment-item/qti-catalog-info/qti-catalog/qti-card[@support='spoken']/qti-card-entry[@data-reading-type='screen-reader']		Mapped

### Word List Element Mapping

The word list mapping is done within the item itself, unlike for SAAIF where the word list exists as a separate item.

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differenced from SAAIF
keyword		/itemrelease/item/keywordList/keyword	qti-html-content	title	/qti-assessment-item/qti-catalog-info/qti-catalog[@id=<tagging id that is referenced in the prompt HTML>]/qti-card[@support='keyword-translation']/qti-card-entry/qti-html-content	QTI stores word lists within the item XML	Mapped
html	listType listCode	/itemrelease/item/keywordList/keyword/html[@listtype=<translation name>]	qti-card-entry	data-list-code data-list-type	/qti-assessment-item/qti-catalog-info/qti-catalog[@id=<tagging id that is referenced in the prompt HTML>]/qti-card[@support='keyword-translation']:qti-card-entry		Mapped
html		/itemrelease/item/keywordList/keyword/html[@listtype=<translation name>]	qti-html-content	src	/qti-assessment-item/qti-catalog-info/qti-catalog[@id=<tagging id that is referenced in the prompt HTML>]/qti-card[@support='keyword-translation']/qti-card-entry[@data-list-type=<language translation>]/qti-html-content/p/audio/source	QTI stores word list translations within the item XML	Mapped

### Stimulus Element Mapping

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differenced from SAAIF
passage	version	/itemrelease/passage/version				QTI does not store the version number of the item	Include in Metadata <Version> field.
	format	/itemrelease/passage/format				QTI does not store the format of the item	Include in Metadata <StimulusFormat> field.
	bankkey	/itemrelease/passage[@bankkey]					Drop SAAIF Field
	id	/itemrelease/passage[@id]	qti-assessment-stimulus	title identifier	/qti-assessment-stimulus[@title] /qti-assessment-stimulus[@identifier]	Format of title: 123456  Format of @identifier: sbac-200-123456	Mapped Include in Metadata <Identifier> field
attriblist/attrib/val		/itemrelease/passage/attriblist/attrib[@attid='stm_pass_id']/val					Identical to passage/id field above. Drop SAAIF field
attriblist/attrib/val		/itemrelease/passage/attriblist/attrib[@attid='stm_pass_subject']/val					Include in Metadata <Subject> field
attriblist/attrib/val		/itemrelease/passage/attriblist/attrib[@attid='stm_pass_desc']/val					Drop SAAIF Field
attriblist/attrib/val		/itemrelease/passage/attriblist/attrib[@attid='stm_att_StimFormat']/val					Include in Metadata <StimulusFormat> field
stem		/itemrelease/passage/content[@language='ENU']/stem	qti-stimulus-body		/qti-assessment-stimulus/qti-stimulus-body	HTML5 content placed natively in the QTI element. No need to encapsulated in CDATA.  Any images in the content are handled with HTML <img> tags, where the src attribute can be the relative image file, or the base64 encoded image.	Mapped

SAAIF Node (XML Element)	SAAIF Node (XML Attribute)	SAAIF XPath	QTI Node (XML Element)	QTI Node (XML Attribute)	QTI XPath	QTI Notes	Proposed Resolution of Differenced from SAAIF
textToSpeechPronunciation		/itemrelease/passage/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>']/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/readAloud/textToSpeechPronunciation	qti-card-entry		/qti-assessment-stimulus/qti-catalog-info/qti-catalog[@id='item_<internal id>_Stem']/qti-card[@support='spoken']/qti-card-entry[@data-reading-type='computer-read-aloud']		Mapped
brailleTextString		/itemrelease/passage/content[@language='ENU']/apipAccessibility/accessibilityInfo/accessElement[@identifier='<internal content identifier token>']/contentLinkInfo[@itsLinkIdentifierRef='<internal content identifier token 2>']/relatedElementInfo/brailleText/brailleTextString	qti-card-entry		/qti-assessment-stimulus/qti-catalog-info/qti-catalog/qti-card[@support='spoken']/qti-card-entry[@data-reading-type='screen-reader']		Mapped