

Component Test Plan

SBAC-11Test Spec Bank

Version 1.4

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Test Specification Bank	

Revision History

Date	Version	Description	Author
04/06/14	1.0	Initial Draft and introduction	Ryan Marinello
04/07/14	1.1	Requirement tracing	Ryan Marinello
04/14/14	1.3	Level 2's	Ryan Marinello
04/14/14	1.4	API	Ryan Marinello

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I. Purpose

The purpose of this document is to describe the testing strategy and test scenarios applied to the tested component.

I. Overview

1. The overall responsibilities of this component are:
 - a. Data collections consisting of specifications, blueprint and algorithms
 - b. Integration with Test Authoring
 - c. Integration with Test Item Bank
 - d. Integration with Test Packager
 - e. RESTful services and API for query and retrieval of test specifications and workflow information for test packages

The client components supporting the Test Spec Bank component are:

- 1) Test Authoring for direct access of data persisting from creations, queries, store and retrieval of test data
- 2) Test Packager for purposes or packages; Registration, Complete, Scoring, Reporting, Administration and Simulation.
- 3) Test Item Bank for retrieval of items.

II. Component: Test Spec Bank

The Test Spec Bank component is a repository of test assessment specification data. Test Authoring integrates with the Test Specification Bank component for storage of published assessment data, retrieval of data and integrates with Test Item Bank for item data based on item metadata, item pools and test forms. During testing DRC integrated AIR's Core Standards web services for subjects, publications, have been integrated to provide test data for standards publications with information feeding assessment blueprints and other uses. This component is a graphical interface used for detailed view of specifications and requesting exported specifications.

III. Scope of Testing

This plan focuses on verification and validation testing of the Test Specification Bank component based on the Level 2 component requirements. Mission statement: prove level 2 requirements for Test Specification Bank which are believed to be correct. Heuristic: CBC (contextual, beneficial, congruent)

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1. Verification Testing

Verification testing will cover the functional testing of requirements.

Requirement Document	Document Name	Location	Version
Level I Requirements	DRC SBAC11 Requirements – Test Authoring Level I	Knowledge Tree -> High Level Requirements -> DRC	V.5
Level II Requirements	DRC SBAC11 Requirements – Test Authoring Level II	Knowledge Tree -> Requirements -> Level II Requirements	V.1

2. Validation Testing

Validation testing will cover scenario testing.

Scenario	Endpoints and examples
Display and Describe the Test Authoring API RESTful Services and Controllers	<ol style="list-style-type: none"> 1. http://localhost:8080/rest/api 2. /api/exportPackage 3. /api/testSpecification 4. /api/testSpecification/{Id}/exportPackage 5. /api/user 6. /api/user/applicable/tenants 7. /api/user/assets
RESTful Response Codes	<ol style="list-style-type: none"> 1. 200 for GET and PUT with response content 2. 201 for POST with response content 3. 204 for DELETE no response message 4. 404 for Not supported endpoint 5. 500 Error(s) from un-supported requests
http://localhost:8080/rest/exportPackage Content-Type: application/json Supported Methods: GET, PUT	/exportPackage/export-package-id GET 200 /exportPackage/export-package-id/retry PUT 200
http://localhost:8080/rest/testSpecification Content-Type: application/json Supported Methods: GET, PUT, POST	/testSpecification/{Id} GET / 200 codes /testSpecification GET 200 /testSpecification/{Id}/exportPackage POST 201 /testSpecification/{Id}/specXML GET 200
http://localhost:8080/rest/user Content-Type: application/JSON Supported Methods: GET	/user /applicableTenants GET 200 /user/assets GET 200 *integrated Test Item Bank endpoint
Describe the Services	Dependencies
http	CurrentUserService
http	ExportPackageService
http	NavigationService

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http	TestSpecificationService
http	UserService

IV. Test Strategy

1. Test Tools

Tools may be used to:

- Invoke business rules by manipulating, creating, deleting or updating test data
- Determine test pass/fail criteria in a manual and automated fashion
- Document requirements to traceability

2. Test Environment

The DRC test environment is located at DRC and supported by the development team. The environment uses repeatable software, tools and frameworks:

Tool, Framework, Software, etc.	Category	Version
Java	Programming Language	1.7
Spring Framework	Framework	3.2.0
MongoDB	Database	2.0
EC2	AWS	n/a
Oracle VirtualBox	Virtual Machine	4.2.6
Apache Tomcat	Server	7.0.35
JCE	Encryption	
Hyperic	Monitoring Agent	5.0
Servlets	Platform	2.5
Advanced Rest Client Google Chrome	Testing tool	3.1.1
Hexawise	Testing tool	n/a
cURL	Testing tool	7.2.8.1
Chrome, Firefox, IE, Safari	Browsers	
FileZilla	Testing tool – SFTP	3.6.0.2

3. Test Interface

The Test Spec Bank interface provides interfaced web services, search controls and export functionality as well as sortable columns within Grids. In addition REST was utilized to perform stateless API tests.

V. Test Deliverables

The table below lists the deliverables providing proof of testing.

Document Name	Type
Test Plan (this document)	PDF
Test Results (this document)	PDF

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Test Scripts	PDF
Test Dashboard (this document)	PDF
Test Report (this document)	PDF

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Acceptance Criteria

The Test Spec Bank logical component interface is a cog among Assessment Creation and Management components. The user interface allows for users to interact with viewing and exporting specifications per tenant when acting as a user with appropriate role based permissions. Consequently, the goal of testing is not to completely demonstrate that currently documented requirements have been exactly met; rather, the goal is to demonstrate that the delivered Test Specification Bank component fulfills the basic purpose of the component and can be enhanced or modified as requirements are discovered and finalized.

II. Introduction

2. The overall purpose of this component is to manage and maintain specification data that is needed across the test delivery system and for the Test Spec Bank, Test Packager and other components in the system. This includes:
 - a. A UI to allow for creation and management
 - b. A REST service to return a web-addressable path
 - c. A UI for storing system configuration data
 - d. RESTful services system configuration data and integration data
 - e. A Database of collections of data
 - f. Authentication Integration for login and logout

Users of Test Specification Bank may be administrators, psychometric analysis users and others. Shared clients of Test Spec Bank component will be system components which interface with the services and assets; both from an upstream and downstream approach. Meaning Test Item Bank, Test Spec Bank and Test Packager

Deployment

The Test Spec Bank is deployed as part of an Assessment Creation and Management group. At a minimum, the Test Authoring, Test Spec Bank, Test Item Bank and Test Authoring components must be deployed together. Item Authoring and Item bank can be optionally deployed with other remaining Assessment Creation and Management components

Terms and Definitions

Term	Definition
Assessment	Data items which may include images to be displayed or included on a user interface. The data items may be associated to a component, and a tenant.
Package	The customization of the appearance of the system for a particular Consortium

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	client. Branding assets include logos and banners.
Core Standards	The portion of Program Management that is responsible for externalizing properties and managing component endpoints.
Content Management	The portion of Test Authoring responsible for data management
RESTful Endpoint	The location of a service, pointed to by a URI
Program	For the purposes of these requirements, the term “program” refers to a customer’s plan for administering tests. A program is not considered to be an entity.
URI	Uniform Resource Identifier, a string of characters used for identifying and locate a resource
Tenancy	Hierarchical structured component
DTD	Document Type Definition provided by AIR
TIB	Test Item Bank
TSB	Test Specification Bank
TR	Test Registration
TAA	Test Administration

Terms and Definitions

Term	Definition
APIP	Accessible Portable Item Profile. A technical standard that focuses on accessibility in assessment items.
Blueprint	The design for a test. The test blueprint indicates the number of test questions or points related to each competency on the test and the relative emphasis placed on each competency.
Field Test	Test made up of test items intended to develop and calibrate new assessments.
Grade Level	Grade or standard the item is designed for
Item	A question on a test. It may be composed of several parts including audio and visual files.
Item Author	A person or agency responsible for item creation.
Item Bank	A systems application that manages the storage and retrieval of assessment items, tracks item versioning and lineage, and provides a robust search and query capability that allows searching on all types of metadata.
Item Status	A term used to indicate how an item can be used. Some of the valid values are: <ul style="list-style-type: none"> • Pilot Test • Field Test • Operational

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JSON	JavaScript Object Notation, a lightweight, text based, open standard designed for human-readable data interchange.
Pilot Test	A trial series of new or modified items given to a select group of students.
Retired Item	An item that will no longer be used for an assessment.
Rubric	a guide listing specific criteria for grading or scoring academic papers, projects, or tests
Runtime exception	An unanticipated condition for which no error handling exists but normal processing cannot continue
Source Item Bank	The Item Bank from which an item is pushed to a Test Item Bank
XML	Extensible Markup Language, a set of rules for encoding documents in machine-readable form.

Assumptions

	Assumption	Comments
1.	This DTD provides additional definitive requirements about the structure and content of test specifications, and is considered part of these requirements. For this reason, details contained in the DTD shall not be repeated here. Please refer to the DTD for additional guidance on the structure and content of test specifications.	
2.	Test Spec Bank only has Test Authoring/Packager as a client.	
3.	Test Authoring is responsible for validation consistent, complete and ready for promotion.	
4.	Test Specs cannot be promoted to the next workflow level unless the test specs pass validation and Test Authoring deems them	
5.	The Test Packager will be aware of the validation state/workflow status of the test specs. It should not extract test spec before they are deemed ready for extraction	
6.	Test Packager should be a function of Test Authoring rather than a separate application.	
7.	Blueprint is part of a test specification	
8.	Test Authoring will be concerned with this workflow, and the Test Packager will not attempt to extract packages unless the test specs (and potentially items) are at the appropriate level in the workflow.	
9.	Test Authoring component is responsible for transitioning the spec between states, and where are the rules for each state defined/enforced	
10.	Test Spec Bank would simply track the state of the	

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	specification as it pertains to the workflow, but support for state transitions/rule enforcement, would be owned by the authoring system.	
11.	Test Authoring is responsible for versioning and workflow	

Data and Data Relationships

The Test Authoring user interface allows for creation, management and retrieving role based assessment information associated with deployments, components, and tenants. Insert the architecture topology image here if available.

Test Specification Component Targets	For Test Registration and Test Administration components	For Test Scoring components	For the Data Warehouse and Reporting components	For the Test Delivery component	A superset package
Test Specification Sub-Part	Registration	Scoring	Reporting	Administration	Complete
testblueprint		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
poolproperty	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
itempool		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
testform		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
adminsegment				<input type="checkbox"/>	<input type="checkbox"/>
performancelevels		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
scoringrules		<input type="checkbox"/>			<input type="checkbox"/>
reportingmeasures			<input type="checkbox"/>		<input type="checkbox"/>
comment	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
registrationform	<input type="checkbox"/>				
registrationsegment	<input type="checkbox"/>				

Requirements

Requirements are numbered according to the following convention:

1. RFP.## - a requirement from the RFP
2. RADPM.## - a requirement from the detailed requirements from RFP-11 or the Architecture document
3. PRPM.## - a requirement from the Proposal
4. DRPM.## - a detailed requirement from the Level I document
5. OTHPM.## - other Program Management requirements

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The Test Spec Bank component must meet the applicable requirements from the General Requirements. The following are the DTD and example XML artifacts accompanying this document.

Req. Number	Requirement	Test Package Artifact	Description
RFP 7	Test Authoring Component will meet requirements detailed in the SBAC IT Systems Architecture (Appendix C)		Outlined in the RFP, this is the header of the main requirement for Test Packaging.
PRTIB 1	Create XML file containing data required for the DTD.	testpackage.dtd	<p>A formal specification of the XML elements that represent a test. XML files that conform to this DTD are suitable for the following purposes:</p> <ol style="list-style-type: none"> 1. Administration: an XML representation of a test that contains all elements necessary to administer the test to a student. 2. An Administration XML packaged with item metadata is suitable for adaptive test simulation 3. An Administration XML packaged with full item content, metadata and item assets can be used to configure a Test Delivery system for administration of a test to students 4. Scoring: an XML representation of a test that contains sufficient elements for configuration of a test scoring system with custom rules for scale scoring this test 5.Reporting: an XML representation of a test that contains sufficient elements for configuration of a test reporting system for reporting of the scale scores for a test 6. Complete: A superset of all the test elements separately required in all of the test representations above
PRTIB 2	Create XML file containing data required for the DTD.	DE_ALG_registration.xml	An abridged test specification that is used to configure the Test Registration component. No item data is packaged in this format.

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PRTIB 2	Create XML file containing data required for the DTD.	DE_PT_ALG_admin.xml	A test specification that is used to perform adaptive simulations or to configure a test delivery system. A simulation XML must be packaged with the item metadata, and an XML intended for a test delivery component requires full item metadata, content and all item assets such as graphics and multimedia files.
PRTIB 3	Create XML file containing data required for the DTD.	DE_read4_scoring.xml	A test specification that is used to configure a test scoring system. Only item references and scoring information is packaged in this format.
PRTIB 4	Create XML file containing data required for the DTD.	DE_read4_reporting.xml	A test specification that is used to configure a reporting system. No item data is packaged in this format.
PRTIB 5	Create XML file containing data required for the DTD.	DE_ALG_complete.xml	A test specification that is a superset of all the elements described above. The four test specification types above contain some common elements and some unique elements. The Complete package contains a superset of all elements.
PRTIB 6	A Test Packaging function must be included with the Test Authoring application to create Test Packages for various purposes. In order to create a test package explicitly using the Test Packaging user interface, the test and its sub-elements must have been fully approved and be in the Approved or Published workflow level described in section 7.2 Test Approval Workflow		

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VI. Test Dashboard

Component	Test No.	Test Case Scenarios	In Progress	Tests Fulfilled		Build	Expected Delivery
				Pass	Fail		
SB-11 Test Spec Bank	ScriptTSB1.0	RESTful /testSpecification		1	0	v0.0.1	April 14, 2014
		UI Package Management		1	0		
		API		1	0		
		Mongo Repo Example		1	0		
		MnA Logs		1	0		

VII. Executive Test Summary

Our primary test objective was to prove Test Specification Bank component was capable to execute level I and level II requirements and received for required functional areas which are covered in the test plan. Component integration testing among Test Authoring, Test Item Bank and Test Packager in conjunction with Core Standards web services and SAML / SSO authentication across endpoints.

Component interactions, tenancy and deployment tests cover URI, REST operations, RESTful web API HTTP controllers, layers, JSON responses, database collections, UI/persistence, database and web services, authentication, roles and permissions.

Test coverage consisted of positive, negative, boundary and user scenarios based from L2 requirements for assessments, item selection algorithms, publications, scoring functions, SSO, subjects, enemy lists, forms, items, item pools, item groups, performance levels, reporting, segments, blueprints, publishing transitory hierarchical tenancy setup, inheritance of configurations, program management dependent functionality, filtering, sorting, workflow and user interface navigations.

Browser performance and compatibility UI testing was performed cross browsers using Chrome, Fire Fox, Safari and IE where default settings were tested. http: tests covered look and feel standards, services, functionality, logic and usability.

UI testing was based from supporting UI AIR guidelines and direction from their UI team experts that provided unique icons for functional areas, navigational pages and designs and layouts for Test Authoring and Test Specification Bank user interfaces.

Test Equipment / Tools – include but are not limited to: a repeatable infrastructure environment and intel core i5 laptops accessing the /api and using either Fire Fox, IE, Safari or Chrome browsers and their respective REST client plugins. Mac book pro with retina quad core i7 and a linux Ubuntu 12.04

All defect discoveries or improvements revealed during testing were quickly reported, managed and fixed in JIRA. Test coverage analysis compiles from combinatorial pairs, cobertura reports and requirements.

The heuristic test strategy, a simple model was used considering the requirements, tests, and environment and product elements.

Overall the Test Specification Bank component is an integrated component that has good design, reliability, scalability, usability, and capability as a supporting features component among other shared services and for expected future component dependencies.