Methods for Integrating Perception with Other Systems

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Many ways to integrate with other systems

- Embed in an iFrame
  - Wikis
  - Blogs
  - Portals

- Launch and Track
  - AICC
  - SCORM

- API / Data Integration
  - QMWiSe
  - HR-XML

- Portals
  - SharePoint

- Connectors for...
  - SAP
  - Blackboard
  - Moodle
Open Assessment Platform

- User Experience
- Web Services APIs
- Security

Questionmark applications
Third-party applications

Business Layer
Data Layer
Standard Compliant Learning Systems

- Most commercial LMSs support AICC and/or SCORM as do most open source LMSs
- Questionmark Customers Use:
  - Moodle
  - PeopleSoft (Oracle) ELM
  - Plateau
  - Saba
  - SumTotal
  - WebCT/Blackboad
  - To name only a few ...
AICC and SCORM Standards

- Which is Better? It Depends.
- Which is Supported by Your Learning System?
- Does Your LMS support AICC with a Direct URL?

AICC Security
- Standardized HTTP (typically 80 or 443) to Transfer Data Between Perception Server and LMS.
- Firewall issues are typically the largest hurdle

SCORM Security

- AICC is Often Easier to Set Up and Troubleshoot.
- Check Your LMS to See Which is Easier to Set Up.
AICC Standard
AICC – Basics

- **Aviation Industry CBT Committee**
  - Computer Based Training
- Works Using a “Back End” HTTP or HTTPS Communication Between the Two Learning Systems and Running Commands to Pass Specific Data.
- Requires Two-Way Communication Between Servers.
- Perception Defines the Data Sent and Received Using a PIP File. Aicc.pip is Common, but is Often Renamed.
- Some LMS Versions Require a Content Package to be Created. We Have a tool for this—Publish to LMS.
AICC – Setting Up Use Case

- Suppose We Have a Perception 5 On Demand Installation We Would Like to Integrate with an AICC-Compliant LMS.
- Insure Both Systems are on the Same Network and are Not Blocking Port 80 (or 443 for Default SSL Port).
- Create an Assessment in Perception and Set it to Allow Run From Integration.

- Create a content package using Publish to LMS, or (if supported by your LMS) enter a launch URL, such as:
AICC – Communication

Step 1:
LMS sends return URL, Session Tracking ID and Assessment ID.

SSL Port 443

Step 2:
Perception requests the Participant Name.

Step 3:
LMS sends Participant name.

Step 4:
Perception launches the assessment.

LMS Server

Perception Server

Step 5:
Participant finishes. Results are sent back to LMS.

SSL Port 443

Step 6:
LMS accepts and stores result data. Also accepts exit command and confirms.
AICC – Troubleshooting

- The PIP.log File is Your Most Valuable Tool!
  
  C:\Perception5\Server\Logs\Pip.log

- Sample PIP.log entry:
  
  Error 04/27/05 14:36:19
  https://sample.piplog.com/aspen/lang-en/content/cbt_4return.asp
  
  Error in WinHttpSendRequest 12029 - Connection to the server failed.

- This Error Indicates a Problem With the SSL Certificate.

- Most Errors are Standard HTTP Errors Which Can be Googled.
SCORM Standard
SCORM – Basics

- **Sharable Content Object Reference Model**
- SCORM is a Newer Standard for Learning Systems to Communicate Using a Wrapper Page
- Works Using a HTML “Wrapper” Page Which Tracks the Data Being Sent Between the Systems
SCORM – Cross Domain Issue

- Many Browsers Block JavaScript or Java Communication Between Different Domains

Either communication is stopped between the Learning Module and the API...

Or communication is stopped between the API and LMS
SCORM – Communication Basic

Step 1: LMS launches PerceptionSCO.htm including the Assessment ID.

Step 2: PerceptionSCO.htm requests required variables and launches the assessment.

Step 3: Assessment is completed. PerceptionSCO.htm sends results back to the LMS.

Step 4: LMS stores results. When the participant clicks the Home button, the window closes.
SCORM – Detailed Workflow

Create

- Zip file created by PLMS
  - Imsmanifest.xml
  - Contains the relevant information for the PerceptionSCO.htm script to access session.dll
  - PerceptionSCO.htm
  - Contains the JavaScript that interacts with the SCORM API’s as well as launches the assessment by parsing the query string it is called with.

Content Package is imported into LMS

Launch

- Content package uses SCORM API to gather participant details
  - cmi.core.student_id
  - cmi.core.student_name
- Wrapper tells LMS the assessment is starting
  - cmi.core.lesson_status = incomplete
- Session.dll is called via PIP

Notify

- Assessment Submitted
  - Session.dll calls home URL property with values in the query string
    - cmi.core.score.raw
    - cmi.core.score.max
  - Wrapper requests mastery score from LMS
    - cmi.student_data.mastery_score
  - Wrapper notifies LMS that assessment is completed. (No mastery score set)
    - cmi.core.lesson_status = completed
  - Wrapper notifies LMS that assessment has passed/failed (Mastery score set)
    - cmi.core.lesson_status = pass or fail
  - Values are parsed and sent to SCORM API in an http string
  - SCORM API updates LMS with values from the http string using SCORM calls.
SCORM – Detailed Workflow

- Example Imsmanifest.xml
  `<resource identifier="QM_Assessment_7088043157756397" type="webcontent" adlcp:scormType="sco" href="perceptionSCO2004.htm?call=scorm&session=7088043157756397&href=https://ondemand.questionmark.com/12345678/session.php">

- PerceptionSCO.htm file or PerceptionSCO2004.htm file contains the javascript that interacts with the LMS’s SCORM interface (API). As well as launching the assessment by parsing the query string it is called with. In the above example:


  The javascript parses the querystring variables and uses them to assemble the session.dll pip call, so the above parsed would create:

SCORM – Detailed Workflow

- Content package uses SCORM API to gather participant details
- Wrapper tells LMS the assessment is starting
- Session.dll is called via PIP

When the assessment is started the wrapper asks the LMS for two pieces of information:
- **cmi.core.student_id** – this is used for the Participant name. If this is not available or is blank the wrapper will not continue and the assessment will not be started.
- **cmi.core.student_name** – this is used for the Participant details. If this is not available or is blank it is ignored.

The wrapper then tells the LMS the assessment is starting:
- **cmi.core.lesson_status** is set to 'incomplete'

SCORM package calls session.dll via pip using some of the details gathered from the LMS as mentioned above.

The file scorm.pip is used to enable communication between the wrapper and Perception. This is a very simple file that will not normally require changing:
- **[Settings]**
  - UseHome=yes
  - TopicPercent=yes
- **[Output]**
  - SCORE=%SESSION.PERCENT%

The only setting that is likely to need changing is **TopicPercent**. This controls whether topic scoring information is sent to the LMS at end of assessment. The default value is 'yes', meaning that a score for each topic in the assessment is passed to the LMS. Changing this to 'no' will mean that no topic scoring is passed to the LMS.
SCORM – Detailed Workflow

- Assessment Submitted
- Session.dll calls home URL property with values in the query string
- Wrapper requests mastery score from LMS
- Wrapper notifies LMS that assessment is completed. (No mastery score set)
- Wrapper notifies LMS that assessment has passed/failed (Mastery score set)
- Values are parsed and sent to SCORM API in an http string
- SCORM API updates LMS with values from the http string using SCORM calls.

- Notify

Once session.dll is finished it should call the Home URL property, with certain values in the query string.
  - cmi.core.score.raw – this is set to the percentage score attained for the assessment as a whole.
  - cmi.core.score.max – this is always set to 100 to indicate the score is a percentage.

- The wrapper then asks the LMS for the mastery score (i.e. the pass/fail cut score)
  - cmi.student_data.mastery_score – this is used to judge whether the participant has passed or failed.

- If the mastery score is not available (i.e. it was not defined by the LMS) the wrapper tells the LMS that the assessment has been completed.
  - cmi.core.lesson_status – this is set to “completed”

- If the mastery score is available, the wrapper tells the LMS that the participant has passed or failed.
- If the percentage score is greater than or equal to the mastery score the participant is judged to have passed.
  - cmi.core.lesson_status – this is set to “passed”

- If the percentage score is less than the mastery score the participant is judged to have failed.
  - cmi.core.lesson_status – this is set to “failed”

- It then parses these and sends values back to the LMS' SCORM API. This property is determined by where the perceptionsco.htm file is located, so that it can return a string similar to the following:
  - http://URL/locationof/perceptionsco.htm?Score=100&topics=1&Topic_1=Topicname&Percect_1=100

- SCORM receives the querystring and uses variables from it to return the results to the LMS via SCORM calls.
SCORM – Troubleshooting

- On Screen Errors are Important. If Necessary, Take Screen Shots While Testing.
- You Can Check the PIP.log to Verify that the Launch Command is Being Received.
- Command Responses are Not Logged to the PIP.log.
- Relevant Logs are Located in the Default Folder: C:\Perception5\Server\Logs\
- Refer to the Documentation. Great Troubleshooting Steps and Sample Errors are Outlined There.
Publish to LMS
Publish to LMS

- Content Packager → Publish to LMS
- Supports Package Exchange Notification Services (PENS) Standard that Automates the Transfer of Content Packages into the LMS
- SCORM 1.2 and 2004
  - Supported in version 4.4 and higher
- SCORM Wrapper is Now Included in the Package
Publish to LMS

- Select an Assessment in AM or in BBA
  - Select “Publish to LMS”
Publish to LMS

- **AICC Content Package**: An AICC content package consists of .AU, .CR5, .DES and .CST files to enable one or more assessments to be launched using HACP.
- **IMS Content Package**: An IMS content package consists of an XML file containing information about one or more assessments.
- **SCORM 1.2 Content Package**: Consists of an XML file containing information about one or more assessments.
- **SCORM 2004 Content Package**: Consists of an XML file containing information about one or more assessments.
- **Assessment URL**: An assessment URL enables a single assessment to be launched.

[Image of Publish to LMS Wizard window]
QMWISEe

- Who can tell me what it stands for?
  Questionmark Web Integration Services environment

- What in the world is it?
  A Web Services-Based Application Programming Interface
QMWISE – Basics

- Web Service Application Programming Interface
- Allows Safe Access to Perception’s Database to Create, Modify, Automate and Verify Data
- Supports Most Modern Programming Languages (.NET, Java, PHP, PERL)
- Includes Support for Security Headers
  - Secure Server-to-Server Communication
- Comes Installed with Perception 5
- Requires special license
QMWISe Methods

Typical URL - http://servername/qmwise5/qmwise.asmx

QMWISe


The following operations are supported. For a formal definition, please review the Service Description.

- **CreateTopic**
  This method creates a topic from the information supplied and returns the Topic ID of the new topic.

- **AssignAdministratorToAssessmentFolder**
  This method assigns an administrator to a specified assessment folder and sets their permissions to the value specified.

- **GetConfiguration**
  This method returns all current configuration settings contained in the file Web.config.

- **GetAllAssessmentList**
  This method processes a Participant Name and returns a URL that can be used to display a list of assessments for that participant if the participant assessment exists.

- **GetAssessmentResultInfoList**
  This method returns a list giving the full details of the results information for all the assessments in the database.

- **GetAssignmentSchedule**
  This method processes a Schedule ID for a Perception To Go schedule and returns a list giving the full details of the schedule if the schedule exists in the database and is a Perception To Go schedule.

- **CreateQuestionResultInfoList**
  This method creates one or more questions (specified by their Question ID) from a list of question information supplied and returns the number of new questions created.

- **SetParticipant**
  This method processes a Participant ID and updates the details of an existing participant from the participant information supplied. Any group specified will have the new participant as a member if the group exists in the database. Otherwise the group will be ignored.

- **GetAdministratorList**
  This method returns a list giving the full details of all the administrators in the database.
QMWISe Test Harness

C:\Program Files\Questionmark\Perception5\server\qmwise\QMWISeTest
QMWISE Methods

- Methods Grouped Into
  - Gets
  - Creates
  - Adds
  - Checks
  - Sets
# QMWISe Methods

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative URLs methods</td>
<td>Used to return administrative URLs linking to Enterprise Manager and reports</td>
</tr>
<tr>
<td>Administrator data methods</td>
<td>Used to create, delete, check and view administrators. They can also be used to assign administrators to topics and assessment folders</td>
</tr>
<tr>
<td>Assessment data methods</td>
<td>Used to create assessment folders, definitions and topics. They can also be used to list the available assessments and information about them, delete assessments and modify information about them</td>
</tr>
<tr>
<td>Assessment snapshots methods</td>
<td>Used to create, delete and view assessment snap shots. Assessments snapshots form part of the Printing and Scanning solution available in Perception Server</td>
</tr>
<tr>
<td>Assessment URL methods</td>
<td>Used to generate a URL that links to assessments or lists of assessments available to participants</td>
</tr>
<tr>
<td>Disconnected schedule data methods</td>
<td>Used to create, delete and modify disconnected schedules. Disconnected schedules used to form part of the scheduling for Perception To Go assessments. New schedules have been created for Questionmark To Go and can be found in their related sections</td>
</tr>
<tr>
<td>Group data methods</td>
<td>Used to create, delete and modify groups within Perception. Groups are useful to implement as it provides an easy way of scheduling and addressing participants that have something in common</td>
</tr>
<tr>
<td>Group membership data methods</td>
<td>Used to assign participants and administrators to groups. This will allow for easier management of participants</td>
</tr>
<tr>
<td>HR-XML Methods</td>
<td>Used to export data from Perception into various human resource systems that support the HR-XML format</td>
</tr>
<tr>
<td>Overall results data methods</td>
<td>Used to allow the gathering of results, including by assessment, group or participant</td>
</tr>
<tr>
<td>Participant data methods</td>
<td>Used to create, delete and modify participant information. They also allow for lists of participants to be generated including by group</td>
</tr>
<tr>
<td>Results data for specific assessment methods</td>
<td>Used to create results to be placed within the Perception repository. They can also be used to retrieve specific assessment results, which may be of use to external systems</td>
</tr>
<tr>
<td>Result data for specific question methods</td>
<td>Used to retrieve questions from the Perception repository as well as provide a list them</td>
</tr>
<tr>
<td>Schedule data methods</td>
<td>Used to create, delete and modify schedules for participants. They can also be used to gather schedule information by assessments, groups and participants</td>
</tr>
<tr>
<td>QMWISe system data methods</td>
<td>Used to retrieve information about Perception and the QMWISe service</td>
</tr>
</tbody>
</table>
QMWISEe Configuration

- Enterprise Manager
  - Administration
  - Server Management
  - Server Settings
QMWISe Troubleshooting

- The **Soap.log** (**QWS.soaptrace**) is Your Absolute Best Resource!
  
  C:\\Perception5\\Server\\Logs\\Soap.log

- Most Errors in the **Soap.log** are Fairly Self-Explanatory, but Some May Need a Call to Support. Sample log:

  ERROR: 1101 at 2007-02-05 07:26:07:4974

  Cannot find participant.

- Most Common is Error #16. Requires License Update.

- May Not be Efficient for Transferring Bulk Data
## QMWISe Security

<table>
<thead>
<tr>
<th>Security method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOAP authentication</td>
<td>You can require that every message sent to QMWISe includes the name and a secure checksum calculated from a string formed by concatenating the ClientID with the encrypted password for the administrator. This means that no one can use QMWISe unless they know the name and password of such an administrator. Refer to <strong>In-built security</strong> for more details.</td>
</tr>
<tr>
<td>Encrypting messages</td>
<td>The name and checksum used by SOAP authentication has to be included in the messages sent to and from QMWISe. If someone can intercept a single message they will see this information and could make their own request messages. Typically, QMWISe messages only pass from server to server, so interception is unlikely – but it is possible. Use of SSL will encrypt all QMWISe message traffic and minimize the risk of interception. It will also stop confidential data being revealed by eavesdropping on the traffic. It is important to note that the use of SSL will slow down communication between servers as encryption and authentication takes place. Refer to <strong>Using SSL</strong> for more details.</td>
</tr>
<tr>
<td>Restricting access to clients</td>
<td>You can set up QMWISe so that only authorized IP addresses can access it. This means that even if someone else knows the URL for QMWISe and the name and checksum required for SOAP authorisation, they can’t easily access QMWISe because their IP address will not be acceptable. Refer to <strong>Using IIS to control access</strong> for more details.</td>
</tr>
</tbody>
</table>
Pip.log and Soap.log Files

Both Can be Enabled or Disabled in the Perceptionv5.ini File Either by Editing it using Notepad or Using the “Server Settings” Option in Enterprise Manager.

- Recommend Disabling Unless you Need to Track this Data or are Troubleshooting.
Custom Integrations
Questionmark Consulting Services

Consulting Services can:

- Create Custom Solutions to Integrate Into your Existing Systems

- Help You Synchronize Data from Other Systems (Such as Synchronizing Participants from HR systems)

- Design Custom Launch Screens that Work with SSO Solutions Such as SiteMinder (For Both Assessment Launch and Enterprise Manager)

- Real Time or Batch Reporting of Scores to a Third Party
Integrations Documentation

- How to Integrate Perception with Third-Party Applications

- Integrations Using Single Sign-On (SSO) to Authenticate

- Perception Integration Protocol (PIP)
SCORM and AICC Kbase Articles

- How can I call Perception from a AICC HACP-compliant Learning Management System?

- How can I pass demographic data from an AICC HACP-compliant Learning Management System to Perception?

- How can I call Perception from a SCORM-compliant Learning Management System?
Kbase Articles for Specific LMSs

- **Blackboard**

- **Moodle**

- **SumTotal**

- **Saba**

- **PeopleSoft ELM**

- **SAP**
Resources - QMWISe

- QMWISe Technical References Guide
Questions?

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