LTI Resource Search
Integrating Resources and LORs Directly Into Learning Platforms
Overview and Status
August 2018
Why Weave OpenEd Resources Into Your Tool

- Aligned to all important standards and skills
- Effective (based on video consumption followed by assessment)
- All high quality instructional videos that exist
- Classroom assessments from most popular formative assessment banks
How Do Learning Platforms Integrate Resources Today?

Teacher searches LORs one at a time

Teacher installs “LTI resource picker” app into learning platform

Teacher selects a resource

Teacher collects resources in “shopping cart”

Teacher copies and pastes URL into learning platform

Resources added to course in learning platform

OR

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What’s the problem?

- Inconsistent User Interfaces
- Learning Platform should be the “teacher cockpit”
- LORs have unnecessary development burden for LTI “resource picker” apps
- LTI apps add additional credentialing requirements which aren’t needed in an API search call
Many Moving Parts, UI Switches, Opportunities for Failure
So What’s A Better Way?

- Provide a standard REST API for searching LORs
- Let the learning platform or tool own the teacher experience
- Provide the ability for the learning platform or tool to search multiple LORs
  - With little work for the learning platform or tool
  - And even less work for the teacher
- LORs get to implement one search API
  - And connect to many LMSes
Ah Sweet Simplicity… For the Developer and the User

Learning Tool (LMS)
with Resource Search UI Built-in

Learning Object Repository

LTI resource search call

LTI resource search return
So Why A New Standard Now?

- Current process is too complicated for teachers to use the digital resources in multiple LORs
- Finally consensus on what a learning object should have as metadata:
  - LRMI/schema.org
- REST APIs are commonplace now
  - Specifically IMS has made some nice progress on REST/JSON APIs with OneRoster that can be used as a model
So What Comprises the Standard?

- REST calls for resource searching and getting possible values (such as subjects)
- Resource metadata (the payloads of returned data)
- Supplementary definitions of certain structures (such as learning objectives)

*Normalized metadata for all LORs is really quite a big deal*
What Do We Care About for Learning Resources?

- resource name and description
- resource type
- publisher or owner of the resource
- license that applies (such as Creative Commons or a publisher’s URL to their license)
- duration (time to consume)
- web link or LTI link to access
- technical format (MIME types such as “text/html”, “video/mpeg”)
- educational audience (student, teacher, administrator, parent, other)

- thumbnail image
- subject
- language
- age range (more int’l than grade)
- learning objective (such as a state standard)
- author
- publish date
- rating
- relevance
Learning Resource Types

- Work done by CCSSO Communities of Practice to define resource types
- Hierarchical approach enables many types without cognitive overload
- Resources can be tagged with multiple resource types simultaneously
- Examples:
  - Assessment/Formative, Assessment/Interim
  - Collection/Course, Collection/Unit
  - Text/Book, Text/Passage
  - Media/Video
What Does the REST API Look Like?

- An example search
  - https://imsglobal.org/ims/ltisearch/resources?filter=search%3D%27civil%20war%27
  - Note: arguments to filter parameter are URL encoded (hence need for filter parameter)

- Search (filter) data fields:
  - search (searches multiple fields as LOR chooses)
  - name
  - description
  - subject
  - learningResourceType
  - language
  - typicalAgeRange
  - textComplexity
  - learningObjectives
  - author
  - publisher
  - timeRequired
  - technicalFormat
  - educationalAudience
  - accessibilityAPI
  - accessibilityInputMethods
  - publishDate
  - rating
  - relevance
Filtering Options

OneRoster offers powerful searching controls starting with filter with two options:

1. Full predicate logic:

\[ \text{?filter}=<\text{data field}><\text{predicate}><\text{value}> \]

OR

\[ \text{?filter}=<\text{data field}><\text{predicate}><\text{value}><\text{logical}><\text{data field}><\text{predicate}><\text{value}> \]

- Predicates: =,!=,>,>=,<,<=

2. "attribute=" and "attribute~" shorthands (after "filter=")

- This provides OR searching semantics
  - ?filter="subject=subject1" - record not returned;
  - ?filter="subject=subject1,subject2" - record not returned;
  - ?filter="subject=subject1,subject2,subject3" - record returned;
  - ?filter~"subject=subject1" - record returned;
  - ?filter~"subject=subject1,subject2" - record returned;
  - ?filter~"subject=subject1,subject2,subject3" - record returned.

NOTE: To support this predicate logic we MUST have a “filter=” parameter and URL encoded query
Pagination, Sorting and Selection

These options introduced by OneRoster control how data is returned

- **Pagination**
  - Limit (default 100)
  - Offset (default zero)
    - https://imsglobal.org/ims/ltisearch/resources?limit=10&offset=0

- **Sorting**
  - sort=<data field> (but not multiField)
  - orderBy =asc | desc
    - https://imsglobal.org/ims/ltisearch/resources?sort=publishDate&orderBy=desc

- **Selection**
  - Defaults to all fields returned
  - Or list the ones you want
    - https://imsglobal.org/ims/ltisearch/resources?fields=name,url
Current Status

● Spec is public!
  - http://imsglobal.org/resource-search
  - Including Swagger/OpenAPI (such nice progress from IMS Global team)

● Two certified providers: ACT OpenEd, Knovation

● Plugfest demonstrating interop of LTI Resource Search
  - At February and May meetings
Next Steps

- Client conformance
  - ACT OpenEd, Knovation, SAFARI Montage, SchoolCity all working on their clients
  - They were of course demonstrated. Just working through conformance suite
Futures for LTI Resource Search

● Search for assessment objects (items, forms)
  - The metadata there is quite different from instructional resources
  - Should be mostly QTI
  - Do institutions (states, districts) want this?

● Aggregation from multiple LORs?
  - Who will be implementing the aggregation methods? The LMS?
  - What is a realistic way to merge results? Relevance?! Publish date?
  - Is the net result better than multiple tabs?

● Potential standardization of K-12 subjects

● Other ideas?
Call to Action for Suppliers

● Check out the spec at https://www.imsglobal.org/sites/default/files/spec/lti-rs/v1p0/rest_binding/rsservicev1p0_restbindv1p0.html
  ○ Should save you quite a few steps of navigation

● See my open source sample client for key steps to implement
  ○ http://github.com/openedinc/srch_cli

● Go get certified!
  ○ https://www.imsglobal.org/learning-tools-interoperability-Lti-resource-search%E2%84%A2-conformance-certification-testing