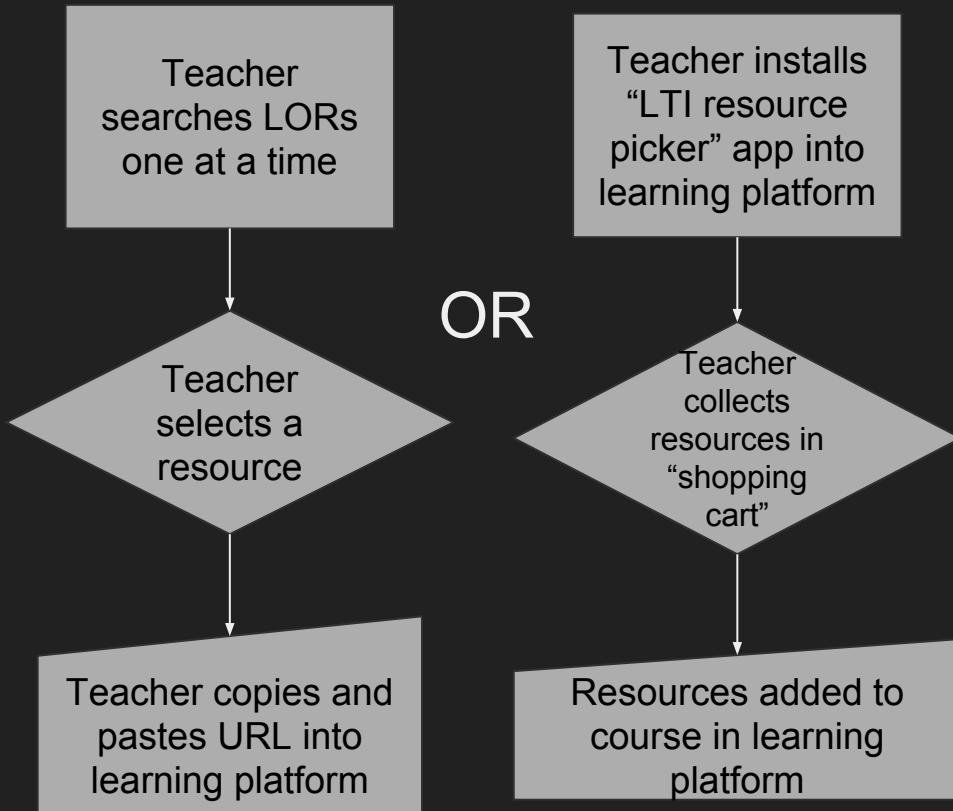


# Why LTI Resource Search?

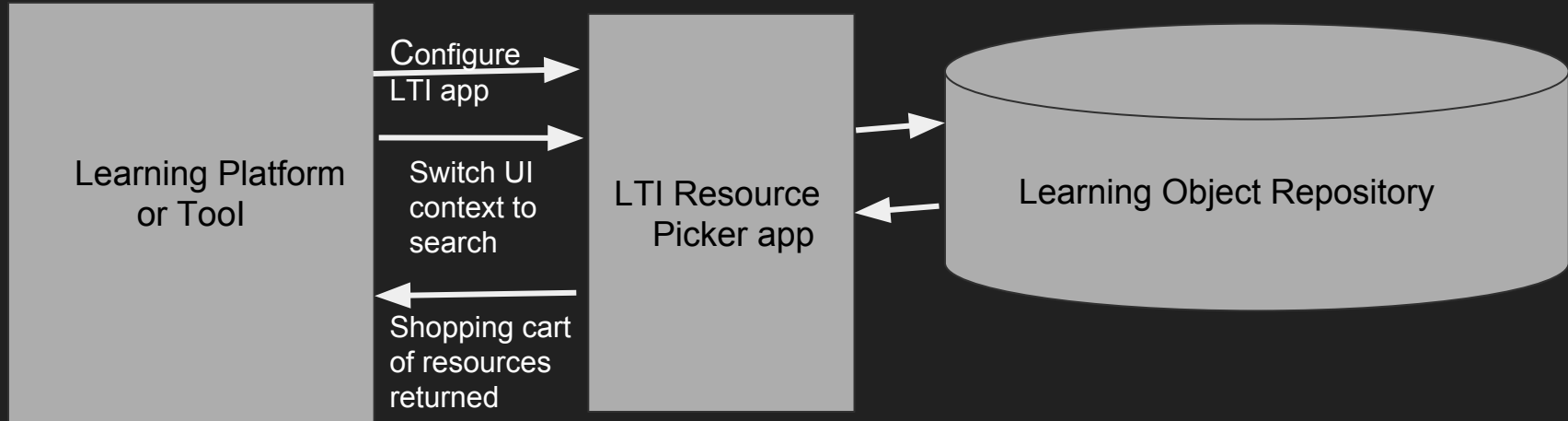
Integrating Resources and LORs  
Directly Into Learning Platforms and Tools

# How Do Learning Platforms and Tools Integrate Resources Today?



- 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

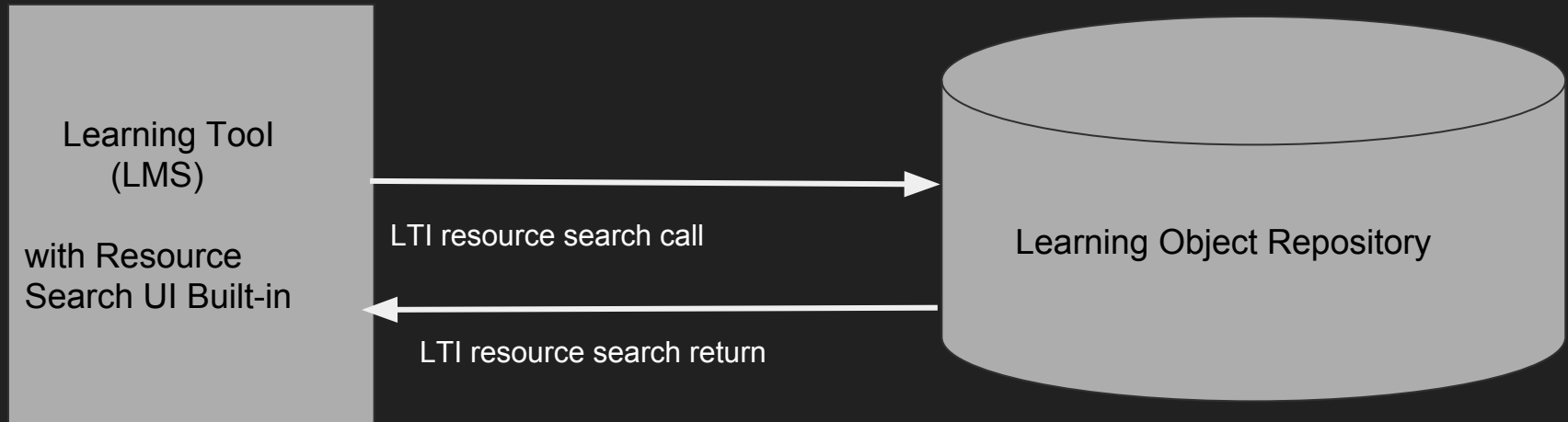
# Many Moving Parts, UI Switches, Opportunities for Failure



# 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 LMS

# Ah Sweet Simplicity... For the Developer and the User



# 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)

# Use Case: Basic Search

Use keywords to search for learning objects in restricted- and unrestricted-access libraries.

Each result will include:

- Name
- Description
- Link to content object (URL or LTI link with accessing method)
- Relevancy rating
- Lots of metadata for each resource type....



# 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://imglobal.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**

# Use Case: Advanced Search

Advanced search: Use keywords (search terms) and metadata (filter values) to search for learning objects in restricted- and unrestricted-access libraries.

Results will be filterable by many criteria and sortable:

- by audience
- by relevance (i.e., “best matches first”)
- by resource type (i.e., assessments, worksheets, reference topics, etc)
- by media type (i.e., videos, images, documents)
- by license/rights (such as grouping Creative Commons together)
- by publisher (i.e., matches from sources together)

# Filtering Options

OneRoster offers powerful searching controls starting with **filter**.

```
?filter=<data field><predicate><value>
```

OR

```
?filter=<data field><predicate><value><logical><data field><predicate><value>
```

- Predicates:
  - =, !=, >, >=, <, <=
- Filter AND or OR (=, ~)
  - 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 content

# Pagination, Sorting and Selection

These options introduced by OneRoster control how data is returned

- **Pagination**
  - Limit (default 100)
  - Offset (default zero)
  - `https://imglobal.org/ims/ltisearch/resources?limit=10&offset=0`
- **Sorting**
  - `sort=<data field>` (but not multiField)
  - `orderBy =asc | desc`
  - `https://imglobal.org/ims/ltisearch/resources?sort=publishDate&orderBy=desc`
- **Selection**
  - Defaults to all fields returned
  - Or list the ones you want
    - `https://imglobal.org/ims/ltisearch/resources?fields=name,url`

# Futures for LTI Resource Search

- Aggregation from multiple LORs
- Potential standardization of K-12 subjects
- Other ideas?

# Timeline

- Goal of draft standard by end of year
- One implementation of provider by end of year
- Three implementations of provider by 1Q2018
- One consumer by 1Q2018



# Call to Action

## For Learning Platforms

- Search a variety of LORS (OpenEd, Knovation, SAFARI Montage) with just one API

## For LORs

- Get a ready audience of Learning Platform users

## How You Can Help or Learn More

- Join IMS Global!
- Join the bi-weekly, member-only LTI Resource Search meetings, Tuesday at 10am EST
- Track issues in the forums
- Watch for the coming certification tools

BACKUP

## But ...Hasn't This Been Done Before?

- App note on using LTI credentials for resource search and access had example REST call
- LRMI - defines attributes to describe educational resources. Used as LTI RS payloads
- schema.org/CreativeWork - adopts LRMI
- OAI-PMH - older standard used by online libraries for replication