Web Services Bootcamp: Adding Value to Library Apps & Services

Jason A. Clark
Head of Digital Access and Web Services
Montana State University Libraries
A quick look ahead…

• Why web services for libraries?
• What do we gain in the move to "mashup"?
• Define the major terms of web services
• Resources for learning: wizard and tools (Yahoo Pipes, Google Code Playground)
• Code samples for downloading and practicing
Questions?

• Ask anytime during the presentation
• This can be heady stuff
• twitter.com/jaclark or email
Web as Platform

• Tim O'Reilly's concept for Web 2.0

oreilly.com/web2/archive/what-is-web-20.html

• software written above level of single device

• lightweight programming models

• small pieces, loosely joined
Web as Platform

• Examples

  o [www.lib.montana.edu/channel/](http://www.lib.montana.edu/channel/)

  o [www.lib.montana.edu/beta/bookme/](http://www.lib.montana.edu/beta/bookme/)
Terms: API

What is an API?

An application programming interface (or API) is a way for developers to access parts of a remote web site and integrate it with their own site.

MSU Libraries
"lofiAPI" www.lib.montana.edu/~jason/files/api/lofi/
Terms: Web Service

What is a Web Service?
• Broader term
• Public interface (API)
• Provides access to data and/or procedures
• On a remote/external system (usually)
• Use structured data for data exchange (often XML)
Terms: Mashup

What is a mashup?

A Web application that uses and/or combines data from multiple sources within a single tool. Trendsmap [trendsmap.com](http://trendsmap.com)
Terms: Structured Data

Structured data = XML and JSON
• Extensible Mark-up Language and Javascript Object Notation
• Flexible mark-up languages
• Lightweight and easy to parse
• Allow communication between disparate systems
Terms: POST and GET

Two primary verbs for web services actions
• POST data to a web service
• GET data from a web service
• Read and Write actions
Why use Web Services?

• Access to content/data stores you could not otherwise provide (zip codes, news, pictures, reviews, etc.)

• Enhance site with a service that is not feasible for you to provide (maps, search, products, etc.)

• Combine these services into a seamless service you provide (mashups)
Provide Web Services?

• You have a service that benefits your users best if they can get to their data from outside the application

• You want others to use your data store in their applications
Available Web Services

• Google
• Yahoo!
• Amazon
• eBay
• Flickr, Instagram
• New York Times
• Google App Engine (code.google.com/appengine/)
• Netflix
• iTunes
• YouTube
• pinboard.in
• Many more...
Top Mashup Types - recent

Top Mashup Tags

- mapping (13%)
- video (13%)
- tools (13%)
- travel (9%)
- visualization (9%)
- fun (9%)
- music (9%)
- social (9%)
- search (9%)
- weather (4%)

Click on a slice or label to see details || Or see the whole 

ProgrammableWeb.com 04/10/13
Top Mashup Types

Top Mashup Tags

- mapping (26%)
- deadpool (14%)
- search (10%)
- social (10%)
- shopping (7%)
- photo (7%)
- video (6%)
- travel (5%)
- music (5%)
- mobile (4%)

ProgrammableWeb.com 04/10/13
You'd be surprised...

• AllCDCovers.com [http://www.allcdcovers.com/api](http://www.allcdcovers.com/api)
• OpenDOAR [http://www.opendoar.org/tools/api.html](http://www.opendoar.org/tools/api.html)
• Google Book Search APIs - [http://code.google.com/apis/books](http://code.google.com/apis/books)
• LibraryThing APIs - [http://www.librarything.com/services](http://www.librarything.com/services)
• WorldCat Search API - [http://www.worldcat.org/devet/wiki/SearchAPIDetails](http://www.worldcat.org/devet/wiki/SearchAPIDetails)
• Open Library API - [http://openlibrary.org/dev/docs/api](http://openlibrary.org/dev/docs/api)

* See ProgrammableWeb [http://www.programmableweb.com/apis/directory](http://www.programmableweb.com/apis/directory)
Types of Web Services

- SOAP
- XML-RPC
- REST
What is SOAP?

• An acronym for Simple Object Access Protocol
• Version 1.2 of the W3C recommendation
• dropped the acronym
• Specification maintained at w3.org
• There's nothing simple about SOAP!
Using SOAP

• Send a message specifying an action to take, including data for the action
• Receive a return value from the action
• Most SOAP services provide a WSDL file to describe the actions provided by the service
What's WSDL?

• Web Services Description Language
• XML mark-up for describing the functionality provided by a SOAP service
SOAP Example

EBAY wsdl

http://api.google.com/GoogleSearch.wsdl

<?xml version="1.0" encoding="UTF-8"?>
xmlns:ns1="urn:ebay:apis:eBL BaseComponents">

...</SOAP-ENV:Header>

<SOAP-ENV:Body>
<ns1:GetSearchResultsRequest>
<ns1:Version>425</ns1:Version>
<ns1:Query>*</ns1:Query>
<ns1:TotalOnly>true</ns1:TotalOnly>
</ns1:GetSearchResultsRequest>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
SOAP: Final Thoughts

• Complex
• Messaging and Data mingled
• Usually seen in software APIs, but many scripting languages have libraries
• Google API has moved away from it
What is XML-RPC

• XML Remote Procedure Call
• Specification maintained at xmlrpc.com
• Provides a means to call methods/procedures on a remote server and make changes and/or retrieve data
• An early specification
Using XML-RPC

• Most common implementation of XML-RPC used today is that of blog ping services
• Technorati, Flickr, FeedBurner, others?
XML-RPC: Final Thoughts

• An updating protocol
• Early adoption, but little recent development
What is REST?

• The greatest thing since sliced...
• Representational State Transfer
• Unique data resources with addresses
Theory of REST

- Focus on diversity of resources (nouns), not actions (verbs)
- Every resource is uniquely addressable
- All resources share the same constrained interface for transfer of state (actions)
- Must be stateless, cacheable, and layered
REST = Web Protocol

Web As Prime Example
• URLs uniquely address resources
• HTTP methods (GET, POST, HEAD, etc.) and content types provide a constrained interface
• All transactions are atomic
• HTTP provides cache control
REST: Final Thoughts

• Similarity to web - easy to understand
• URL is the method
• Most popular type of web service
Formats for Data from Web Services

• XML
  o Lots of different formats
  o Can use a particular standard
    ▪ MARC XML
    ▪ Dublin Core
    ▪ RSS
    ▪ Atom
  o Or may be a proprietary format

• JSON (Javascript Object Notation)
  o very popular
  o easy to use with Javascript
  o can be simpler to work with

• HTML
Web Services in Libraries

• Vendors: LibGuides, Serial Solutions, ExLibris
• Repository66: mash-up of OpenDOAR data with Google Maps and repository growth charts from ROAR, developed by Stuart Lewis of the University of Aberystwyth, Wales
  http://maps.repository66.org/
• lofiAPI: MSU Libraries (ETD, RMT)
• MSU Library Lifestream: RSS services (Twitter, del.icio.us, last.fm, MSU Library Blog)
• Bento Box Search Interface at NCSU Libraries
  o www.lib.ncsu.edu/search/?q=laser
Web Services in Libraries

• Web Services from OCLC
  o WorldCat Search API
  o xISBN
  o xISSN
  o WorldCat Registry (Registry Search and Registry Detail)
  o WorldCat Identities
  o Virtual International Authority File
  o Terminology Services
• LibraryThing API
• Google Book API
• Open Library API
Under the hood...

Making the examples work... a closer look at the web services handout.

Which examples do you want to talk about?

- Yahoo Pipes
- Google Code Playground
- Basic API examples
What I've Learned

• Web services are closed source software
• Documentation and online support is vital
• Debugging can be hard
• Similarities to common protocols are important
• Practice and finding your development kit is essential
```
google.load('search', '1');

function OnLoad() {
  // Create a search control
  var searchControl = new google.search.SearchControl();

  // Create an ImageSearch
  var imageSearch = new google.search.ImageSearch();

  imageSearch.setRestriction(  
google.search.ImageSearch.REstrict_COLORIZATION_GRAYS  
);

  // Add the searcher to the SearchControl
  searchControl.addSearcher(imageSearch);

  // tell the searcher to draw itself and tell it where to attach
  searchControl.draw(document.getElementById("content"));

  // Find me something fit for a fairytale
  searchControl.execute('Carriage');
```

Output:

```
Carriage
```

Image:

- Garden State... free horse and...
jsFiddle

- Can edit javascript and jquery scripts without a web server
- Can share code examples
- http://jsfiddle.net/libdevel/4HbhB/7/
```html
<div id="booklist"></div>
```

```javascript
$(document).ready(function(){
    // add list of New Books
    function addBooks(){
        $.getJSON( "https://spreadsheets.google.com/feeds/list/0AwwFF5rXKpNdOeh5bVNOd2xLTmVQ0QndMSzFNC1ducFE/od6/public/values?alt=json-in-script&callback=?", function (data) {
            $('#div#booklist').append('<div class="new_books">');</n
            $.each(data.feed.entry, function(i, item){
                var record = '<span style="display:none">' + item.id.$t + '</span>';
                if (item.gsx$isbn.$t) {
                    var img = new Image();
                    img.src = 'http://covers.openlibrary.org/b/isbn/' + item.gsx$isbn.$t + '-S.jpg';
                    if (img.width > 2) {
                        record += '<img src="http://covers.openlibrary.org/b/isbn/' + item.gsx$isbn.$t + '-S.jpg"/>';
                    } else {
                        record += '<img src="https://dl.dropbox.com/u/21793776/covers.jpg"/>';
                    }
                } else {
                    record += '<img src="https://dl.dropbox.com/u/21793776/covers.jpg"/>';
                }
                record += item.gsx$bookTitle.$t + '<br/>' + record + '</div>';
            });
        });
    }

    addBooks();
});
```

**The wilderness from Chamberlain Farm: a story of hope for the American wild**

Author: Dean B Bennett

**The Allagash**

Author: Lew Dietz

Description: Wonderful history of the Allagash.

Makes me want to visit

**Night train at Wiscasset Station**

Author: Lew Dietz; Kosti Ruohomaa

**Away from it all,**

Author: Paul Bunyan and Kid
Last thoughts...

• This stuff is becoming mature.
• Digital Library Federation API recommendation
• Library mashups are here - WorldCat widget for Wordpress
Contact Information

Jason A. Clark
Head of Digital Access and Web Services
Montana State University Libraries
jaclark@montana.edu
www.jasonclark.info
twitter.com/jaclark
406-994-6801