Web Services Bootcamp

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A quick look ahead…

- An overview of the different web services protocols
- Wading through the acronym soup and major terms associated with web services
- Walkthrough of the code that makes it happen
- Code lab
Questions?

- Ask anytime during the presentation
- This can be heady stuff
Getting to know you

- About us
- About you
  - Who knows XML?
  - Who knows javascript and DOM?
  - Who knows PHP?
  - Goals for workshop?
What is a mashup?

• A web application that uses and/or combines data from multiple sources within a single tool
Why use Mashups?

- 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 (mash-ups)
Mashup Examples

- www.housingmaps.com/
- www.lib.montana.edu/beta/bookme/
- www.DistancesCalculator.com
Distance from 📍 Redstone, MT to 📍 Coffee Creek, MT

- **258.01 mi**
  - Straight Distance
- **362 mi**
  - Driving Distance
- **6 hours 44 mins**
  - Estimated Driving Time

The straight distance between Redstone, MT and Coffee Creek, MT is 258.01 mi, but the driving distance is 362 mi.

It takes 6 hours 44 mins to go from Redstone, Montana to Coffee Creek, Montana.

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**Redstone, Montana**
- Latitude: 48.8217 // Latitude: -104.944

**Photos of Redstone, MT**

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**Coffee Creek, Montana**
- Latitude: 47.3478 // Latitude: -110.082

**Photos of Coffee Creek, MT**

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**Redstone, MT Weather**
- Mon
  - 25° F - 57° F
  - Chance of Rain

---

**Coffee Creek, MT Weather**
- Mon
  - 19° F - 36° F
  - Snow
Available Web Services

- Google
- Yahoo!
- Amazon
- eBay
- Flickr
- del.icio.us?
- AllCDCovers.com
- ISBNdb.com
- OpenDOAR
- arXiv.org
- Freebase
- Google Book Search APIs
- LibraryThing APIs
- WorldCat Search API
- Open Library API
Possible Types Of Data

● Bibliographic Data
● Book Covers
● Digital Library metadata and objects
● Reviews
● Ratings
● Library Information
● Map Data
Top Mashup Types - recent

Top Mashup Tags

- Last 14 days
- See all time

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

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

ProgrammableWeb.com 04/10/13
Top Mashup Types

![Pie chart showing top mashup tags: mapping (26%), deadpool (14%), search (10%), social (10%), shopping (7%), photo (7%), video (6%), travel (5%), music (5%), mobile (4%).]
How Do Mashups Work?

- Retrieve data from another source(s) typically via a web service
- Mix these datasets together and integrate them into your website
BASIC CONCEPTS

- API
- Web Service
- GET and POST
- Structured Data
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.
Terms: Web Service

● Provides access to data and/or procedures (API)
● On a remote/external system (usually)
● Use structured data for data exchange (often XML)
● Come in 3 flavors : RPC, SOAP, REST
Demo Time!

- http://www.lib.montana.edu/~jason/files/api/lofi/
Terms: POST and GET

- Two primary verbs for web services actions:
  - GET data from a web service
  - POST data to a web service
  - Read and Write actions
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
Putting it all together

- Data access = Web Services (REST, SOAP, XML-RPC)
- Data typically formatted in XML or JSON
- Data display = one or more scripting languages (javascript, PHP, python, etc)
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
Basic Concepts

• Variables
• Conditions
• Loops
• Functions

http://docs.webplatform.org/wiki/concepts/programming/programming_basics
Demo Time!

- Yahoo Pipes
Yahoo Pipes

- Drag and drop UI for creating mashups
- It’s a way to play with basic programming concepts
- Lots of examples - clone them!
- Variety of inputs and outputs
Yahoo Pipes

● Inputs: RSS feeds, search queries, HTML pages, flickr photos, csv files (Google Spreadsheets), build your own input...
● Outputs: Javascript, RSS, JSON, PHP
Yahoo Pipes Demo

- Use ‘Fetch Feed’ to fetch 2 rss feeds (drupal.org, wordpress.org)
- Use ‘filter’ to limit to two keywords (security, update)
- http://pipes.yahoo.com/pipes/pipe.edit?id=b49ae422dcfc463ccd414f6e16ab6152
Debugging

• Browser Tools
  • Firebug (Firefox) or Firebug lite (chrome)
  • Advanced Rest Client (chrome)
  • Chrome Developer view
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Enc</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>op</td>
<td>present</td>
<td>x</td>
<td>enc</td>
</tr>
<tr>
<td>set_no</td>
<td>005897</td>
<td></td>
<td></td>
</tr>
<tr>
<td>set_entry</td>
<td>0000000001-000000012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>format</td>
<td>marc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
<?xml version = "1.0" encoding = "UTF-8" ?>
<present>
  <record>
    <record_header>
      <set_entry>00000001</set_entry>
    </record_header>
    <doc_number>000189710</doc_number>
    <metadata>
      <oai_marc>
        <fixfield id="FMT">BK</fixfield>
        <fixfield id="LDR">^^^^^cam^^^22003254a^4500</fixfield>
        <fixfield id="001">BCC01-000189710</fixfield>
        <fixfield id="005">20130405142124.0</fixfield>
        <fixfield id="008">101201s2011^^^^nyu^^^^b^^^^001^0^eng^^</fixfield>
        <varfield id="010" i1="" i2="">
          <subfield label="a">2010050095</subfield>
        </varfield>
        <varfield id="016" i1="7" i2="">
          <subfield label="a">015794674</subfield>
          <subfield label="2">uk</subfield>
        </varfield>
      </oai_marc>
    </metadata>
  </record>
</present>
Debugging - advanced

- Turn error reporting on in php.ini
- Apache Log files
Mathematical principles of natural philosophy  by Newton, Isaac, Sir, 1642-1727.

Summary:
Things to Do

- Get data by constructing a query url
- Parse and display the raw data as html (code samples)
- Try a mashup tool
Step 1: Construct a URL

- New York Times API Tool
- Wikipedia API sandbox
The New York Times

Developer Network

API Request Tool

Request URL

http://api.nytimes.com/svc/search/v1/article?format=json&query=newton&api-key=####

Request Results

```json
{
  "offset": "0",
  "results": [
    {
      "body": "8 P.M. (13, 49) WHAT PLANTS TALK ABOUT “Nature” follows J. C. Cahill, an experimental plant ecologist. "byline": "By KATHRYN SHATTUCK",
      "date": "20130403",
      "title": "What\u2019s On Wednesday",
      "url": "http://www.nytimes.com/2013/04/03/arts/television/whats-on-wednesday.html"
    },
    {
      "body": "TAYLORSVILLE, N.C. — Sheri Farley walks with a limp. The only job she could hold would be one where "byline": "By IAN URBINA",
      "date": "20130331",
      "title": "An OSHA Emphasizes Safety, Long-Term Health Risks Fester",
    },
    {
      "body": "A guide to cultural and recreational events in New Jersey. Items for the calendar should be sent "byline": "By IAN URBINA",
      "date": "20130331",
      "title": "CALENDAR; Events in New Jersey",
      "url": "http://www.nytimes.com/2013/03/31/nyregion/events-in-new-jersey.html"
    },
    {
      "body": "A guide to cultural and recreational events in New Jersey. Items for the calendar should be sent "byline": "By IAN URBINA",
      "date": "20130331",
      "title": "CALENDAR; Events in New Jersey",
      "url": "http://www.nytimes.com/2013/03/31/nyregion/events-in-new-jersey.html"
    },
    {
      "body": "Season 2 eggs with salt and cayenne pepper, whisk them, get the pan hot and add ¼ tablespoon butter

HADSBOURG HEIGHTS Bananas Comedy Club Richie Byrne. March 29 at 9 p.m.; March 30 at 7:30 and 10:15 p.m. $20. Best "byline": "By DAVE ITZKOFF, MARK LEIBOVICH, ERIC SPITZNAEL, JOHN HODGMAN, HOPE RREEVES, SAMANTHA HENIG, M
      "date": "20130324",
      "title": "CALENDAR; New Jersey",
      "url": "http://www.nytimes.com/2013/03/24/nyregion/events-in-new-jersey.html"
    },
    {
      "body": "Season 2 eggs with salt and cayenne pepper, whisk them, get the pan hot and add ¼ tablespoon butter

HOW TO MAKE SCRAMBLED EGGS BY WYLIE DUPERSNE KAT WRITES: I believe that"
      "byline": "By DAVE ITZKOFF, MARK LEIBOVICH, ERIC SPITZNAEL, JOHN HODGMAN, HOPE RREEVES, SAMANTHA HENIG, M
      "date": "20130324",
      "title": "The One Page Magazine",
  ]
}
```
Step 2
Work with code samples

- Parse and display the raw data as html
- Workshop Demo Files:  http://librarydev.com/mashupdemos.zip or usb key
- Extract the demo code
Walk Throughs

- Flickr API example
- Lifestream
- Google spreadsheet to HTML
- Google Maps API example
Flickr

- Code Demo: using the Flickr API
Lifestream Demo

- Social Media Lifestream (jQuery) - http://www.lib.montana.edu/~jason/files/web-services/lifestream-jquery-json.html
- lifestream-jquery-json.html file in the mashup demo folder
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>OCLC #</th>
<th>ISBN</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night train at Wiscasset Station</td>
<td>Lew Dietz; Kosti Ruohomaa</td>
<td>Garden City, N.Y.: Doubleday, 1977.</td>
<td>3327044</td>
<td>385129327</td>
<td></td>
</tr>
<tr>
<td>Through the Looking Glass</td>
<td>Lewis Carroll</td>
<td>New York: Morrow, ©1993.</td>
<td>26132443</td>
<td>9780688120498</td>
<td></td>
</tr>
</tbody>
</table>
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: Dorothy Boone Kidney
Description: Compelling autobiography of life in rural Maine

Pride and Prejudice
Author: Jane Austen

Alice in Wonderland
Author: Lewis Carroll

Through the Looking Glass
Author: Lewis Carroll

A Study in Scarlet
Author: Arthur Conan Doyle

The Scarlet Pimpernel
Author: Emmuska Orczy
Description: The first and most successful in the Baroness's series of books that feature Percy Blakeney

The Karate way: discovering the spirit of practice
Author: Dave Lowry
Description: Karate is not just a sport or a hobby - it's a lifetime study toward perfection of
Step 3: Try a Mashup Tool

- Yahoo Pipes
- Google Code Playground
- jsFiddle: http://jsfiddle.net/
Hola, me alegro mucho de verte.
Hi, I'm glad to see you.
```javascript
5 google.load('search', '1');
6
7 function OnLoad()
8 // Create a search control
9 var searchControl = new google.search.SearchControl();
10
11 // Create an ImageSearch
12 var imageSearch = new google.search.ImageSearch();
13
14 imageSearch.setRestriction(google.search.ImageSearch.RESTRIC
15 google.search.ImageSearch.COLORIZATION_GRAYS
16
17 // Add the searcher to the SearchControl
18 searchControl.addSearcher(imageSearch);
19
20 // tell the searcher to draw itself and tell it where to attach
21 searchControl.draw(document.getElementById('content'));
22
23 // Find me something fit for a fairytale
24 searchControl.execute('Carriage');
25
```

Output

Garden State... free horse an...
jsFiddle

- Can edit javascript and jquery scripts without a web server
- Can share code examples
- [http://jsfiddle.net/libdevel/4HbhB/7/](http://jsfiddle.net/libdevel/4HbhB/7/)
```html
  <div id="booklist"></div>
```
```javascript
$(document).ready(function() {
  // add list of New Books
  $.getJSON('https://spreadsheets.google.com/feeds/list/0AwwFF5rXkpNdEH5bVN0d2xLTMvQ9mDSzNFNC1ducFE/first/public/values?alt=json-in-script&callback=?',
  function(data) {
    $('#div#booklist').append('<div class="new_books"></div>');
    $.each(data.feed.entry, function(i, item) {
      var record = '<span style="display:none">' + item.id.$t + '</span>';
      // if there is an ISBN, look for an image
      if (item.gs$isbn.$t) {
        var img = new Image();
        img.src = 'http://covers.openlibrary.org/b/isbn/' + item.gs$isbn.$t + '-S.jpg';
        if (img.width > 2) {
          record += '<img src="http://covers.openlibrary.org/b/isbn/' + item.gs$isbn.$t + '-S.jpg"/>';
        } else {
          record += '<img src="https://dl.dropbox.com/u/21793776/covers丝路/"/>';
        }
        // add title and description
        $('#div#booklist').append('<div>
            <h3>' + item.title.$t + '</h3>
            <p>' + item.description.$t + '</p>
            ' + record + '</div>');
      }
      else {
        $("<div>
          <h3>' + item.title.$t + '</h3>
          <p>' + item.description.$t + '</p>
          ' + record + '</div>").appendTo('#div#booklist');
```
What we'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
Contact Information

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