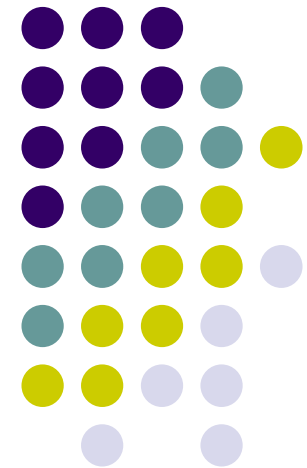
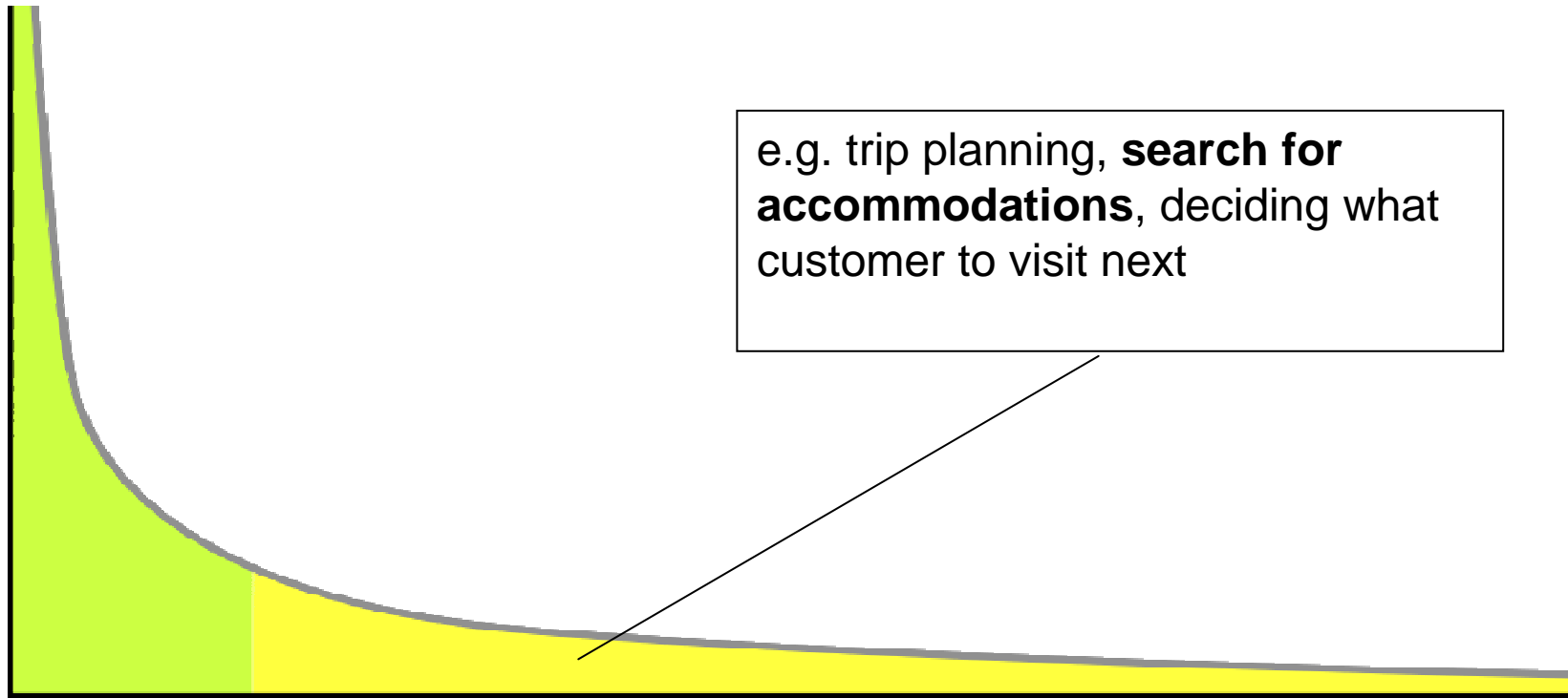
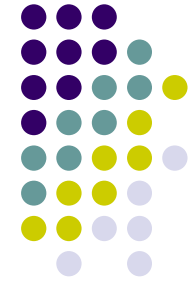


# An End User Perspective on Mashup Makers

Lars Grammel  
The CHISEL Group  
University of Victoria



# Why should end users create software?



The long tail



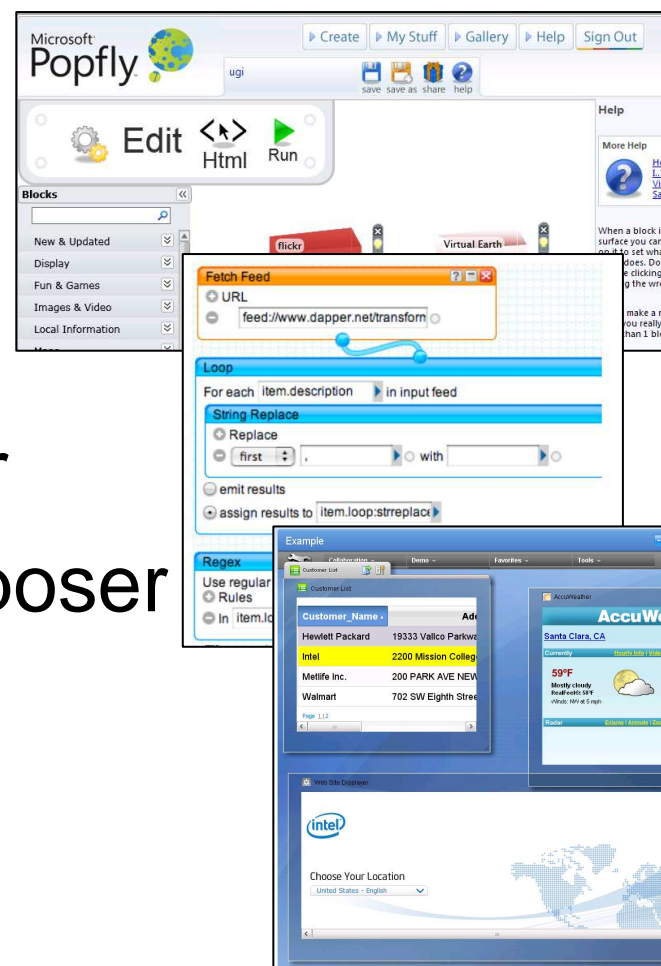
# How do mashups fit in here?

- Mashup: End user driven recombination of web-based data and functionality
  - Web enables reuse and collaboration
- Mashup Makers: Tools that support users in the development of mashups
- **Mashups: a promising approach to address the long tail problem**



# Reviewed Mashup Makers

- Microsoft Popfly
- Yahoo! Pipes
- IBM Mashup Center
- Google Mashup Editor
- Serena Mashup Composer
- Intel MashMaker





# Goals of our review

- **Understand** how end users are supported by **state-of-the-art mashup makers**
- Give **recommendations** how they could be better supported
- Find **research opportunities**

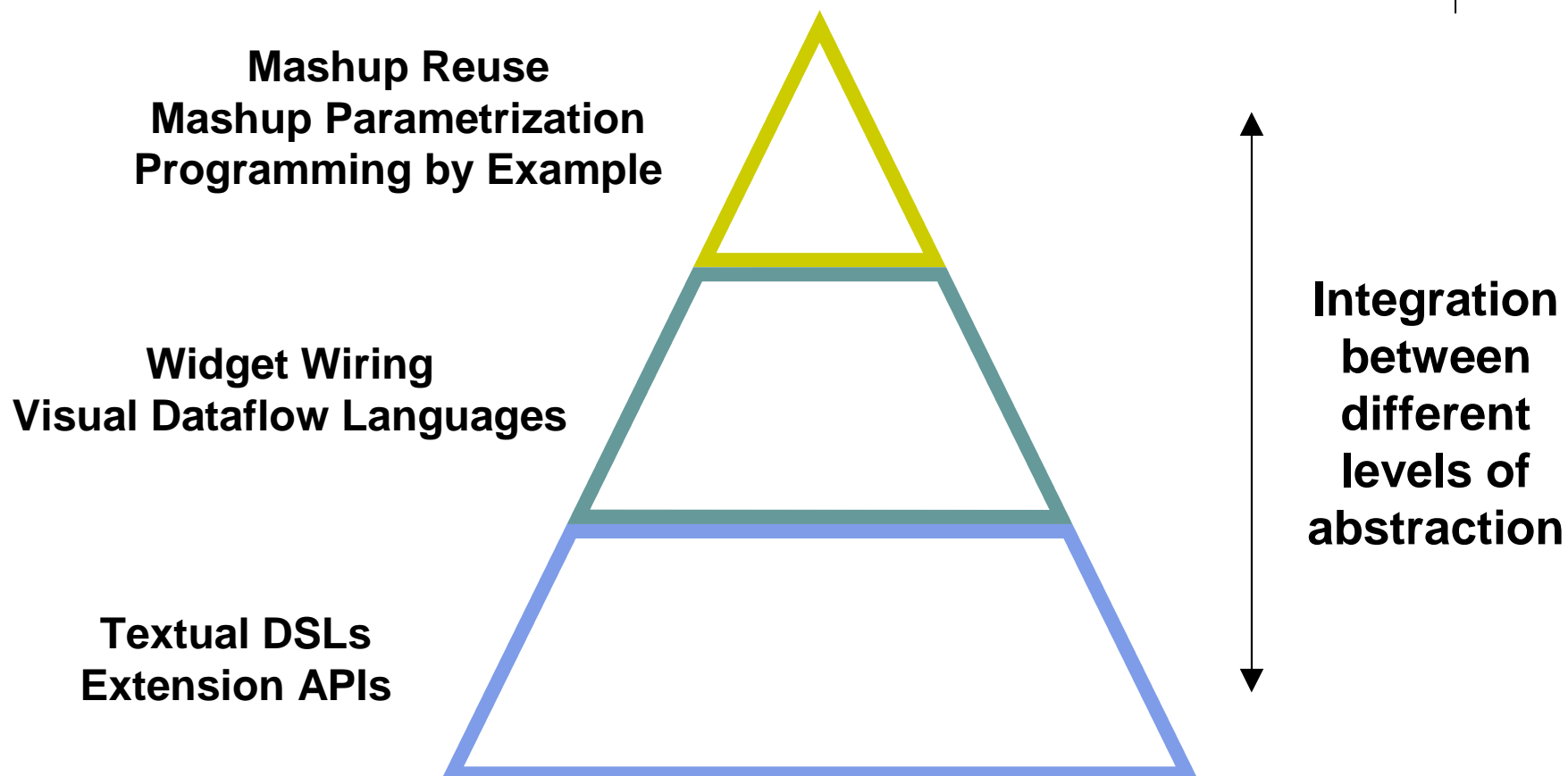


# Evaluation Themes

1. Levels of Abstraction
2. Learning Support
3. Community Features
4. Searchability
5. User Interface Design
6. Software Engineering Techniques



# 1. Levels of Abstraction



# Example: Widget Wiring



The screenshot shows a software interface with a 'Customer List' widget on the left and an 'AccuWeather' widget on the right. A 'Wiring' dialog is open, showing the configuration for the connection between them. The dialog has a 'Receive (1)' and 'Send (0)' section. Under 'Widget To receive content', 'AccuWeather' is selected. Under 'Select content to receive', 'any from Zipcode' is selected. Under 'Select a widget to send content', 'Customer List' is selected. Under 'Select content to send', 'string from Zip' is selected. A tooltip asks 'Which action's content do you want the Customer List send to AccuWeather?' and 'Step 3' is shown. Buttons for 'Show Graph' and 'Done' are at the bottom.

Customer_Name	
American International Group	70 PINE ST
Capital One	1940 Marbu
Cisco	1738 N Nev
Dell	48650 Sem
Ford	3001 Cham

Which action's content do you want the Customer List send to AccuWeather?  
Step 3

Widget To receive content  
AccuWeather

Select content to receive  
any from Zipcode

Select a widget to send content  
Customer List

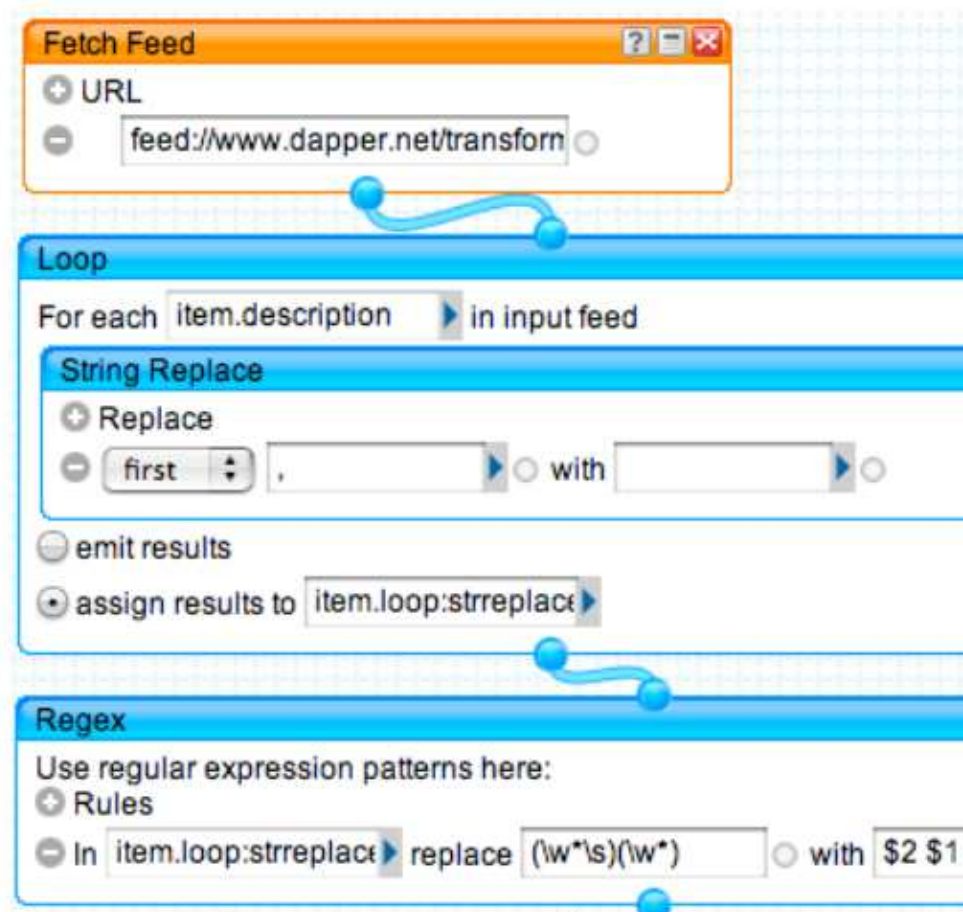
Select content to send

- string from New Feed Address
- any from Row Selection
- any from Select Row as JSON
- any from Send Row as Dojo...
- any from Select Row as XML
- any from Select Cell as CSV
- any from Select Cell as Text
- string from Customer\_Name
- string from Address
- string from Zip
- string from Ticker
- string from URL

Show Graph Done



# Example: Visual Dataflow Languages

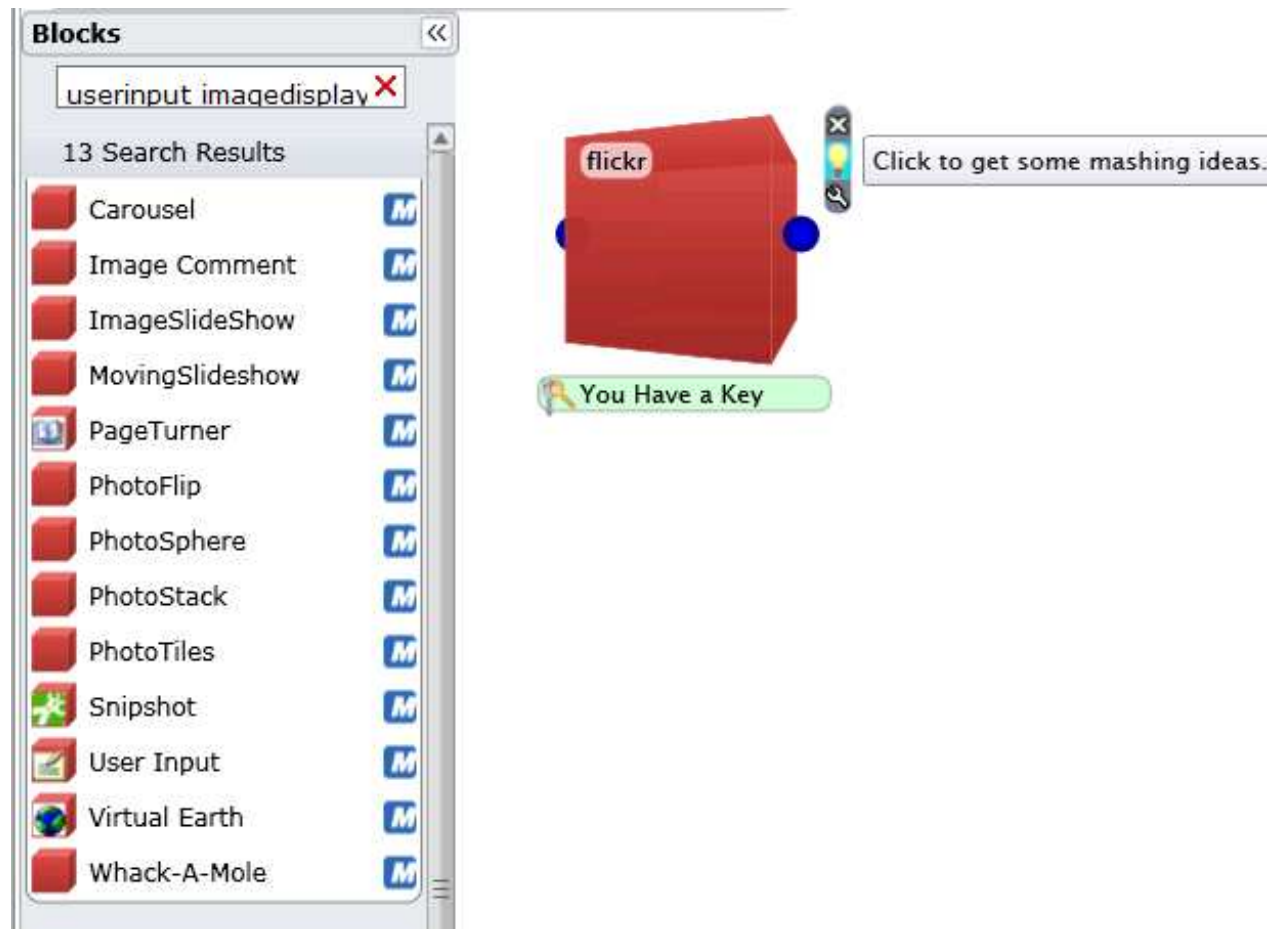




## 2. Learning Support

- Tutorial, Help, API Documentation
- Discussion Forums
- Using Shared Artifacts as Examples, *e.g. Yahoo! Pipes*
- Context-Specific Suggestions, *e.g. MS Popfly*

# Example: Context-Specific Suggestions





## 3. Community Features

- Sharing Mashups and Mashup Elements
- Tagging, *e.g. IBM Mashup Center*
- Rating, *e.g. Intel MashMaker*
- Discussion Forums
- Artifact-Centered Discussion
- Social Network Systems, *e.g. MS Popfly*




# Example: Artifact Centered Discussion



**Description**  
Clock Widget – Is a great Silverlight digital and analog clock for your web site or blog! You can configure its visual parameters in a minute, adding interactivity and up-to-date feeling to your web resource! You can show time in different cities around the world by configuring several clocks.

**Tags**  
display

**Comments**

-  **BelAirIT** on October 27, 2008 2:37 PM  
I wish I could see it! Uses old version of Silverlight.
-  **ahubert61** on June 9, 2008 7:44 AM  
coucou
-  **FLUID** on May 28, 2008 8:12 AM  
Awesome block! Thanks for your contribution, guys!

Add a Comment



## 4. Searchability

- Text-Based Search
- Browsing Mashups by Structural Properties, *e.g. Yahoo! Pipes*
- Simple Categorization of Mashup Elements
- Context-Specific Suggestions

# Example: Structure Based Search

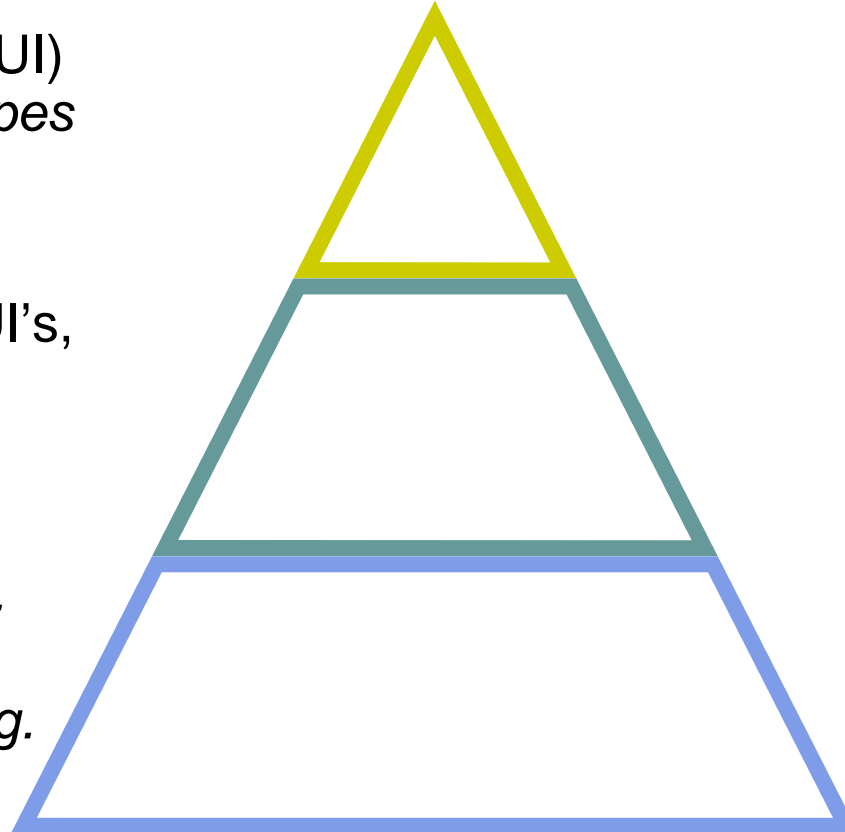


Formats (15) <span>more +</span>	Modules (51) <span>more +</span>	Sources (99) <span>more +</span>
<a href="#">csv (443)</a>	<a href="#">fetch (31080)</a>	<a href="#">api.flickr.com (5609)</a>
<a href="#">georss (2457)</a>	<a href="#">filter (13902)</a>	<a href="#">api.search.yahoo.com (2467)</a>
<a href="#">ical (78)</a>	<a href="#">loop (5210)</a>	<a href="#">blogspot.com (3212)</a>
<a href="#">media (3054)</a>	<a href="#">regex (6399)</a>	<a href="#">feedburner.com (7282)</a>
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<a href="#">media-text (3)</a>	<a href="#">uniq (6522)</a>	<a href="#">search.yahoo.com (4182)</a>
<a href="#">media-video (206)</a>	<a href="#">urlbuilder (5438)</a>	<a href="#">yahoo.com (8458)</a>



# 5. User Interface Design

- Automatic User Interface (UI) Generation, *e.g. Yahoo Pipes*
- Selecting & Customizing UI's, *e.g. MS Popfly*
- Visual UI composition, *e.g. IBM Mashup Center*
- Textual UI composition, *e.g. Google Mashup Editor*







## 6. SE Techniques

- Debugging Output, *e.g. MS Popfly*
- Version Control, *e.g. Serena Mashup Composer*



# Discussion

- **Barriers** between notations on different levels of abstraction
- **Finding** is likely to become a challenge
- Software Engineering Techniques
  - **Correctness** is a major problem with EUD
- **Domain-Specific components**
- **Programming-by-Example** techniques useful in some areas