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Leveraging the Social Web for Situational Application Development and Business Mashups

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About the Speaker: Stefan Tai

- Professor, KIT (Karlsruhe Institute of Technology)
  - Karlsruhe Service Research Institute (KSRI)
  - Institute for Applied Informatics
- Director, FZI Research Center for Information Technology
- Background: IBM T.J. Watson Research Center, New York, USA (1999-2007)

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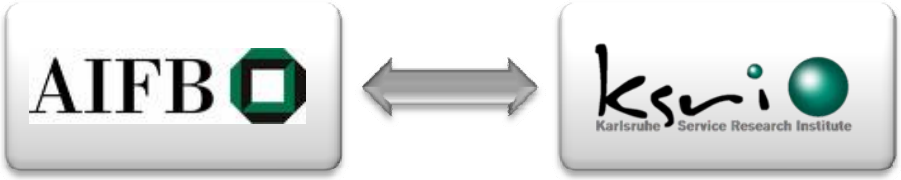
The eOrganization Research Group

www.fzi.de

www.eOrganization.de



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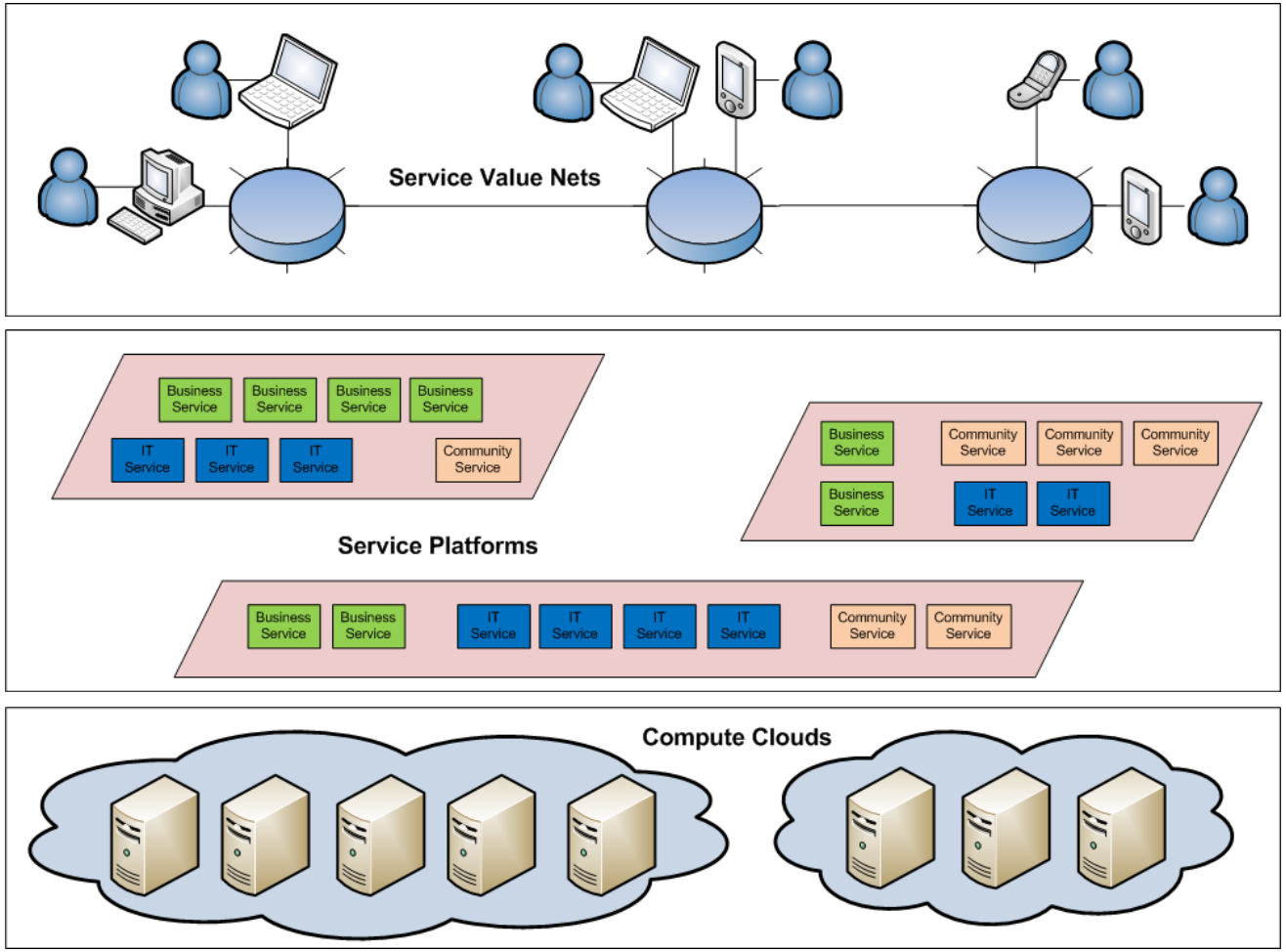
eOrganization Research



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Agenda

- **Introduction:**
  The Long Tail and Situational Applications (Mashups)
- **The Swashup Platform and DSL**

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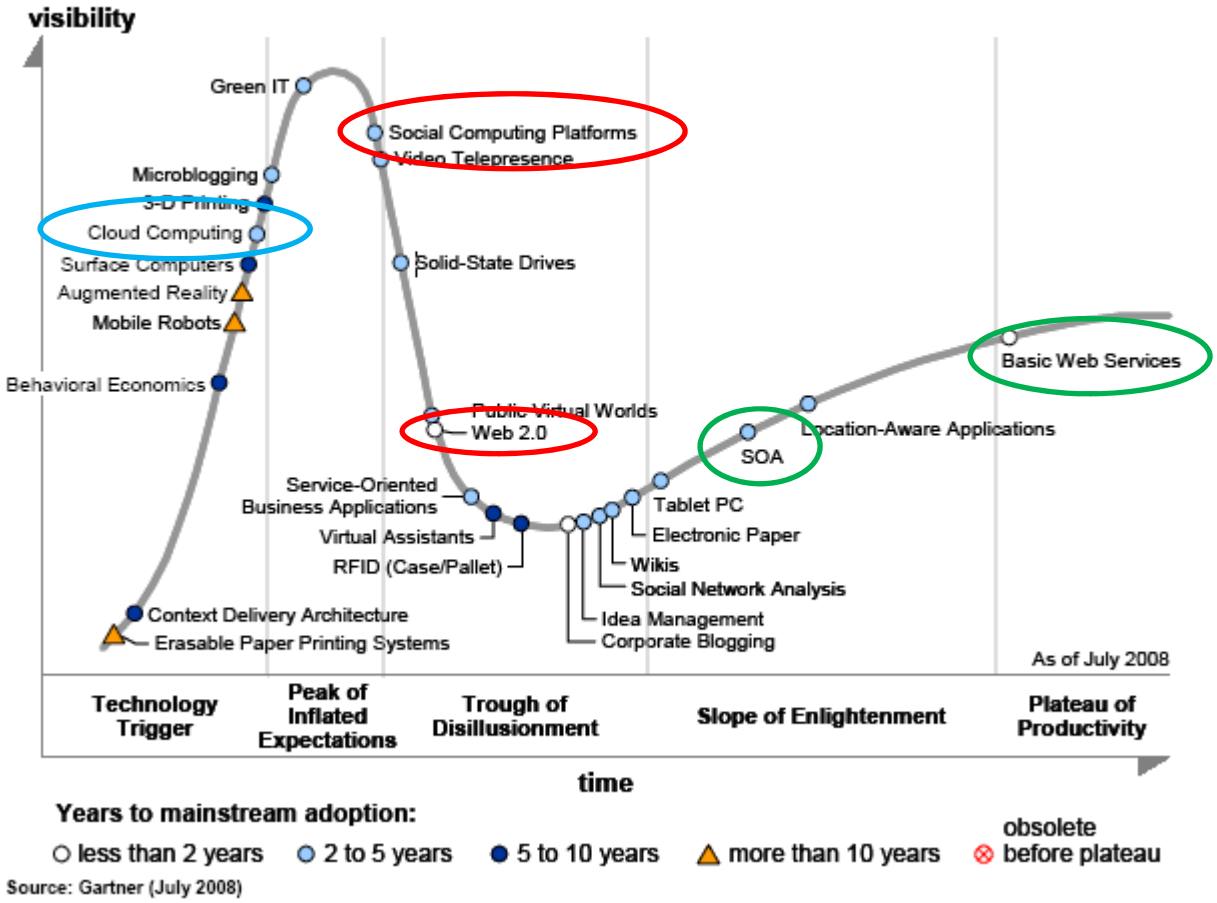
Gartner‘s Hype Cycle for Emerging Technologies, July 2008

Figure 1. Hype Cycle for Emerging Technologies, 2008



Source: Gartner (July 2008)

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Why Social Computing?

- **Explosion in Web usage and content, fueled by global use, mobile device access, and the participation Web: user-generated content, cooperation and innovation**
- **The Web as the desktop (your desktop!)**

➢ **New concepts, methods, and technology needed to leverage the Web as a *combined* compute platform, business platform, and collaboration platform**

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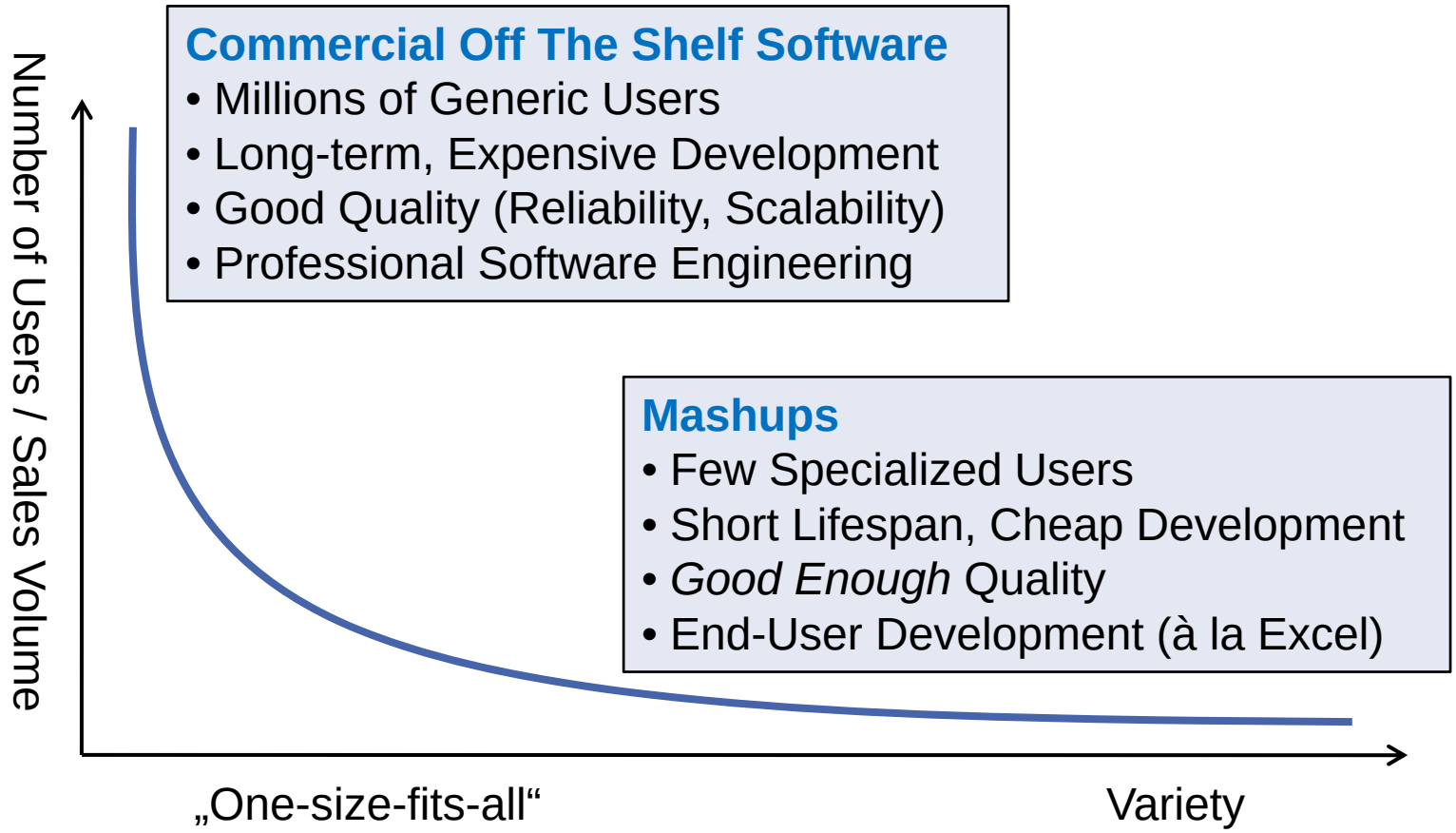
The Long Tail of Business: Mass Servicing of Micro-Markets



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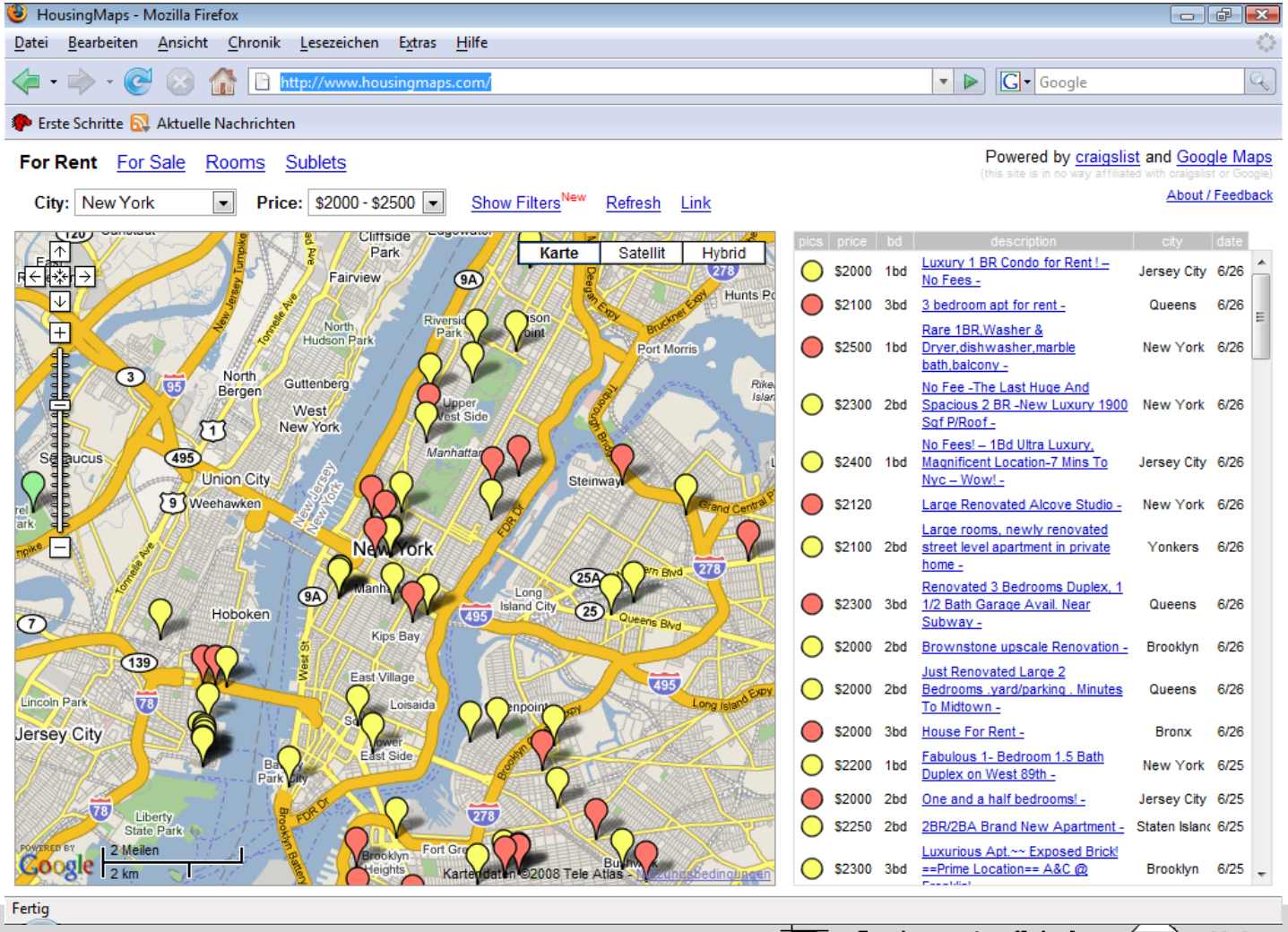
Mashup Example: housingmaps.com



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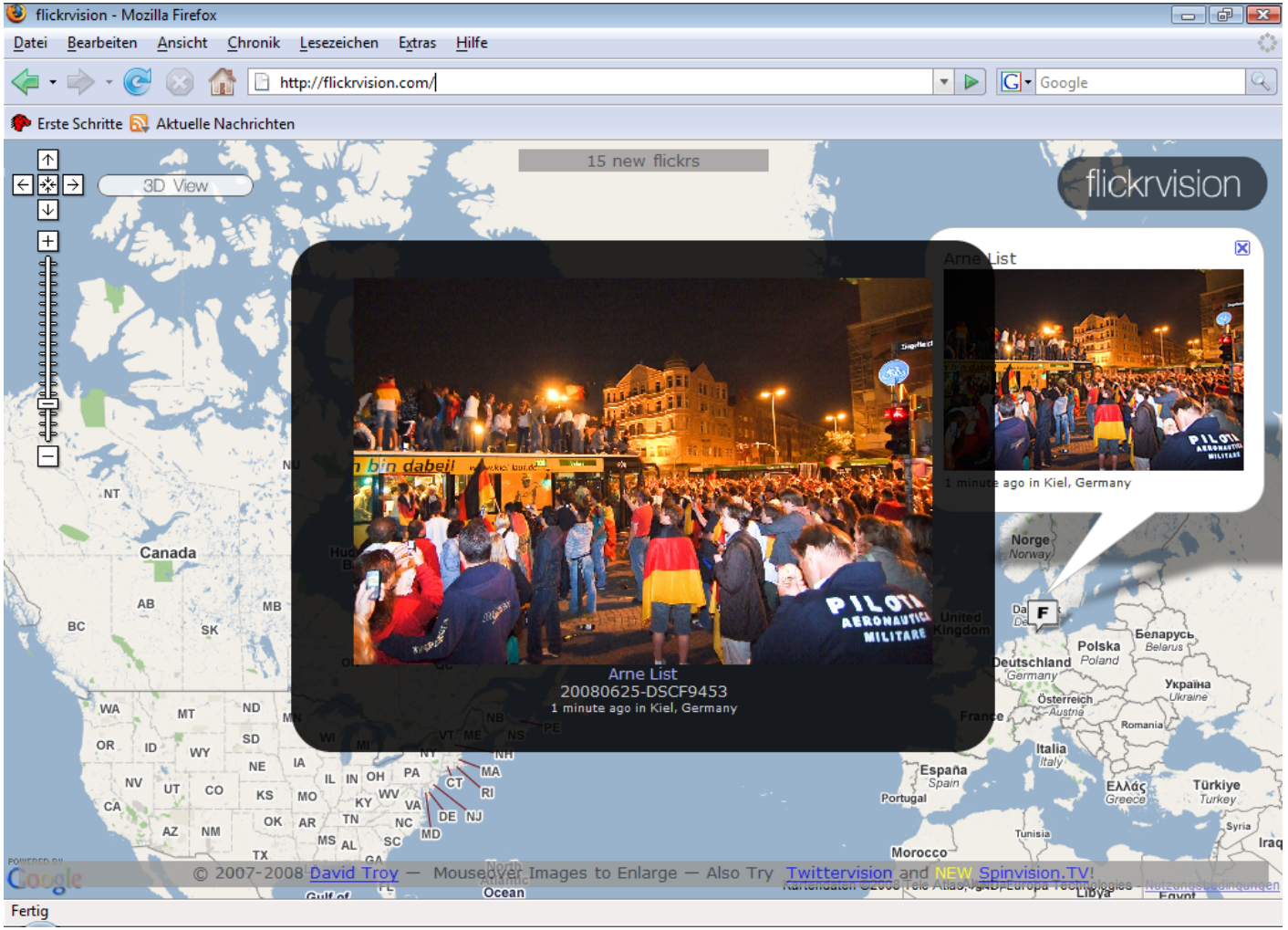
flickrvision.com



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programmableWeb.com

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Mashups

- …are Web applications composing a variety of Web sources via Web APIs, services and feeds (RSS, Atom)
  - Content provider, mashup site, client Web browser
- For situational purpose, fast and good enough
  - Consumer mashups vs. enterprise mashups

- Creation is mostly end-user oriented (often graphical)
- Typically data-driven, aggregating data streams
  - Yahoo Pipes, Microsoft Popfly, IBM Mashup Center, SAP Research Rooftop
- Sometimes process-driven using lightweight workflows
  - IBM Research Bite, Serena Mashup Suite

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Yahoo! Pipes

- … provides a graphical user interface for building applications that aggregate web feeds, web pages, and other services, creating *data mashups* from various sources, and publishing them
- The site works by letting users "pipe" information from different sources and then set up rules for how that content should be modified (e.g. filtering, cf. the New York Times through Flickr example)

source: wikipedia.org

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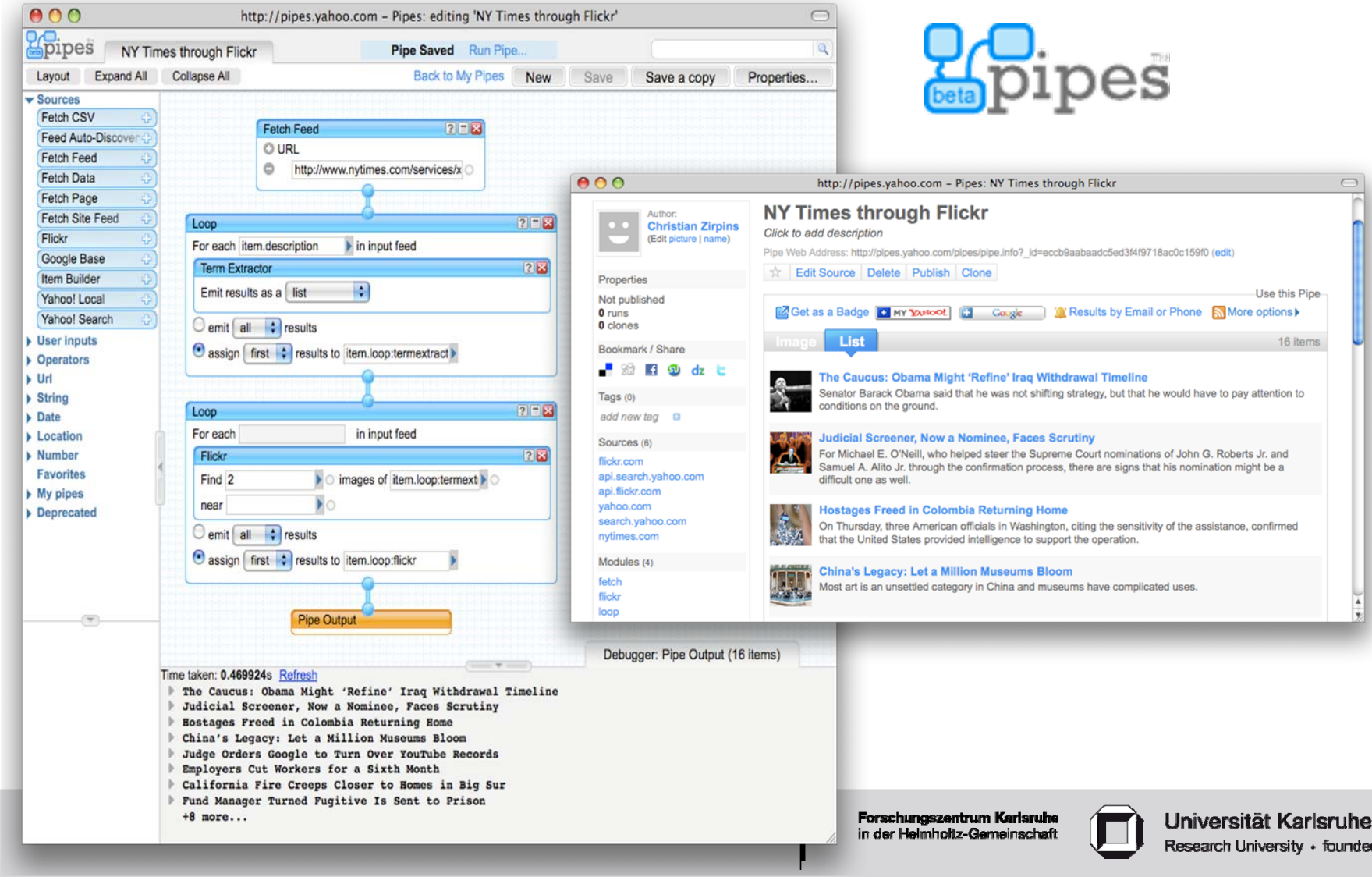
NY Times Through Flickr! (Yahoo! Pipes)



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The Importance of Communities: Yahoo! Pipes Developer Community

- Pipe repository with some 10,000 mashups
  - Advanced searching, querying, and ranking capabilities
  - Reuse: Pipe Clones or references
- Web 2.0 support for pipes developers: tagging, feeds, blogs, forums

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IBM Sharable Code

An Online Platform for Situational Web Applications and Mashups Development and Management

- Started out as a research project at IBM Research
- Now an IBM alphaworks services offering: http://services.alphaworks.ibm.com/isc/

- Joint work with E. Michael “max” Maximilien, IBM ARC
  - http://www.maximilien.com
  - http://blog.maximilien.com

Motivation

- Mashups are ad hoc
  - Difficult to reuse and to share
  - Difficult to discover, to find, and to manage
- (Too) Many service models and types, e.g., SOAP/WSDL, REST, APP, Atom, RSS, ...
- JavaScript UI-based mashups lead to nightmarish code maintenance and security issues
- Lack of unified models and design for mashups

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Swashup beta A uniform platform for developing, sharing, and managing Web 2.0 applications and mashups

- Common service models and mashup design
- Domain-specific languages (DSL) – abstraction
  - data, APIs, services, and mashup
  - tagging, commenting, digging, searching
- Web-based tooling

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Philosophy

- Platform as a set of smaller parts
  - Web applications (tools)
  - Web APIs (services)
  - Reusable components (plugins and gems)
- Interactions between components via APIs
- The platform is itself mashable

➢ ***Web Computing is social, ergo sharable models, sharable components, and sharable designs are key to easier and more productive Web tools***

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The platform itself is mashable and designed as a modern RESTful SOA

- **Builder** application (mashup creator)
  - Enables “easy” design and creation of mashups
  - Agile and social development of mashups parts
- **Community** application
  - Advertisement and community of deployed mashups
  - Discussions, usages, tagging, searching, and ratings
- **Manager** application
  - One-click deployment of mashups to different servers or clouds
  - Management of deployments, e.g., clone, delete, version, ...

Swashup beta

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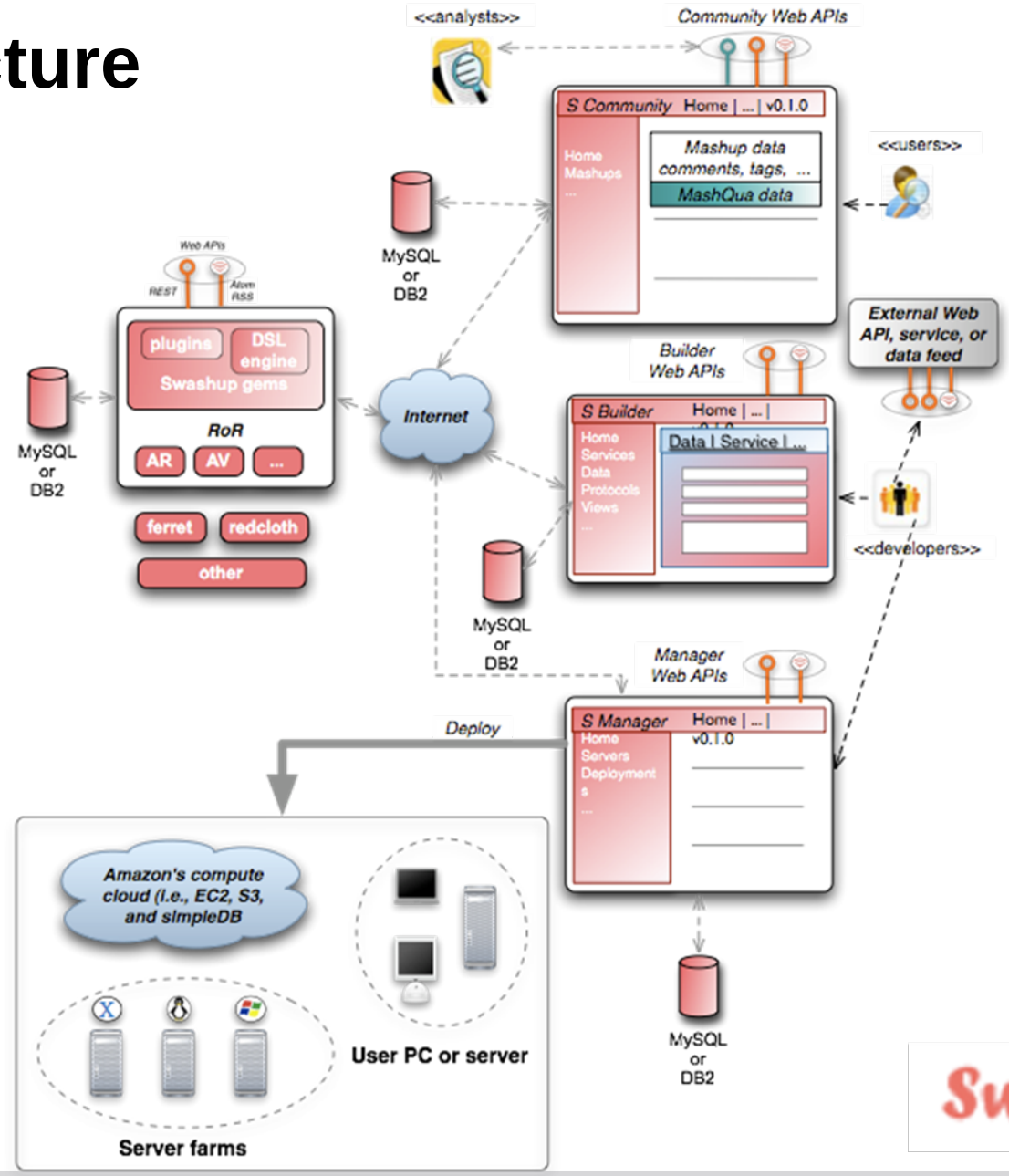
Big Picture



Swashup beta

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A Domain-specific language (DSL) for mashups

- “mini” language built on top of a hosting language that provides a common syntax and semantics
- High-level, mostly declarative, design and programming particular to mashup concepts and behaviors
- Enables easier sharing of parts
- Facilitates the creation of code and tools

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DSL brief overview

- Mashups' designs as recipes (like cooking recipes)
  - Web APIs, services, data, views, ... are ingredients
  - Mashups are unique combinations of Web "ingredients"

- Constructs
  - Represent all basic concepts for creating mashups
  - data, api, service, mashup, connection to user (wiring), connection between services (step), data transformations (mediator), and user interfaces (views)

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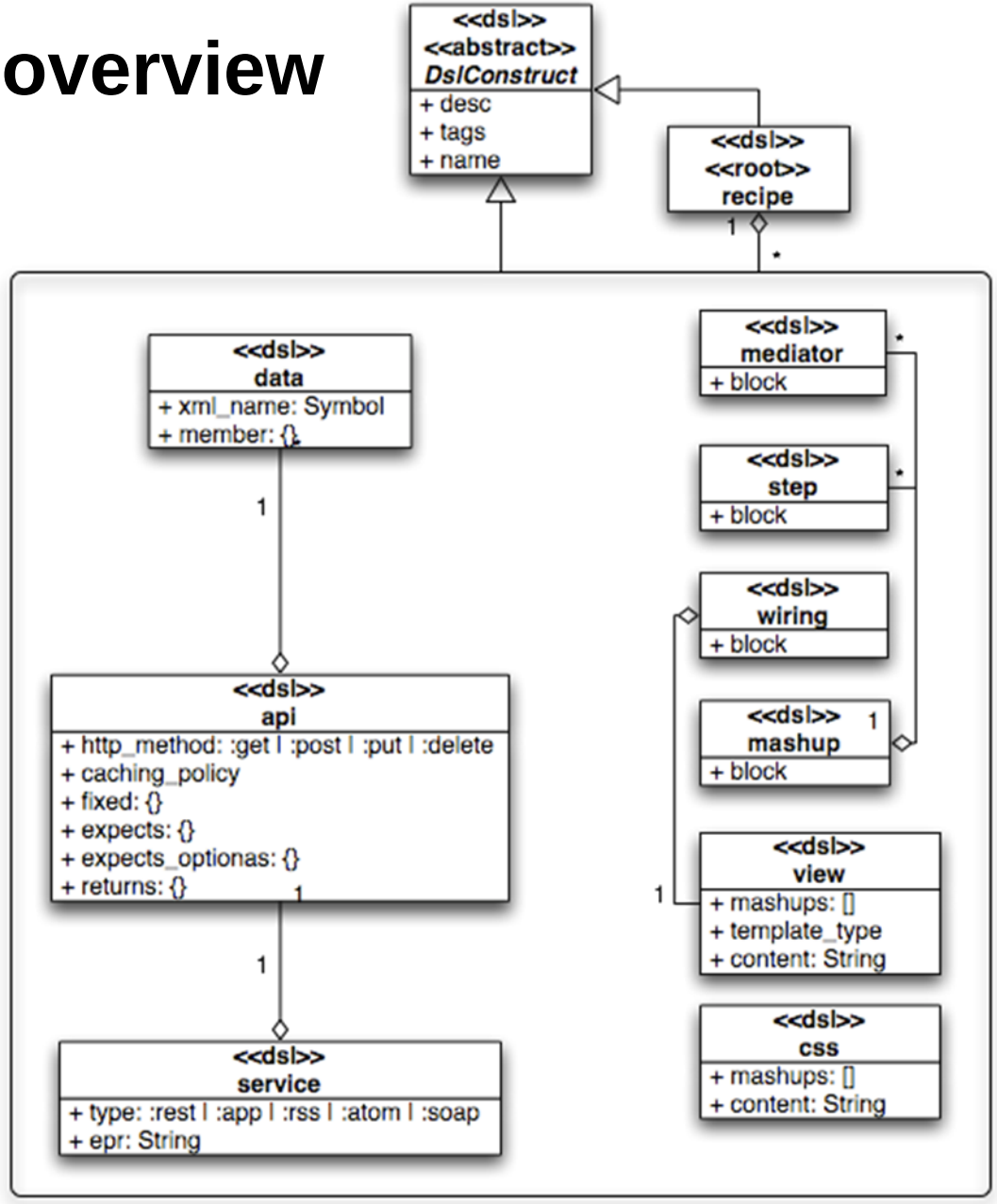
DSL overview



Swashup beta

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DSL details

- recipe – Top level construct; aggregates all others
- data – Describes the schema (data elements) of service's data
- api – Describes the service's API interface
- service – Binds to the actual endpoint, service type, and any special considerations (e.g., caching, headers, ...)
- mashup – One or more services that comprise a collection of wiring and mediation declarations
- mediation – Facilitates data transformation
- wiring – Captures one point of interaction with user
- step – one atomic step in wiring; interaction between services
- view – Captures the view template code for a wiring
- css – Captures view styling via cascading stylesheets
- tag, tags, desc – Captures metadata and English text

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Sample Recipe

flickr_google_news_recipe.rb — swashup

digg_rest_recipe.rb | eventful_rest_recipe.rb | eventful_stanford_recipe.rb | you_tube_flickr_recipe.rb

```
desc "Recipe for flickr.com REST and Google News Atom mashups"
tags ['mashup', 'rest', 'atom']
recipe :flickr_google_news_recipe do

  desc "Flickr's error response part"
  data :FlickrErr do

  desc "Flickr's error <rsp> part"
  data :FlickrErrRsp do

  desc "Flickr's <username>Some name</username> response part"
  data :FlickrUsername do

  desc "Flickr's <photo>...</photo> response part"
  data :FlickrPhoto do
    xml_name :photo

    member :id, :integer, :xml_attribute
    member :owner, :string, :xml_attribute
    member :secret, :string, :xml_attribute
    member :server, :integer, :xml_attribute
    member :farm, :integer, :xml_attribute
    member :title, :string, :xml_attribute
    member :ispublic, :integer, :xml_attribute, :desc => 'integer encoded boolean'
    member :isfriend, :integer, :xml_attribute, :desc => 'integer encoded boolean'
    member :isfamily, :integer, :xml_attribute, :desc => 'integer encoded boolean'
  end

  desc "Flickr's <photos>...</photos> response part"
  data :FlickrPhotos do
    xml_name :photos

    member :page, :integer, :xml_attribute
    member :pages, :integer, :xml_attribute
    member :perpage, :integer, :xml_attribute
    member :total, :integer, :xml_attribute

    member :photos, :FlickrPhoto, :xml_object_array, :desc => 'an array of FlickrPhoto'
  end
```


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Sample Recipe

Swashup beta

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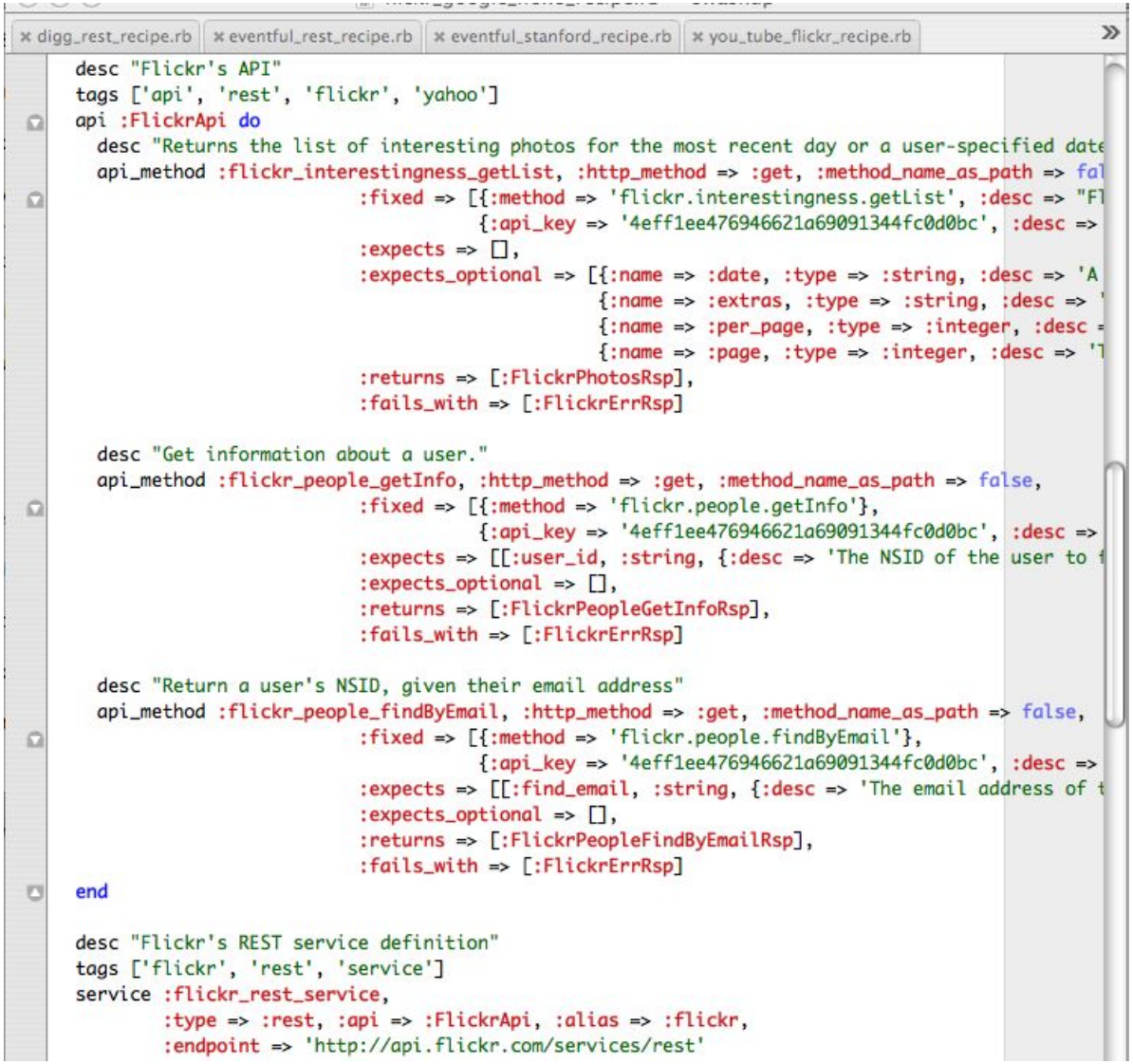

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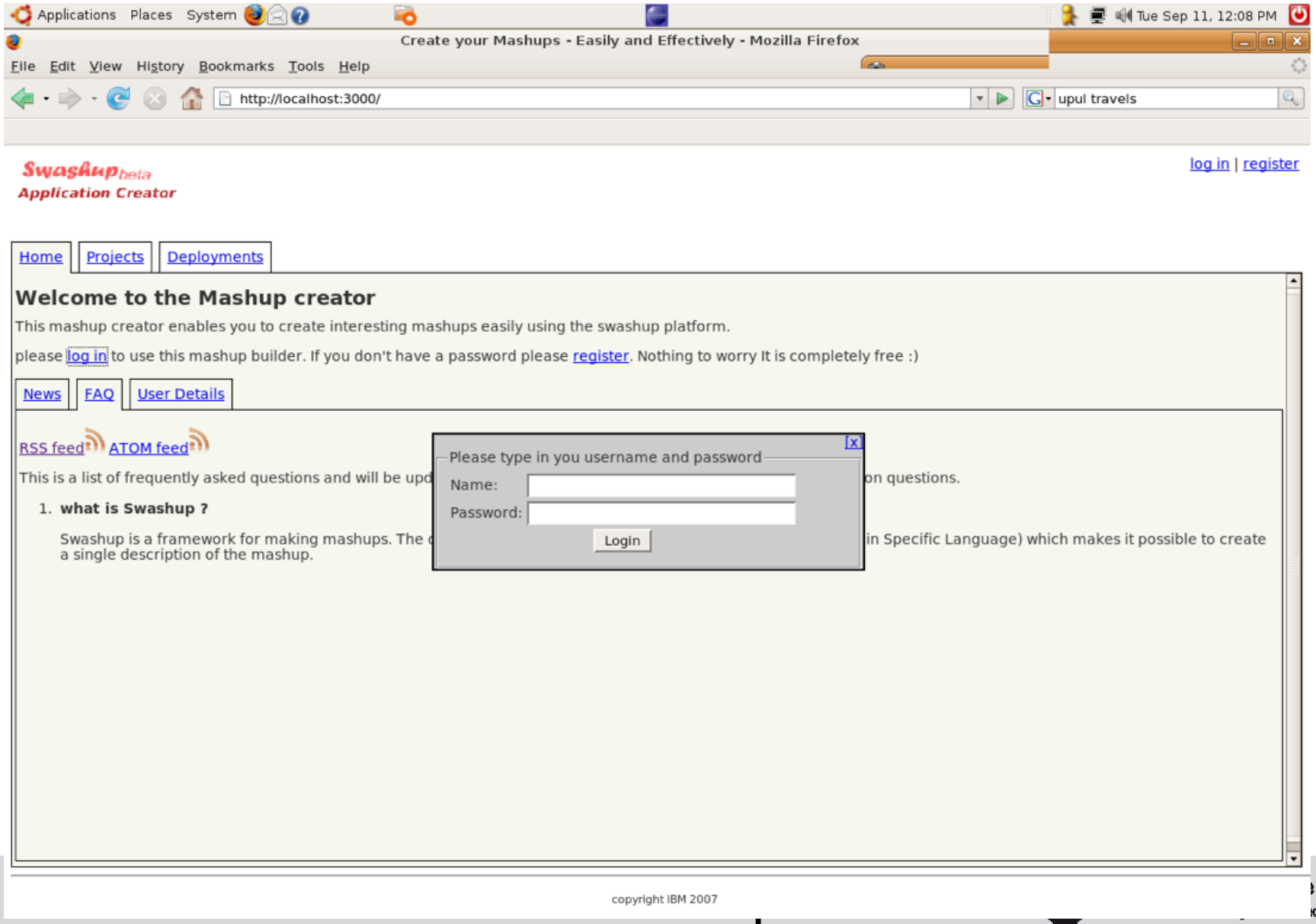
Screen shots: Builder



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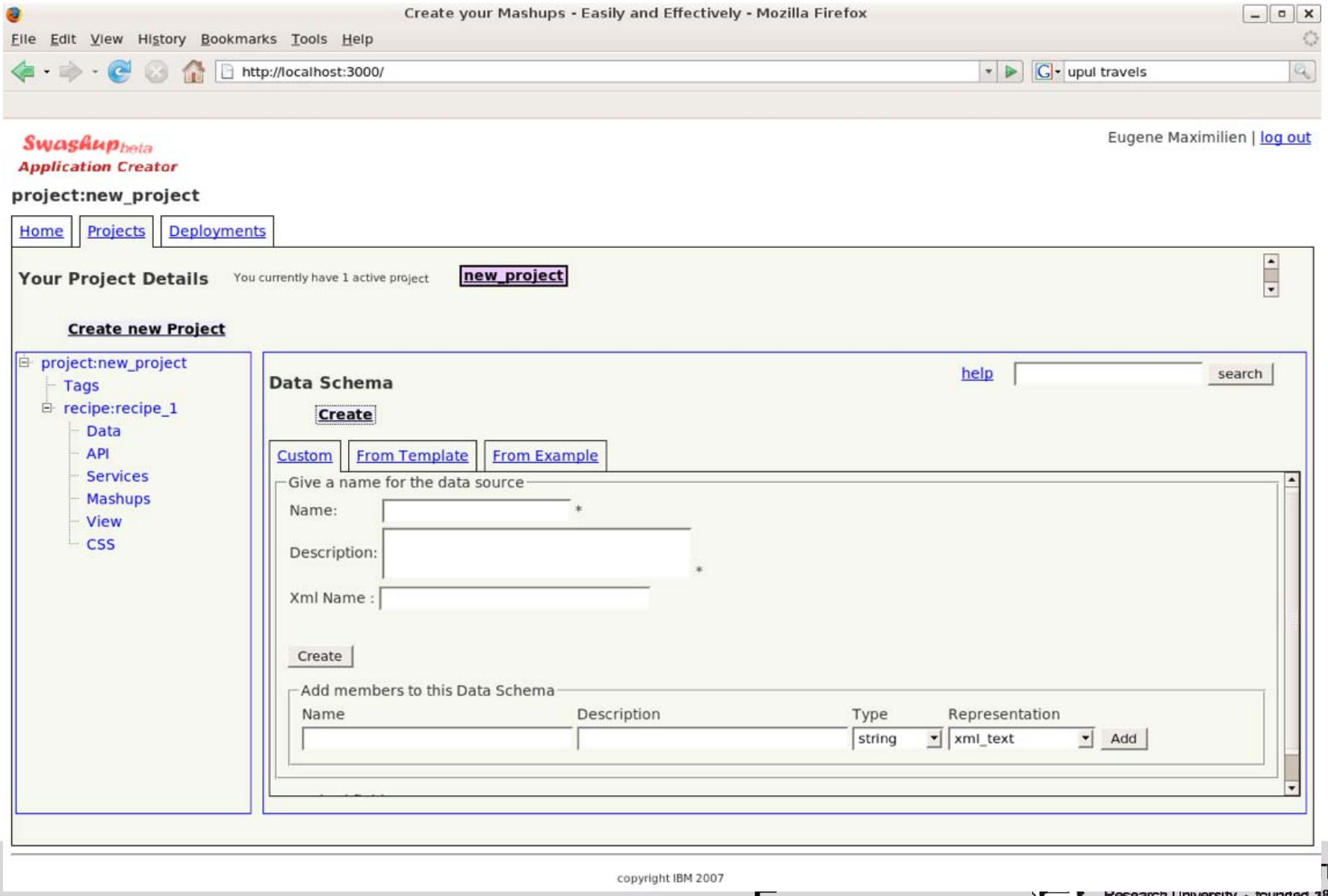

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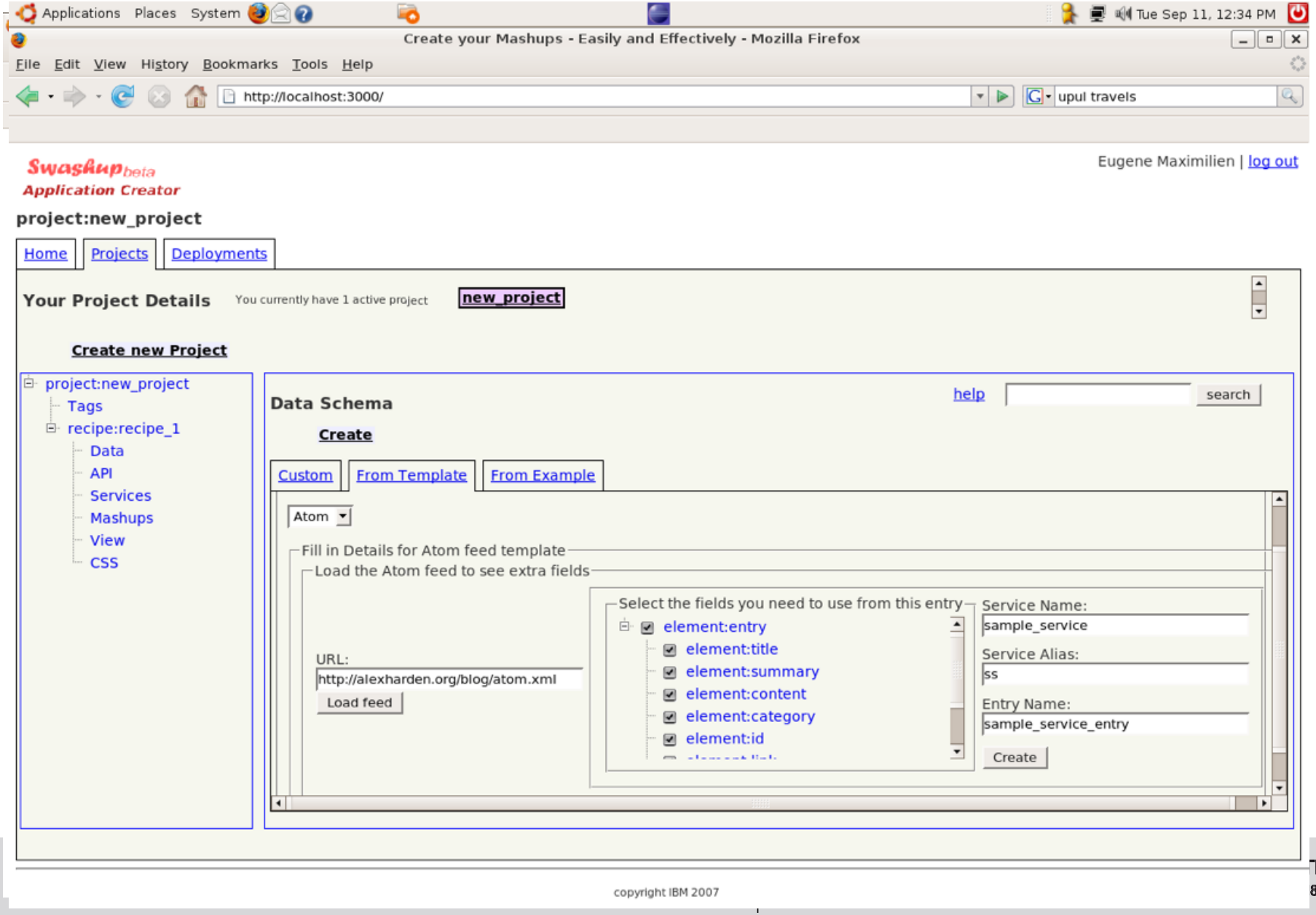

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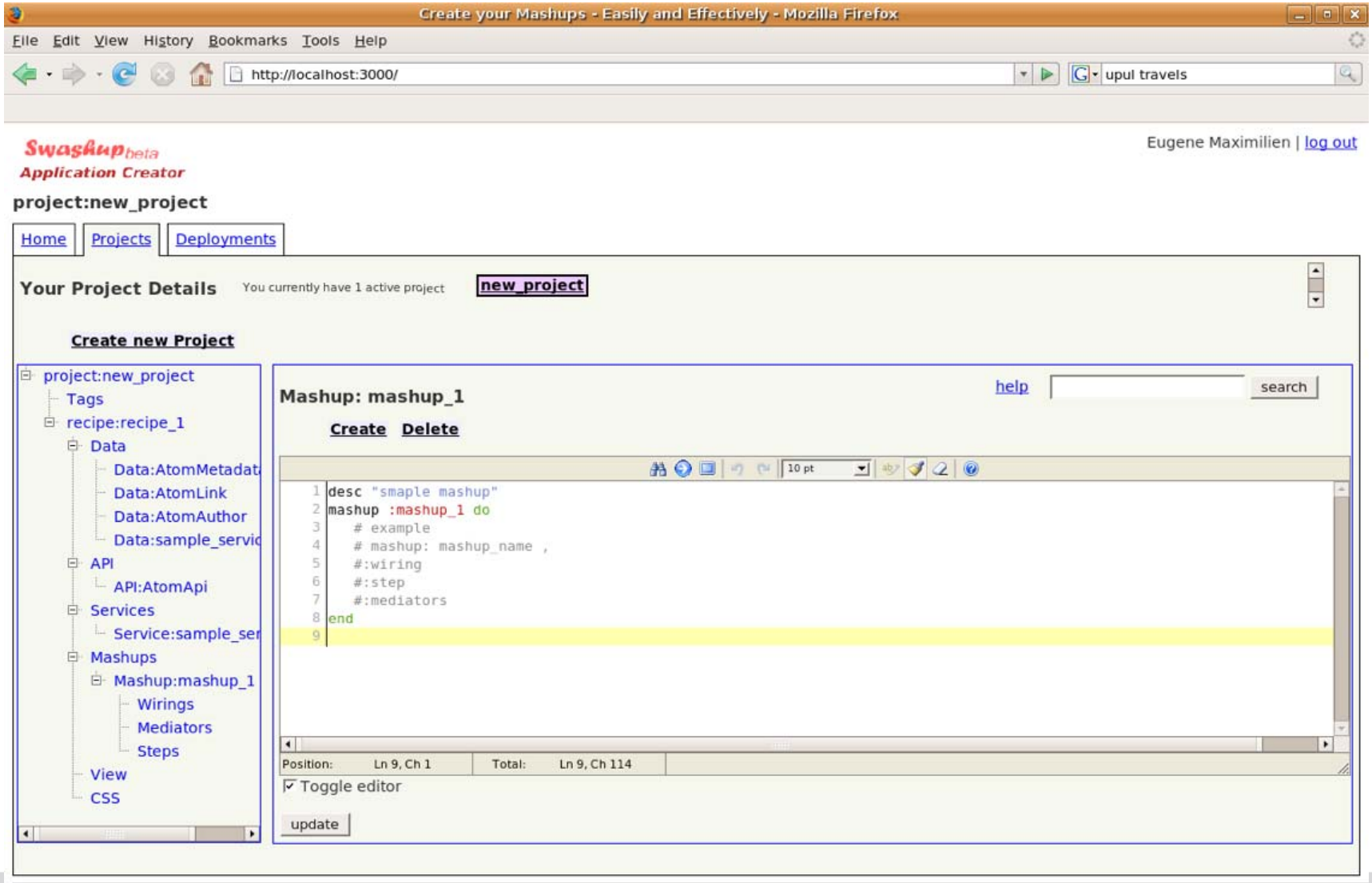

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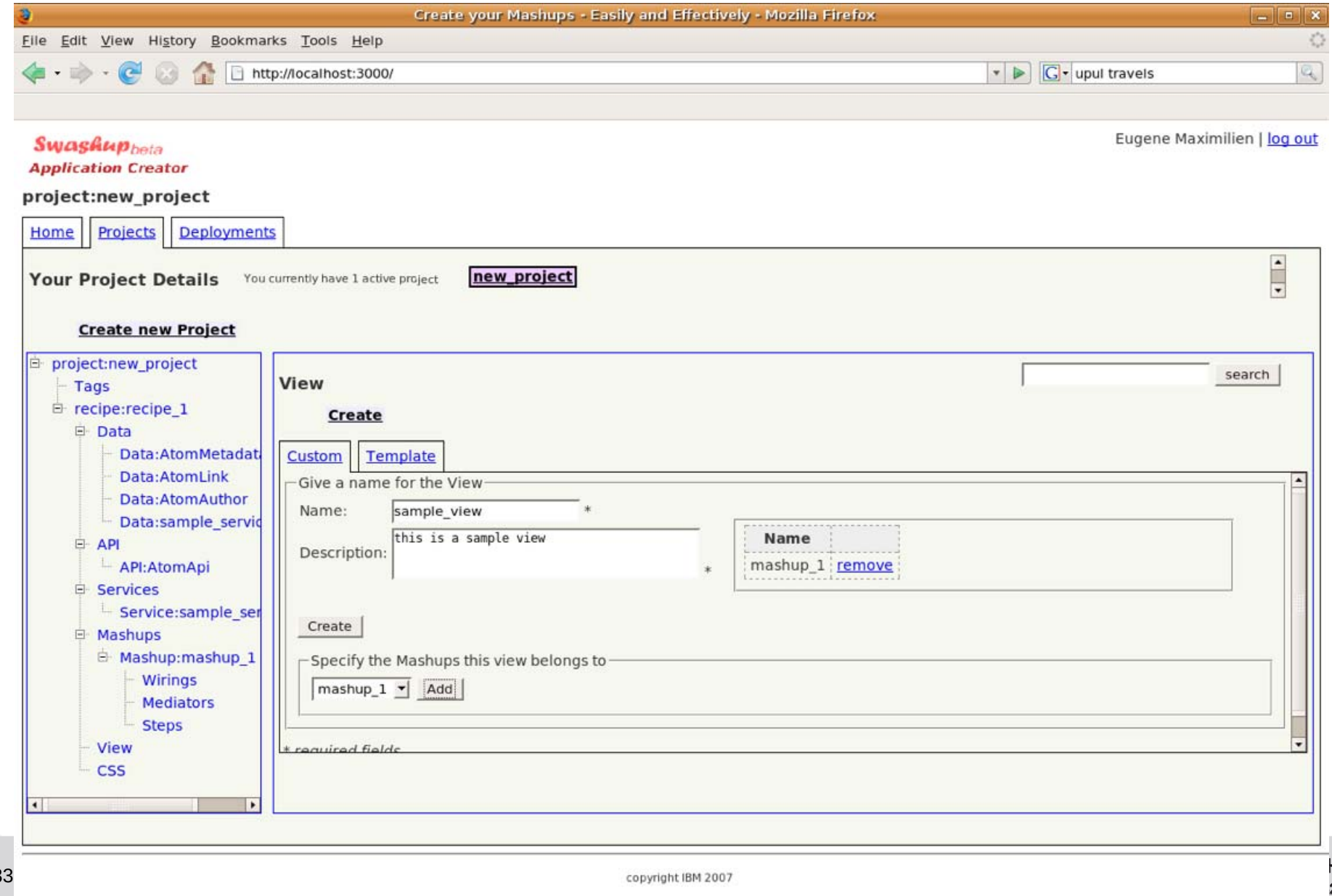

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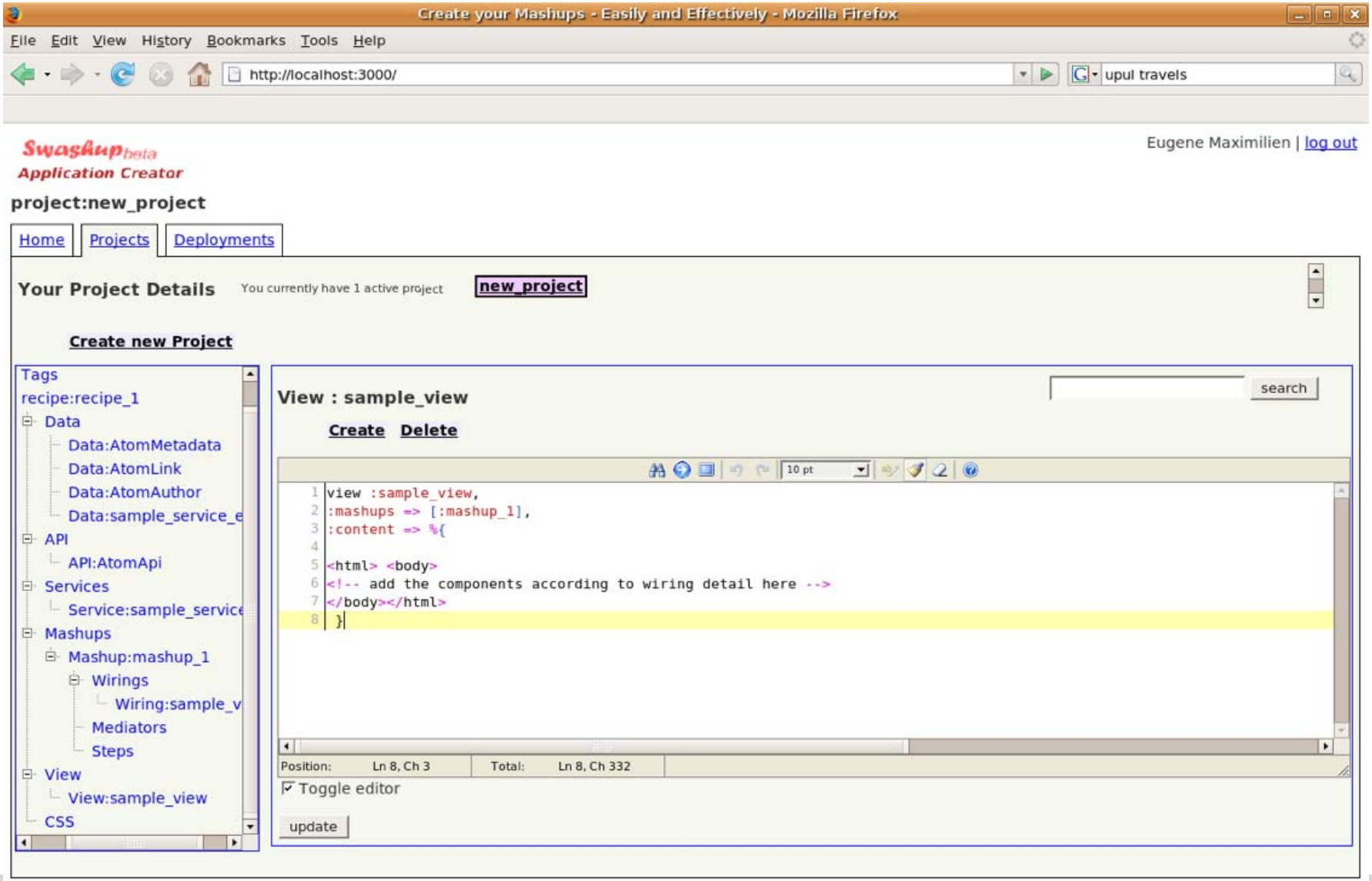

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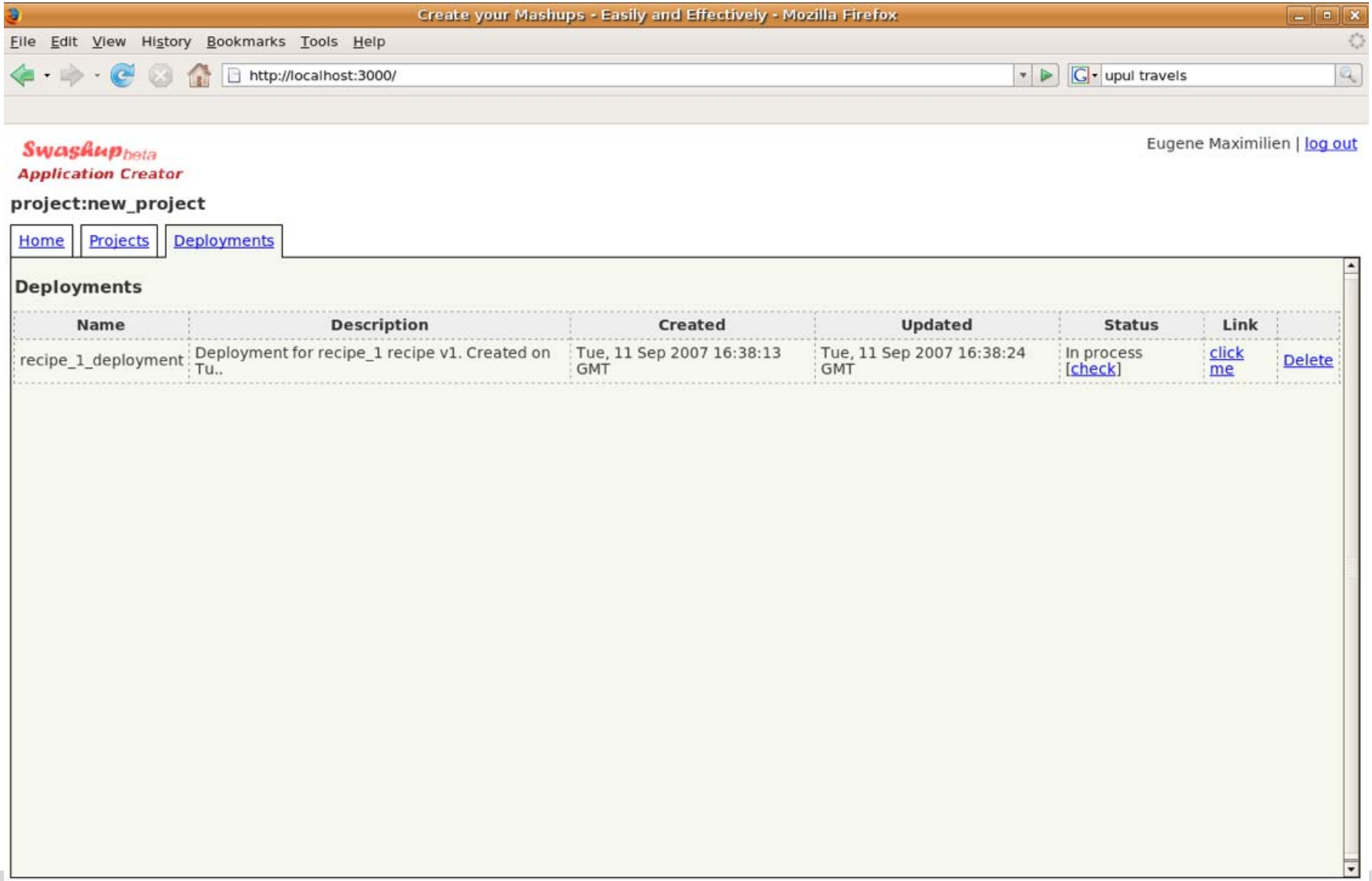

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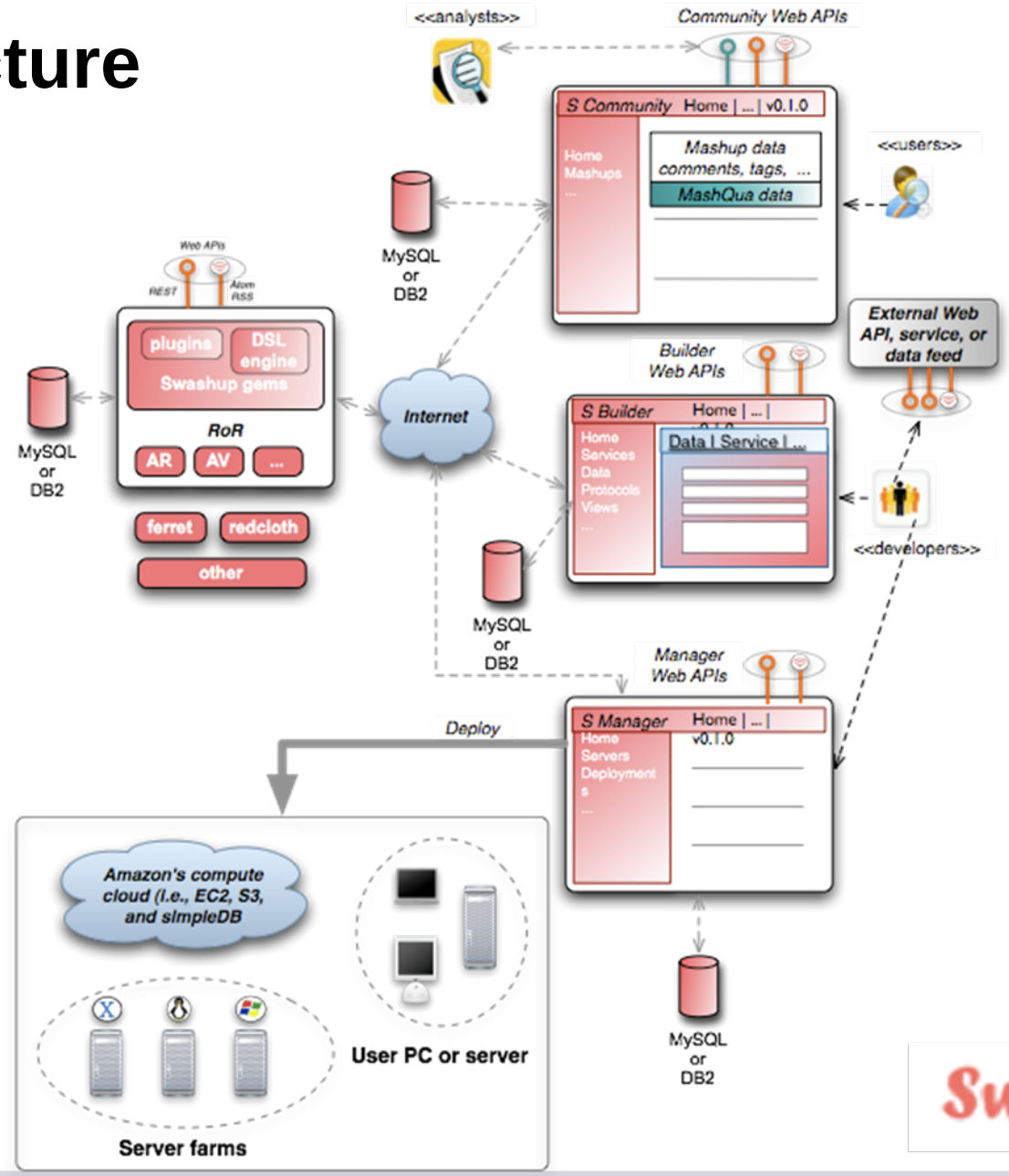
Big Picture



Swashup beta

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References

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- E. M. Maximilien, H. Wilkinson, N. Desai, and S. Tai. “A Domain-Specific Language for Web Services and APIs Mashups”, ICSOC 2007 paper
- E.M. Maximilien, A. Ranabahu, and K. Gomadam. “An Online Platform for Web APIs and Service Mashups”, IEEE Internet Computing 2008 article

- IBM Sharable Code repository: http://knoesis.wright.edu/isc

Some Open Research Questions

- Mashups programming model
  - End-user-oriented integration paradigms
    - Mashup exploration, organization, search and integration
    - Reusable and customizable patterns for mashup creation
    - Combined user interface and application integration
  - Semantic Interoperability
- Mashup platform
  - Lightweight support of enterprise features (e.g security, transactions)
  - Deployment and management in (various) clouds
- Community-driven & collaborative mashup development
  - Challenges of social networking applications
  - Integration with advances in mobile networking

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