Pollock: Automatic Generation of Virtual Web Services from Web Sites

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Outline

- What is Web Services?
- Motivation
- Main Ideas: Pollock
- Application: OpenDBLP
- Conclusion

Web Services

- XML-based framework for machine interoperability
  - API: **`WSDL`**
  - Communication: **`SOAP`**
  - Yellow Page: **`UDDI`**
- Disguised RPC or CORBA in XML
- Let S/W agents communicate each other w/o human intervention (in theory)

Web Services

- By 2008, 75% of industry applications are expected to have Web Services components [Gartner report]
- Tools for Web Services are needed to:
  - Generate
  - Discover
  - Compose
  - Analyze
  - Optimize
  - …

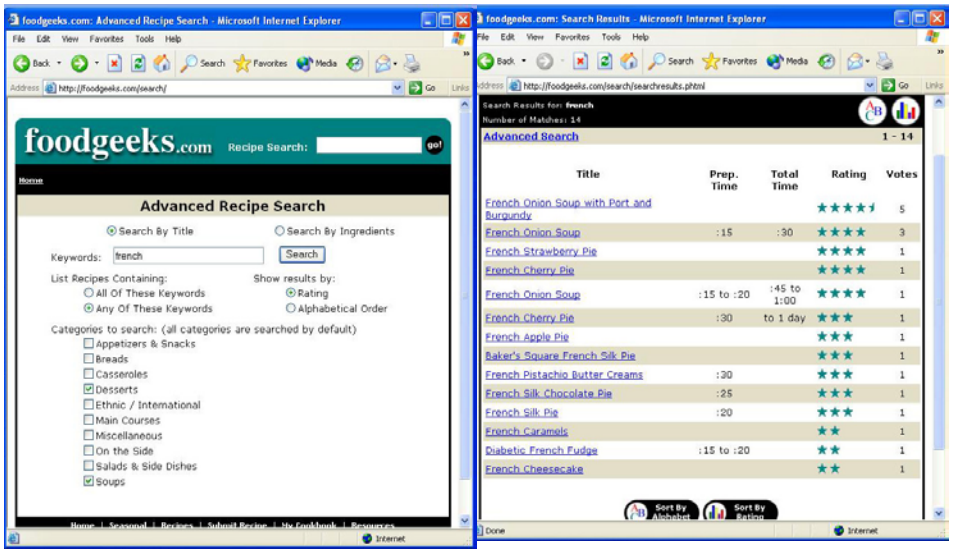
Web Services Research @ Penn State, USA

- Atherton project is to develop tools/methodology for Web Services
  - http://nike.psu.edu/atherton/
- Sub-projects
  - Generation : Pollock [ACM SAC05]
  - Discovery and Composition: BF* [IEEE EEE05]
  - Analysis & Optimization: MISQ [IEEE BSN05]

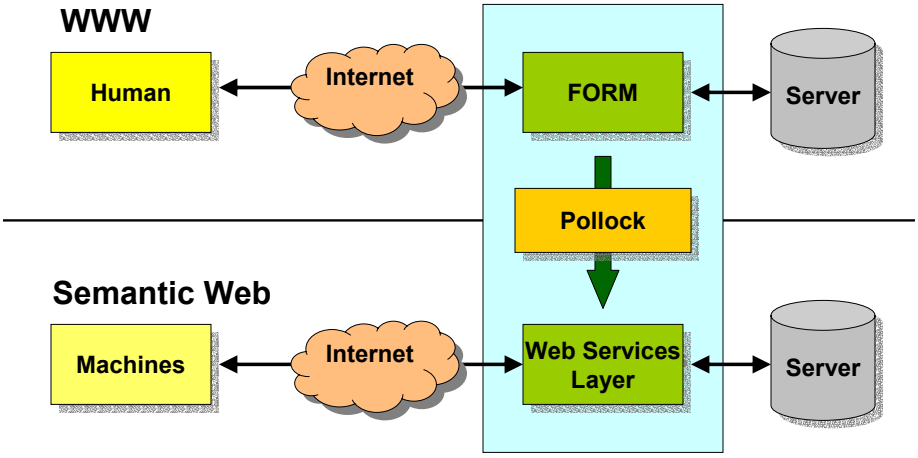
Motivation

- Most commercial companies already have some sort of Web Pages, where users can browse and purchase items
- Most popular interface is HTML FORM
- The functionalities currently being provided through FORM are:
  - Common/popular activities
  - When companies decide to build Web Services based interfaces, these functionalities in FORM are likely to be part

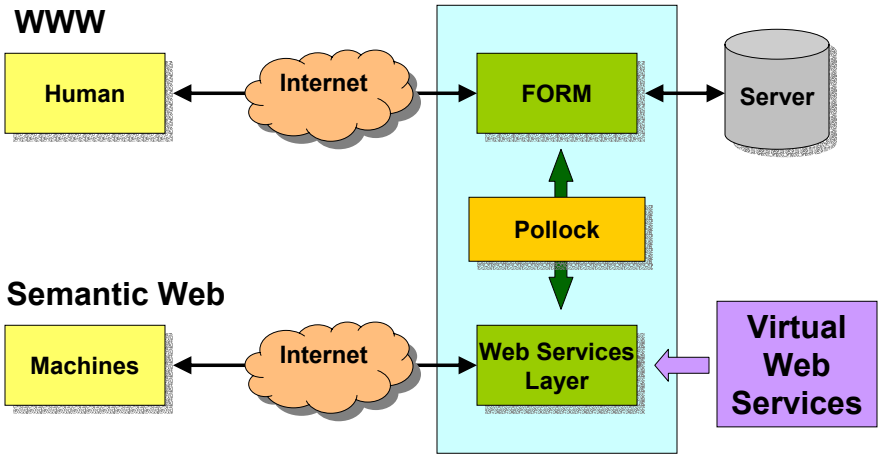
Data in the "Hidden" Web



Motivation I: WS Generator



Motivation II: WS Middleware



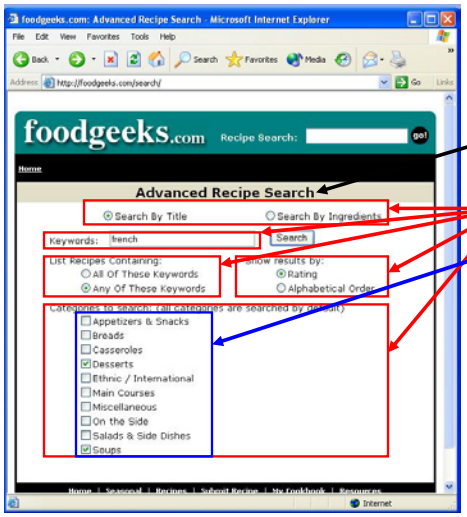
Pollock

- Using a given HTML FORM interface, Pollock does:
  - Generates Web Services API (WSDL)
  - Sits between Web Services API and FORM interface, and translate requests/responses back and forth (SOAP)
  - Generates example Web Services client/server

Pollock

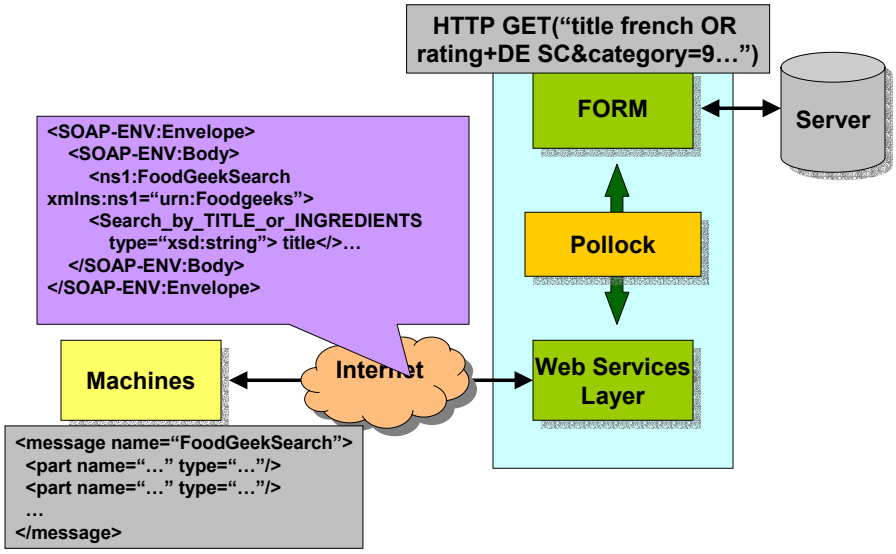
- Two technical challenges
- Interacting with FORM
  - Borrow from DB community' Wrapper/Mediator techniques
  - We used Gatech's XWrapElite
- Map btw FORM and Web Services
  - Need to identify functionality
  - Need to identify mandatory/optional parameters
  - Need to identify types

Foodgeek Example

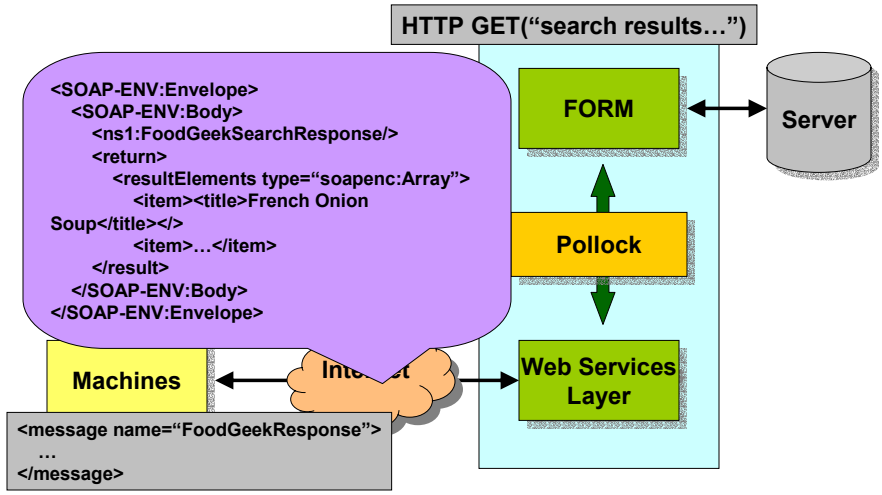


- Two Functionalities
  - Search
  - Response
- Search: <message>
  - Parameters: <part>
  - Type: <types>
- Response: same…
- Wire Search and Response via <portType>
- Generate "`foodgeek.wsdl`"

Foodgeek Example



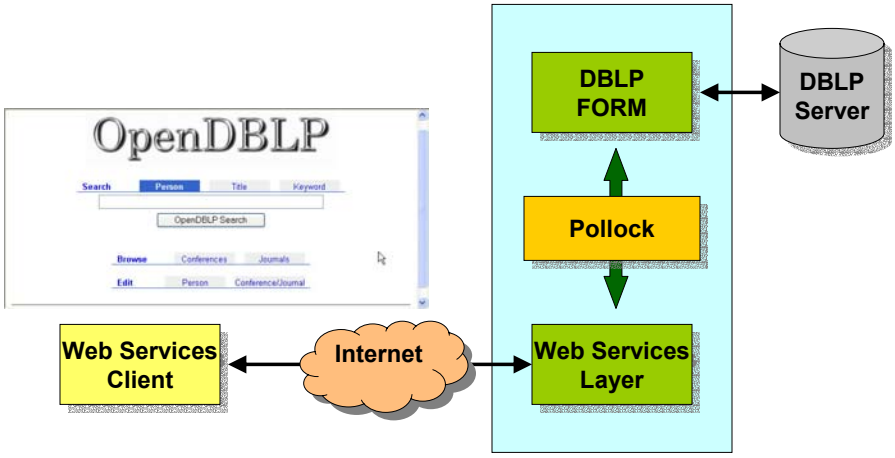
Foodgeek Example



Applications

- Tried Pollock to 8 real web sites
  - eBay, Bigfoot, Wine, Foodgeeks, Yahoo, …
  - Can handle various FORM constructs
- Tried Pollock to DBLP ⇔ OpenDBLP

OpenDBLP: http://opendblp.psu.edu/



Conclusion

- Pollock as a tool to generate Web Services interfaces for HTML FORM interfaces
  - Providing Real Web Services
- Pollock as a middleware server running between web service client and HTML FORM interface
  - Providing Virtual Web Services
- Further details at:
  - http://nike.psu.edu/atherton/
  - http://opendblp.psu.edu/