software engineering

# WSColab: Structured Collaborative Tagging For Web Service Matchmaking


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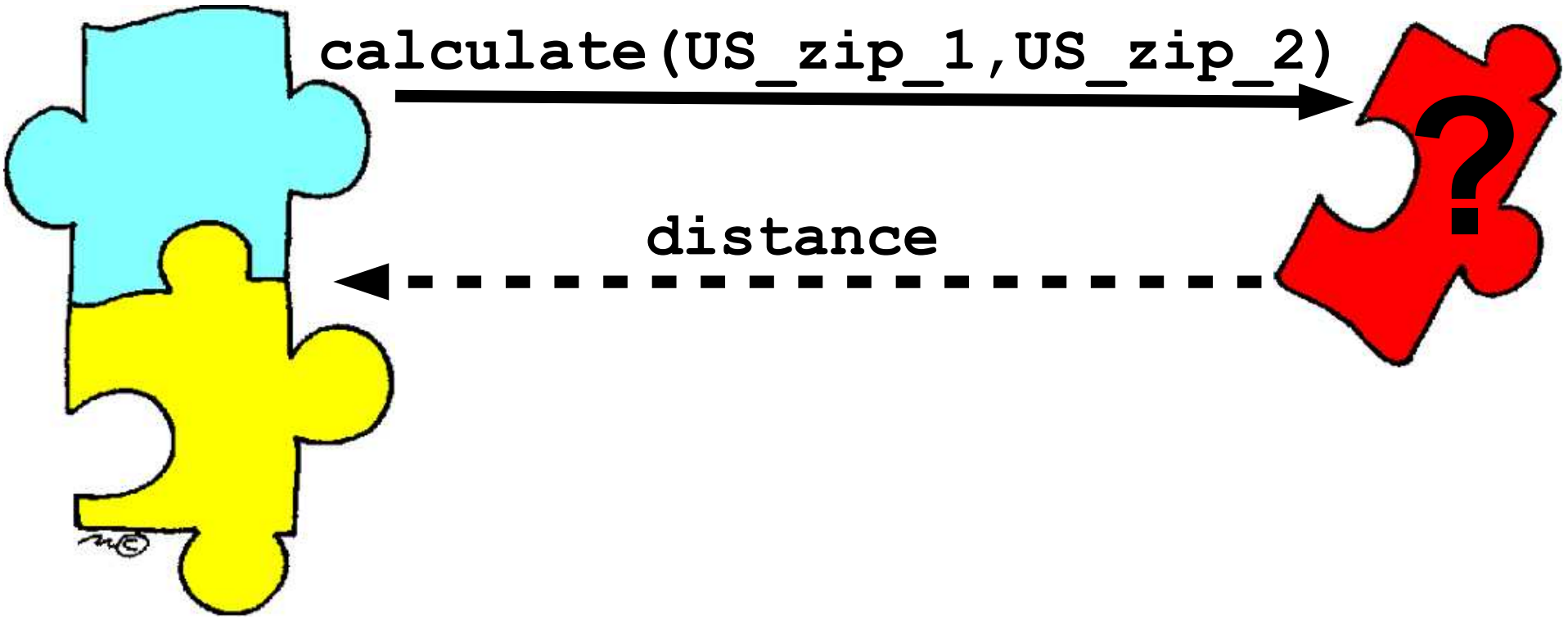
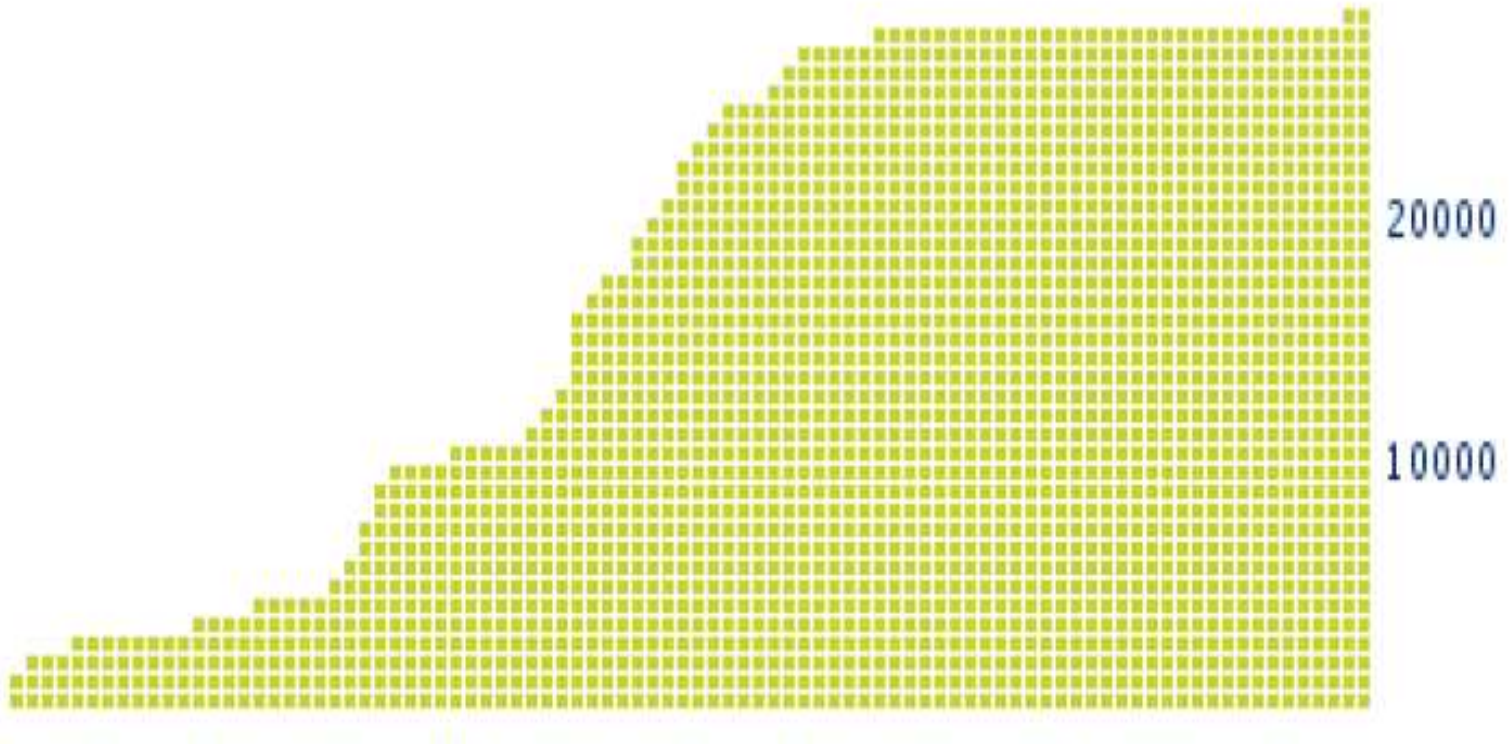
# Real World Problem

- Help user in finding Web service realizing required functionality



# Scale of the Problem

- Number of Web services grows
- Now: 28'451 services online to search




**Number of service found by SeekDa.com during the last 39 months**

# Approach #1: Finding Interface-Compatible Service

[Zaremski&Wing1995]

```
calculate
   (
     US_zip_1,

     US_zip_2,

   ): distance
```

?

==

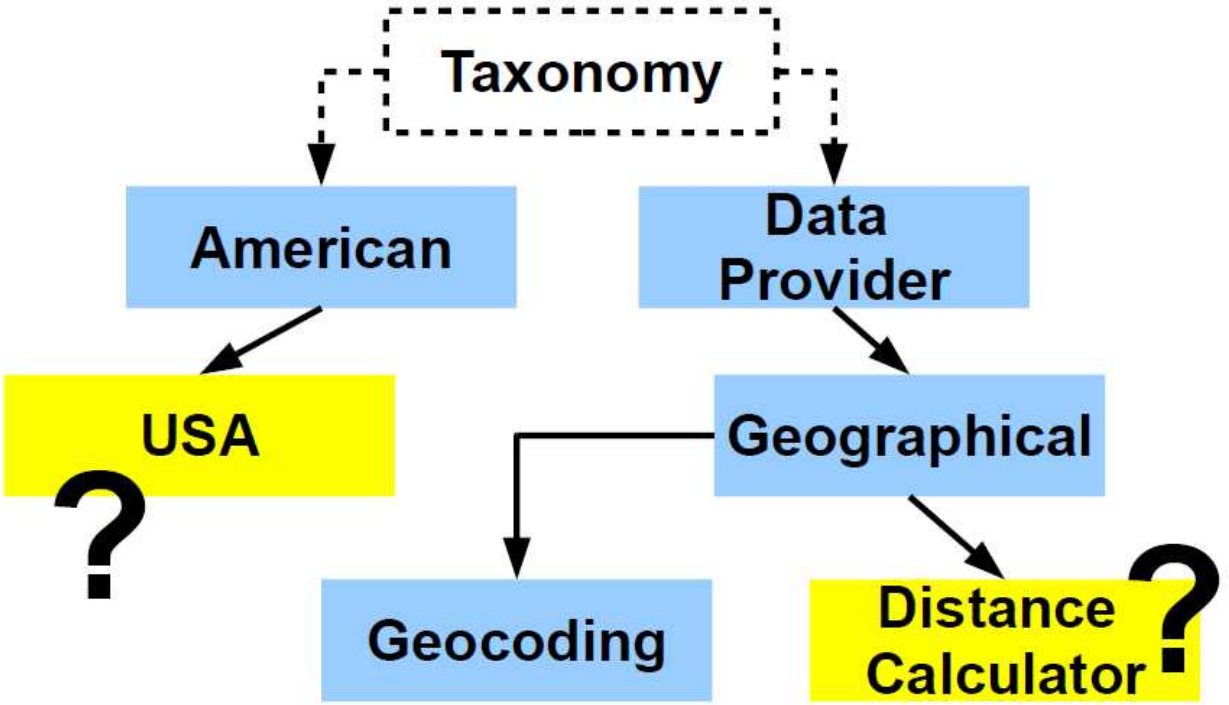
```
getDistance
   (
     longitude_1,
     latitude_1,
     longitude_2,
     latitude_2
   ): miles
```

**Service Request**

**Service Candidate**

- Problems:
  - missing functionality semantics [Dong2004]
  - vocabulary problem [Furnas1987, Dong2004]

# Approach #2: Browsing Web Service Categories




- More precise than interface compatibility test
- Problems:
  - complex for a user
  - no authority for classifying - who classifies?

# from Real World Problem...

- Help user in finding Web service realizing required functionality
- Current approaches fail

## ...to Research Problem

- Find a schema for effective classification of Web services of similar functionality

# Solution: User Classifies Service Documentation with Tags

Returns an estimated distance between two given locations. Works worldwide.

This service has the following inputs:
- " **Location1** " of type geographic point: Latitude and longitude of the first location.
- " **Location2** " of type geographic point: Latitude and longitude of the second location.

This service has the following outputs:
- " **distance** " of type distance: The estimated distance between the given locations in miles, km and feet.

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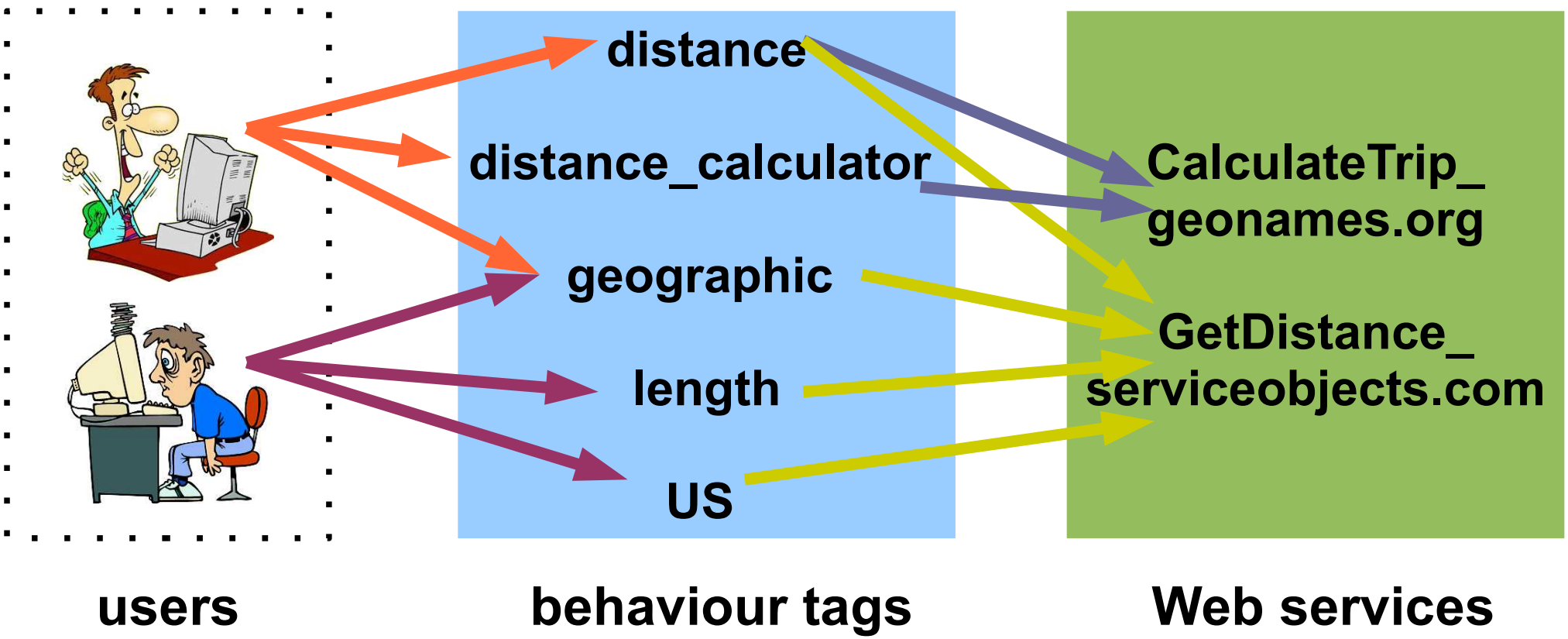
# Scaling Solution: *Structured* Collaborative Tagging



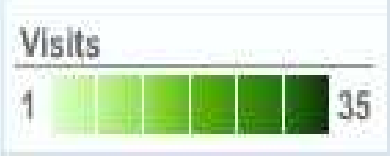

- for: **behaviour**, **input** and **output** **of a service**

# Collecting Tags:
# Web Service Tagging Portal


http://mars.ing.unimo.it/**wscolab**/new.php

# Collecting Tags: Results

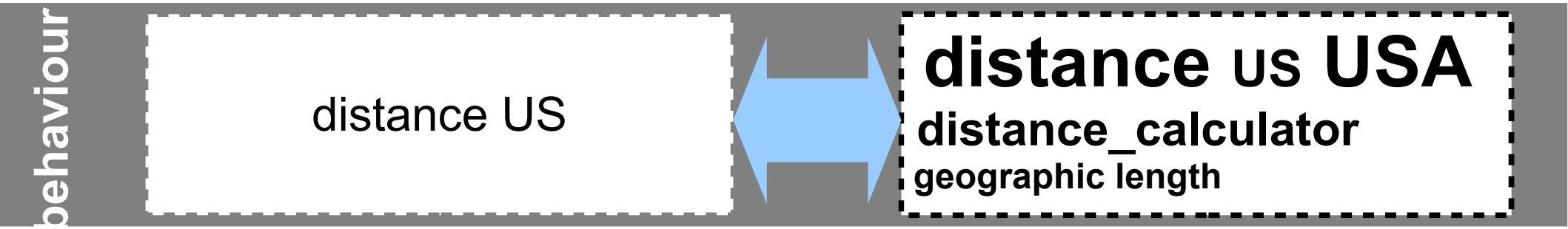
- 12 days of experiment
- 50 services from Jena Geography Dataset [Kuster2009]
- 27 tagging users:
  - our collegues
  - community related to SOA, software engineering
- 2541 annotations collected in total



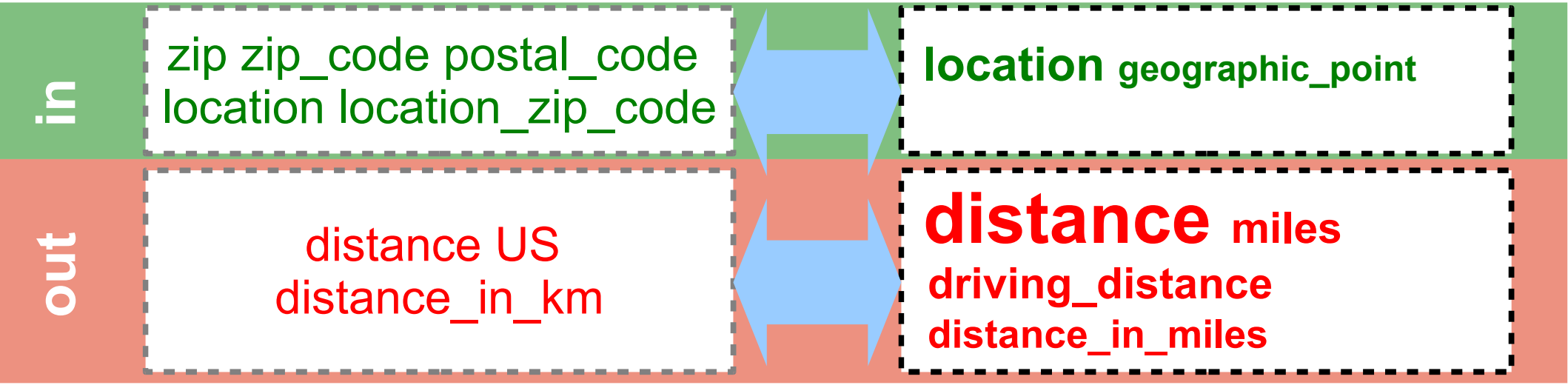

map from [Google Analytics]

# Finding Web Services: Returning Services of Matching Tag Cloud

- categorization-based matchmaking




- function signature matching




**Service Request** **Service Candidate**

# from Real World Problem...

- Help user in finding Web service realizing required functionality
- Current approaches fail

# ...to Research Problem

- Find a schema for effective classification of Web services of similar functionality

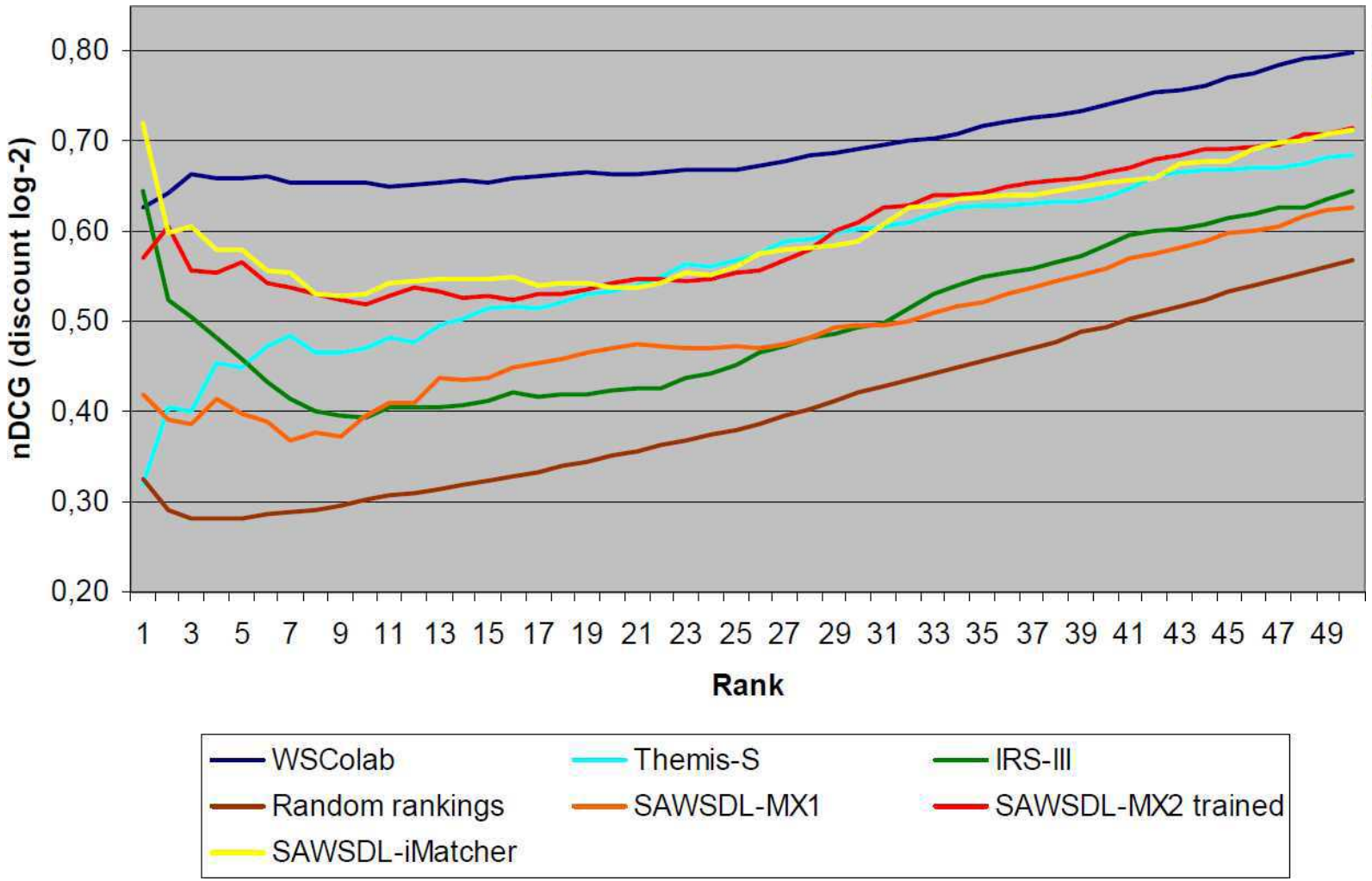
# ...to Evaluation of Solution

- Is my classification schema REALLY effective for finding Web services of similar functionality?

# Evaluation: S3 Contest

- Cross-evaluation of Web service matchmakers at the Semantic Service Selection 2009 contest
  http://www-ags.dfki.uni-sb.de/~klusch/s3/html/2009.html
- 6 different matchmakers using different formalism to describe Web service functionality
- Evaluated over the same test collection:
  - 50 service candidates
  - 9 service requests

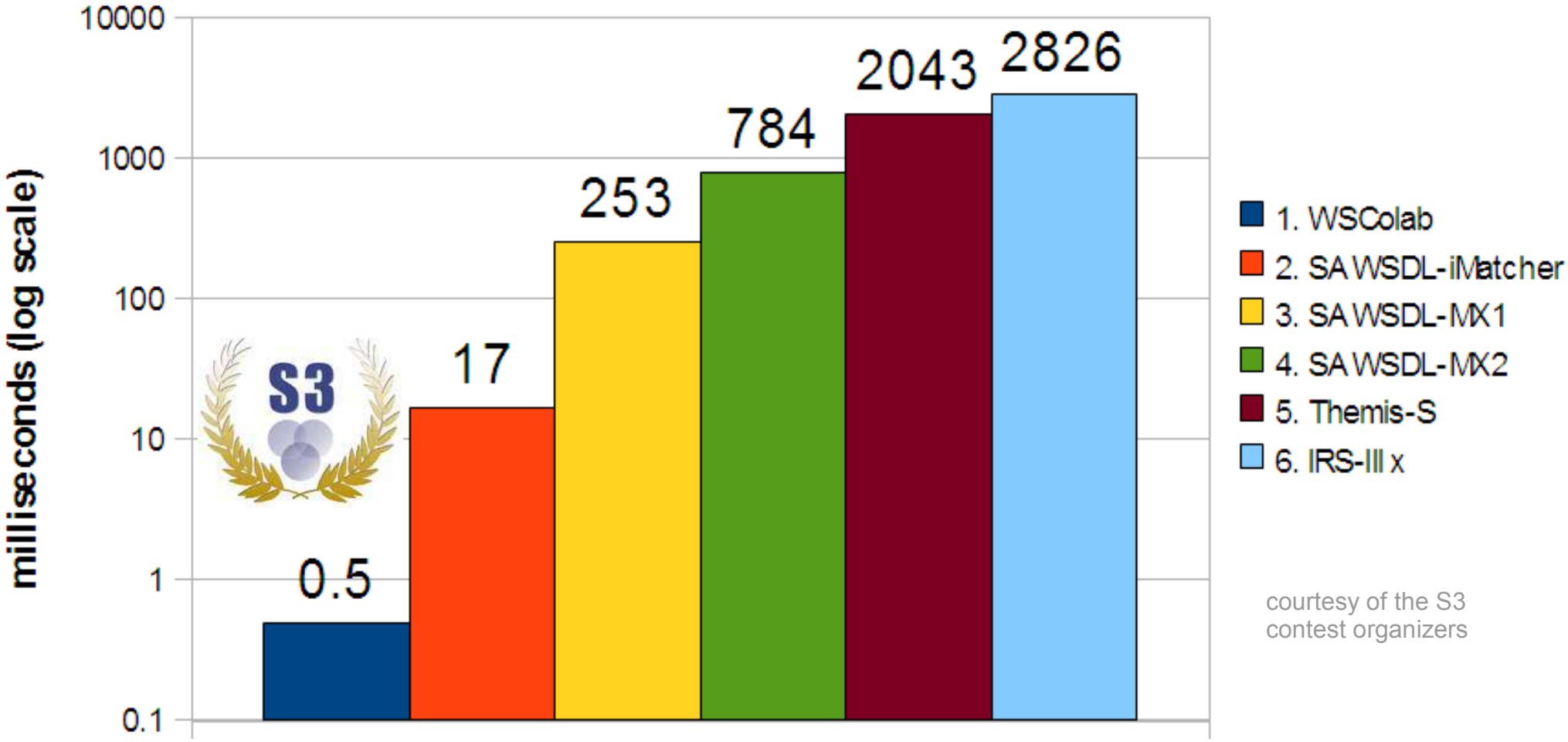
# Effectiveness (nDCG curves)




courtesy of the S3 contest organizers

- A user can find relevant services **faster** with WSColab than with other matchmakers

# Average Query Response Time



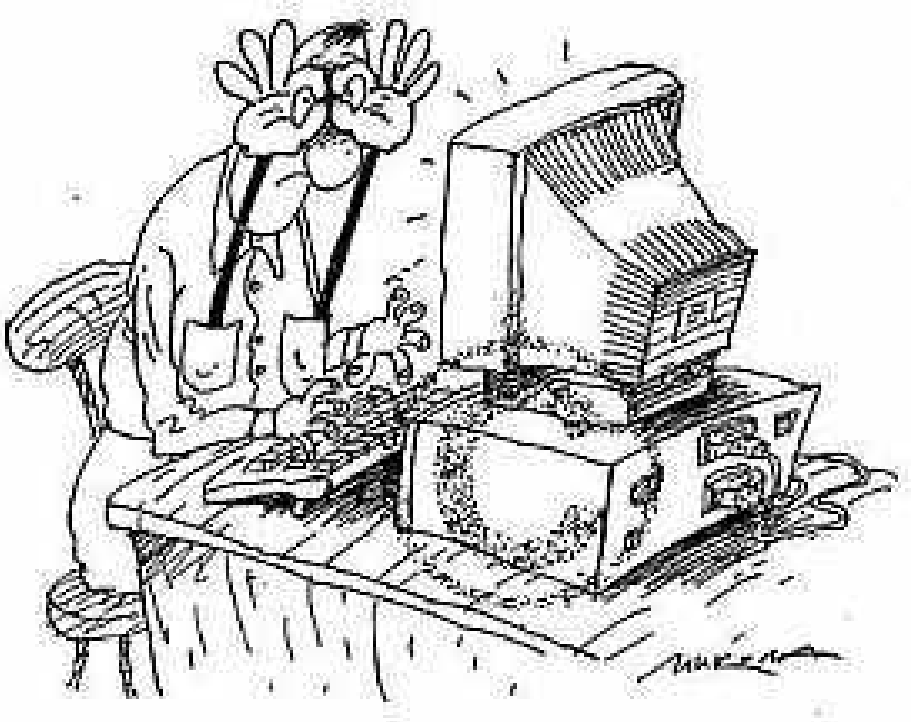

- A user can **actively** interact with WSColab matchmaker to find the right Web service

# Many Thanks to Taggers :-)

**Grzegorz from Poland, Elton from Italy, Marcin from Poland, Pawel from Poland/Switzerland, Pawo from Poland, Andrew B. from Poland, Shoomee from Poland, Mateusz K. from Poland/Finland, Mateusz B. from Cracow, Maria G., Tonny from Romania, Michele from Italy, Mariachiara from Italy, Gabriela from Italy, Nameless Resource, Dodek from Poland, Cynthia from Paragway/Italy, Danilo from Italy, Fletcher from Poland/UK, Claus from Germany, Krzysiek S. from Poland, Marco P. from Italy, Giacomo from Italy, Grzegorz J. from Poland, Radek from Poland, Piotr S. from Poland, Piotr Sk. from Poland, Andrzej from Goldenline, Marco M. from Italy, Michal G. from Poland, mchan, p123, Poncki, kosa, simon, experimenter willi, Zapluty Karzeł Reakcji, radha, cartomatic**

# THANK YOU!

- Questions?



- Wanna tag?
  http://mars.ing.unimo.it/wscolab/new.php
- Want to learn more
  http://www.ibspan.waw.pl/~gawinec/wss/wscolab.html