

WSColab: Structured Collaborative Tagging For Web Service Matchmaking

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Curriculum: Computer Engineering and Science

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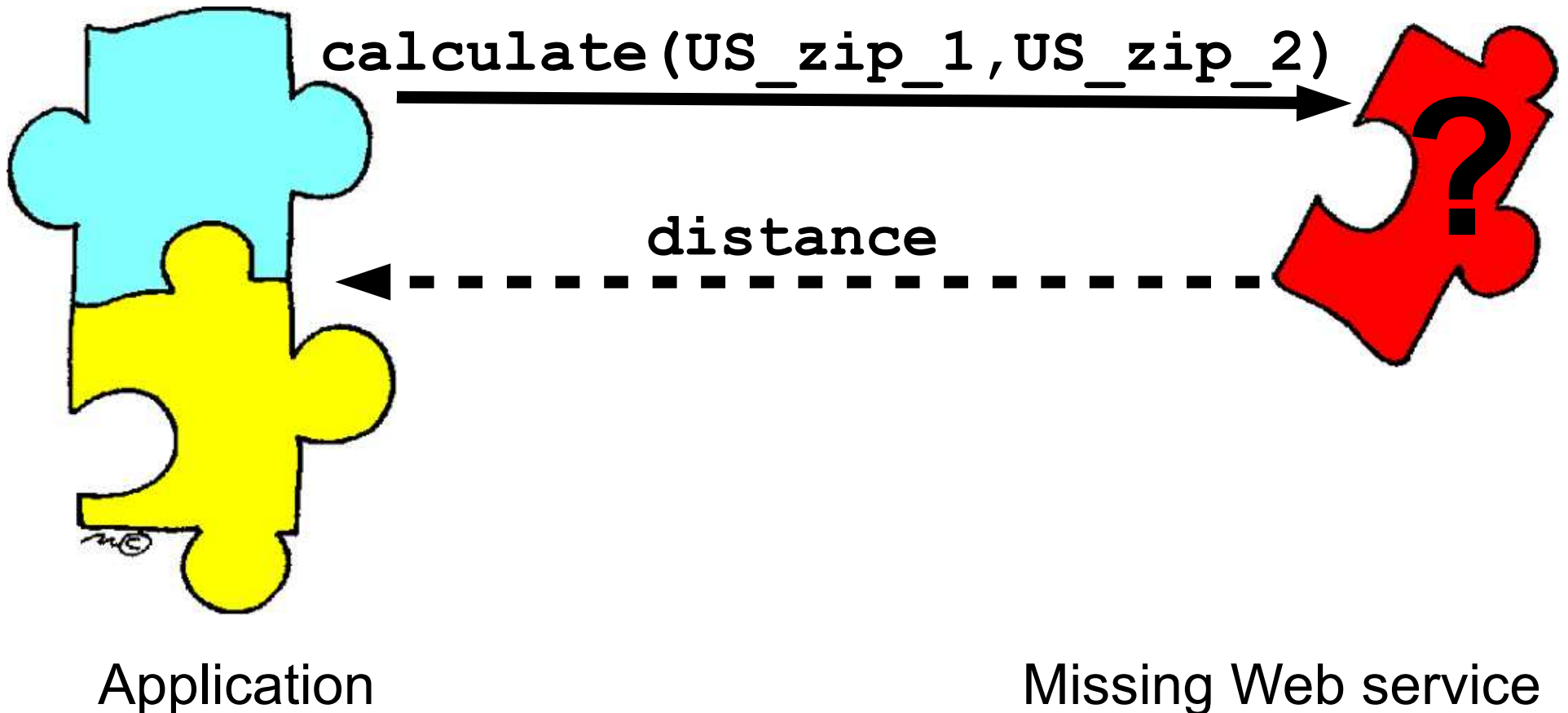


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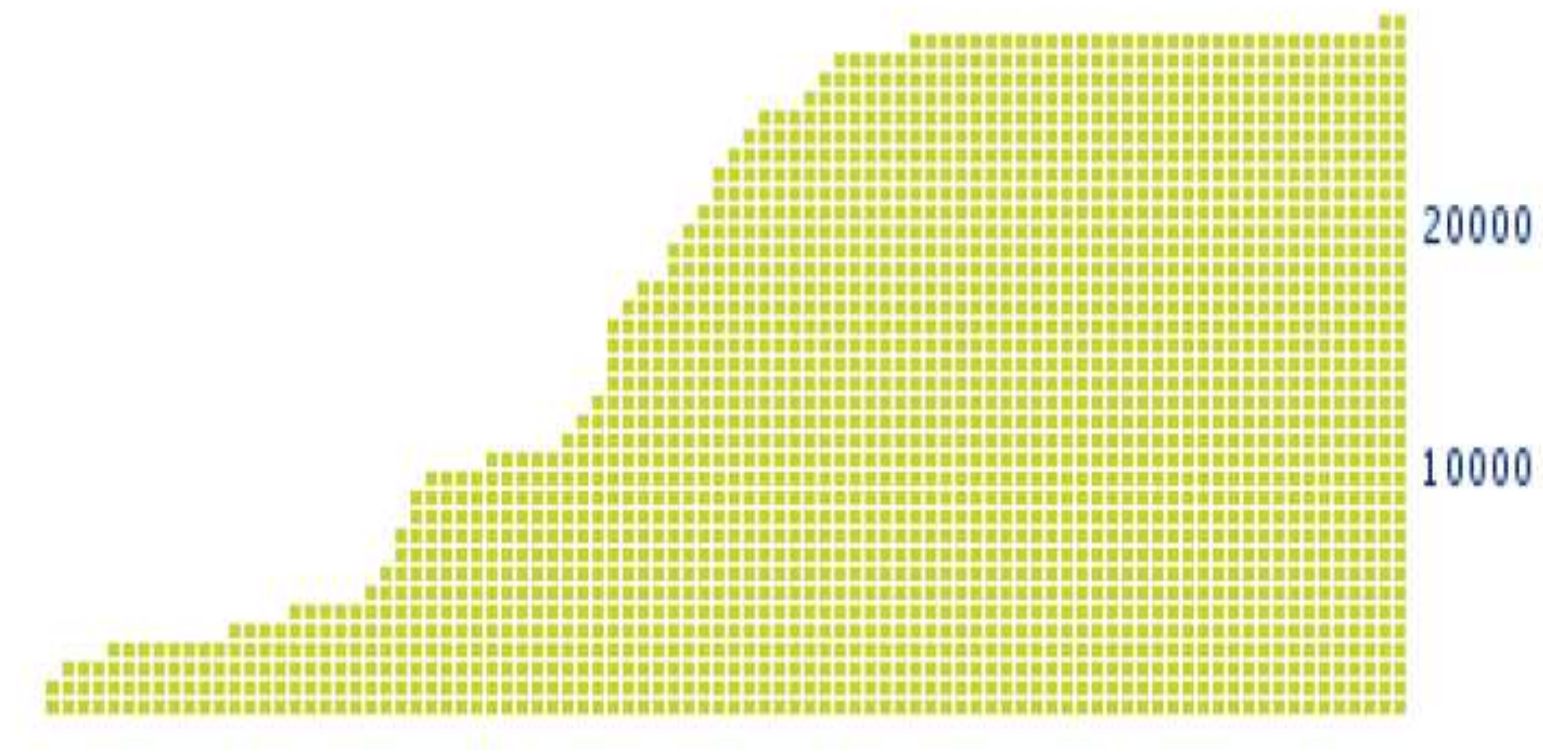
Real World Problem

- 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



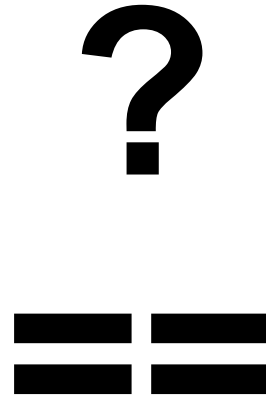
Number of service found by SeekDa.com during the last 39 months

Approach #1: Finding Interface-Compatible Service

[Zaremski&Wing1995]

```
calculate  
(  
  US_zip_1,  
  US_zip_2,  
) : distance
```

Service Request

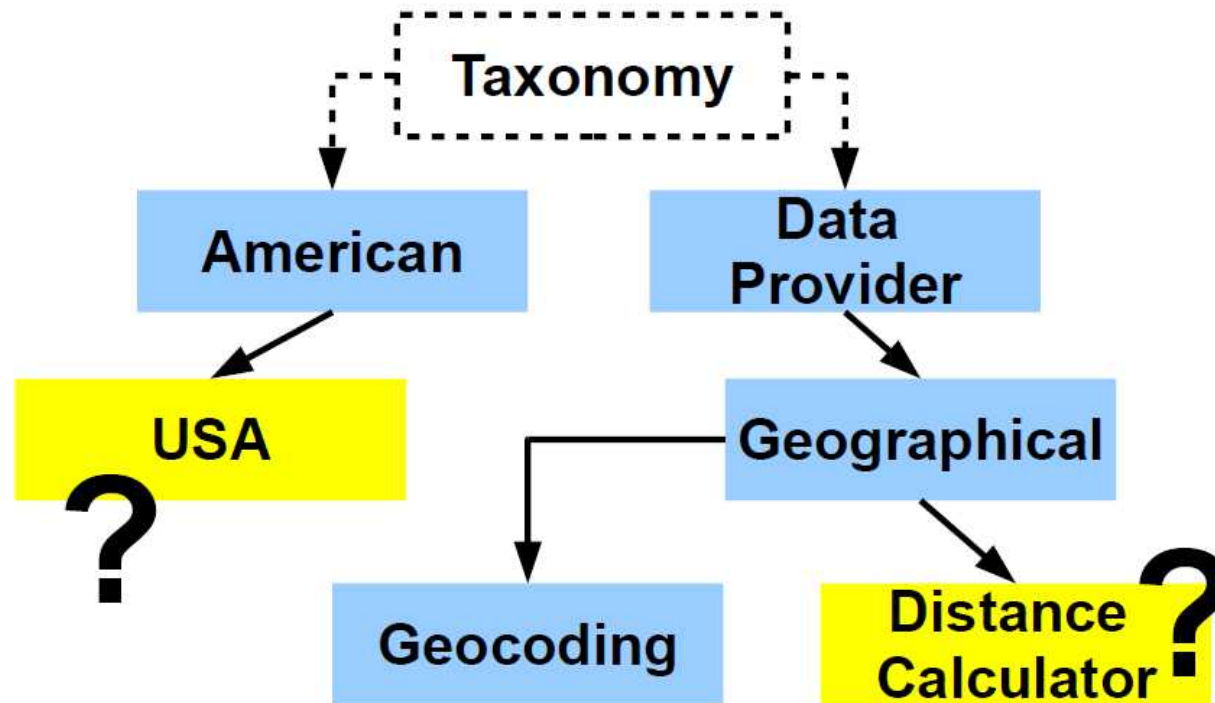


```
getDistance  
(  
  longitude_1,  
  latitude_1,  
  longitude_2,  
  latitude_2  
) : miles
```

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.

Solution: User Classifies Service Documentation with Tags

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

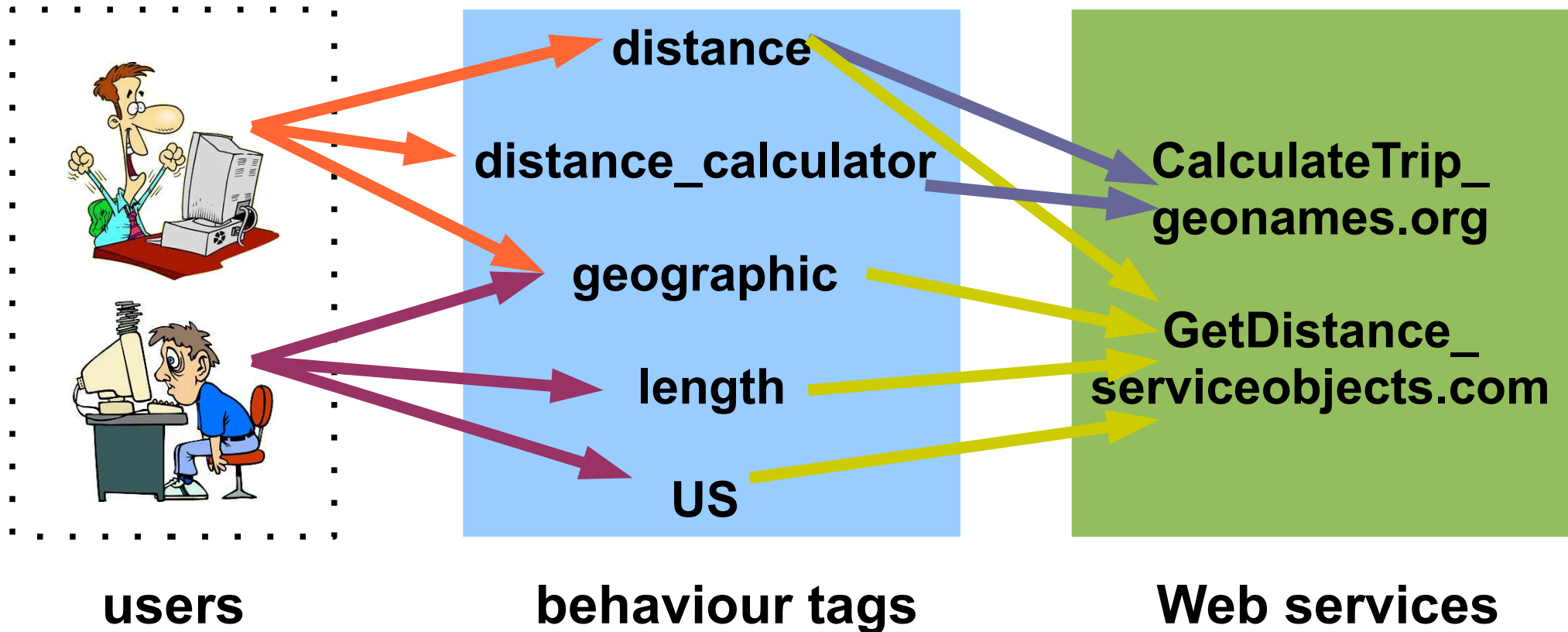
This service has the following inputs:

- "**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.

Scaling Solution: *Structured Collaborative* Tagging




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

Collecting Tags: Web Service Tagging Portal

WScolab BEHAVIOUR: INPUT: OUTPUT: Search for service! Hi Maciej! Logout Services to classify

Tag and classify Web service

You classified it as:  RELEVANT | [Tag/classify again!](#)

GeoNames_FindNearbyWikipedia2

Provider's description

How the provider describes this service:

BEHAVIOUR

```
Find Wikipedia articles localized close to the given location (identified by a country and a postal code).
```

INPUT PARAMETERS

- `country code` -- The ISO code of the country that the returned articles should be localized to.
- `lang` -- The language returned articles should be in. Optional, default=en.
- `maxRows` -- Determines the maximum number of places to be returned (optional, default = 5).

OUTPUT PARAMETERS

- `distance` -- The distance of the localization of the article to the input location
- `lat` -- The latitude of the geographic position the wikipedia article is localized to.
- `lng` -- The longitude of the geographic position the wikipedia article is localized to.
- `Wikipedia articles` -- Wikipedia articles including title, language, summary, link to full

My tags

RULE #1: Try to be specific when describing a Web service. When there are 2 or more different services about weather forecast and only one of them provides weather for whole globe or differs at some points from other similar services, try to underline that fact, e.g. by tags: *worldwide*, *global*.

RULE #2: Tags should be space separated. Use underscore `_` to separate words in multi-word tags, e.g. `zip_code`.

<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 colleagues
 - community related to SOA, software engineering
- 2541 annotations collected in total

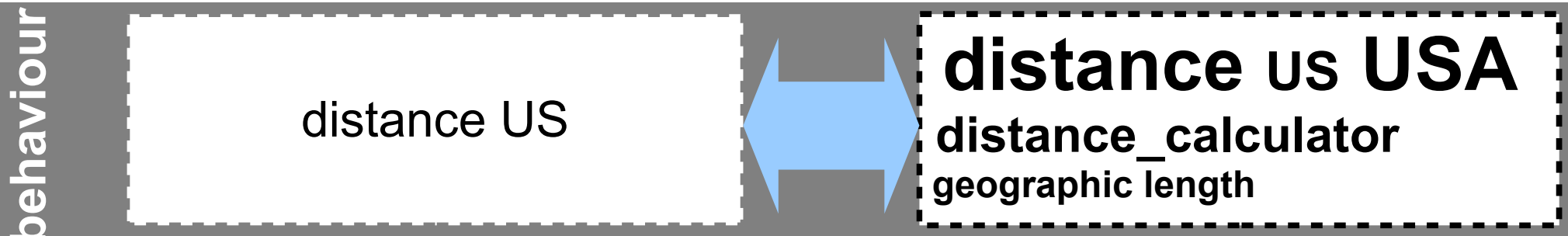
Visits



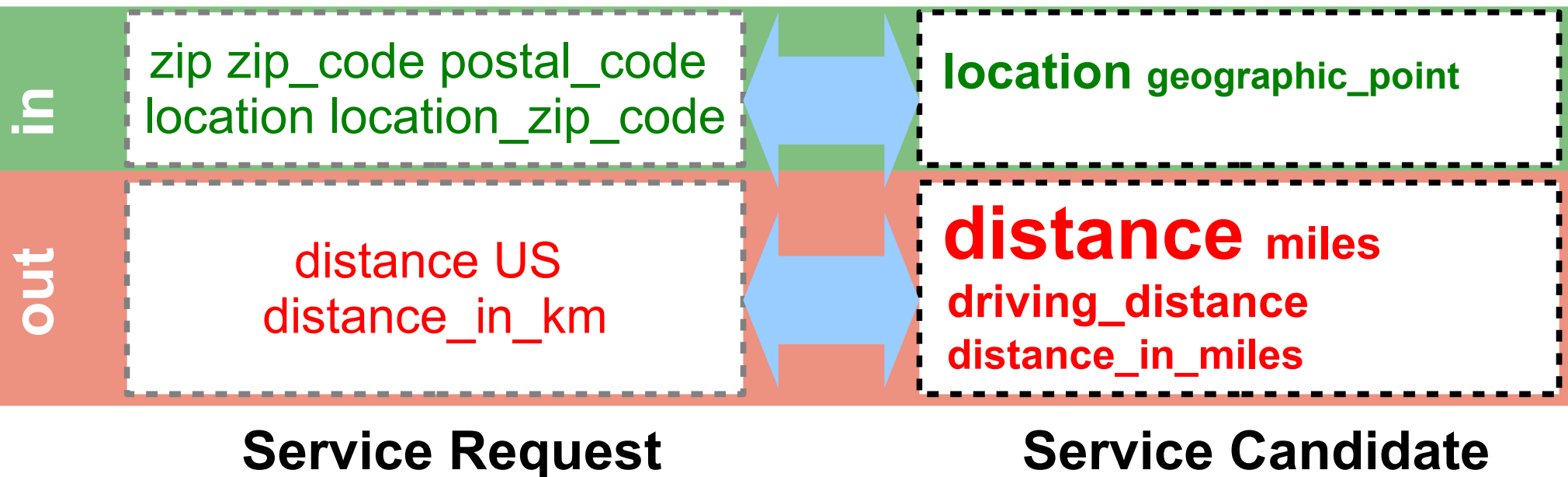
map from [Google Analytics]

Finding Web Services: Returning Services of Matching Tag Cloud

- categorization-based matchmaking



- function signature matching



from Real World Problem...

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- Current approaches fail

...to Research Problem

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

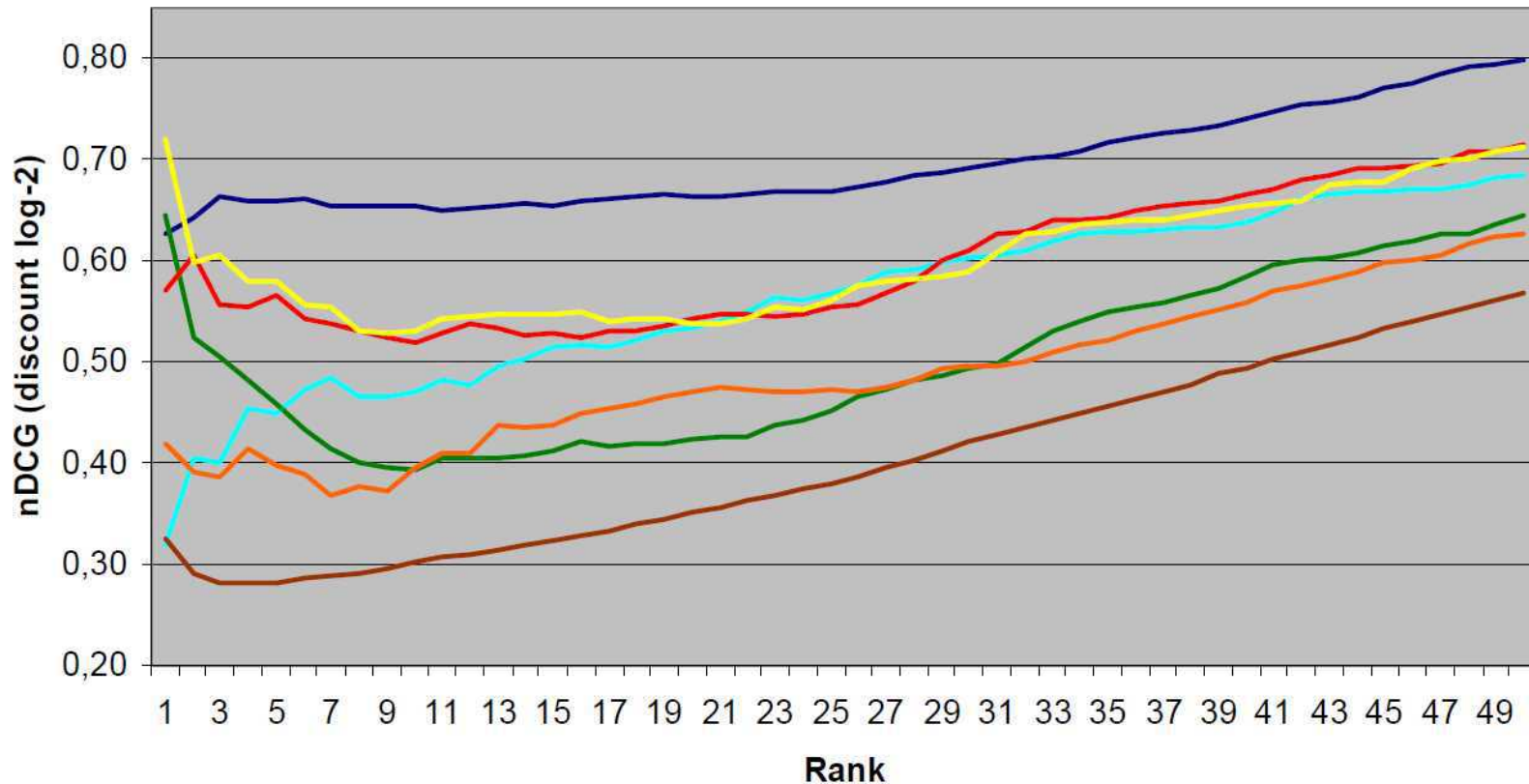
...to Evaluation of Solution

- 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

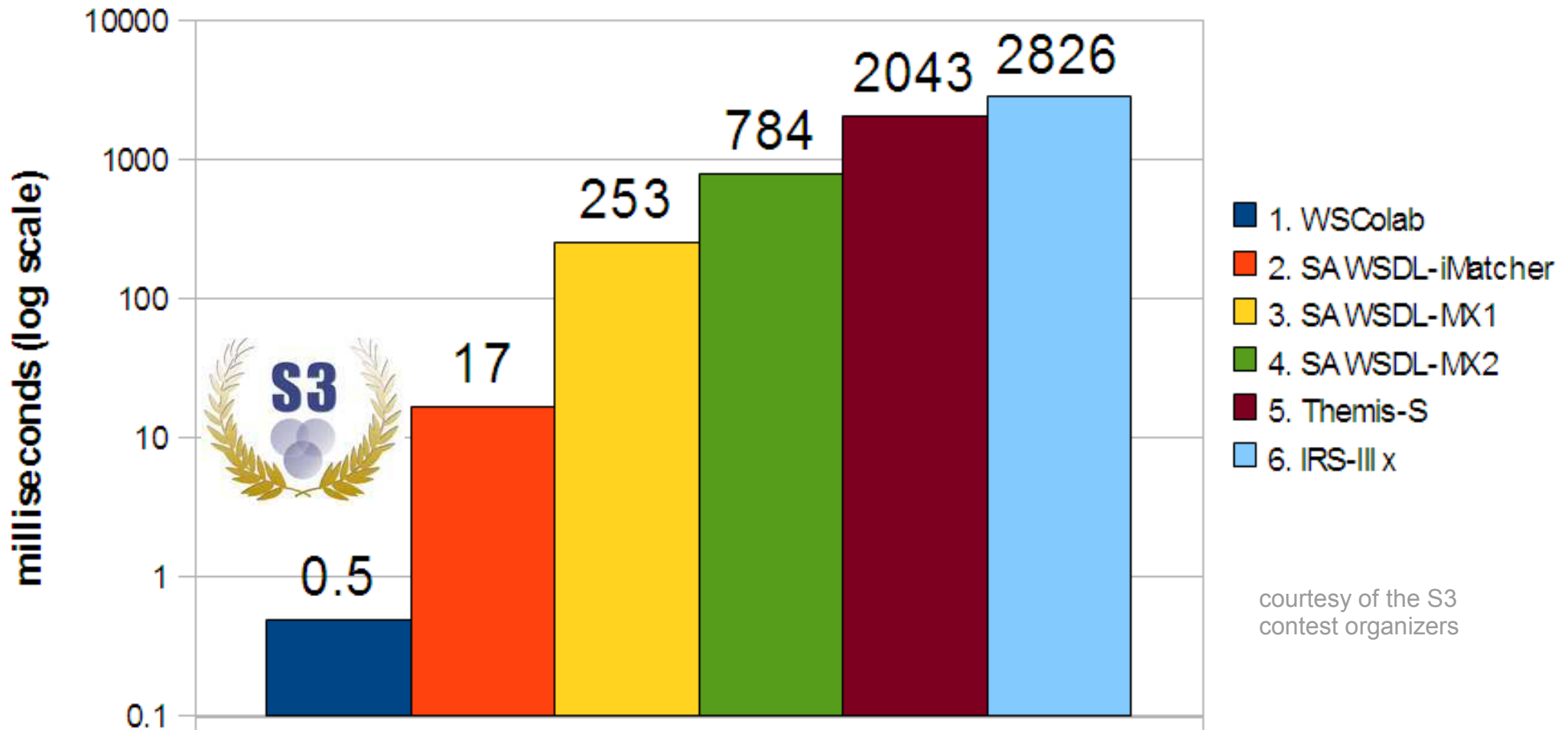
Effectiveness (nDCG curves)



courtesy of the S3
contest organizers

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

Average Query Response Time



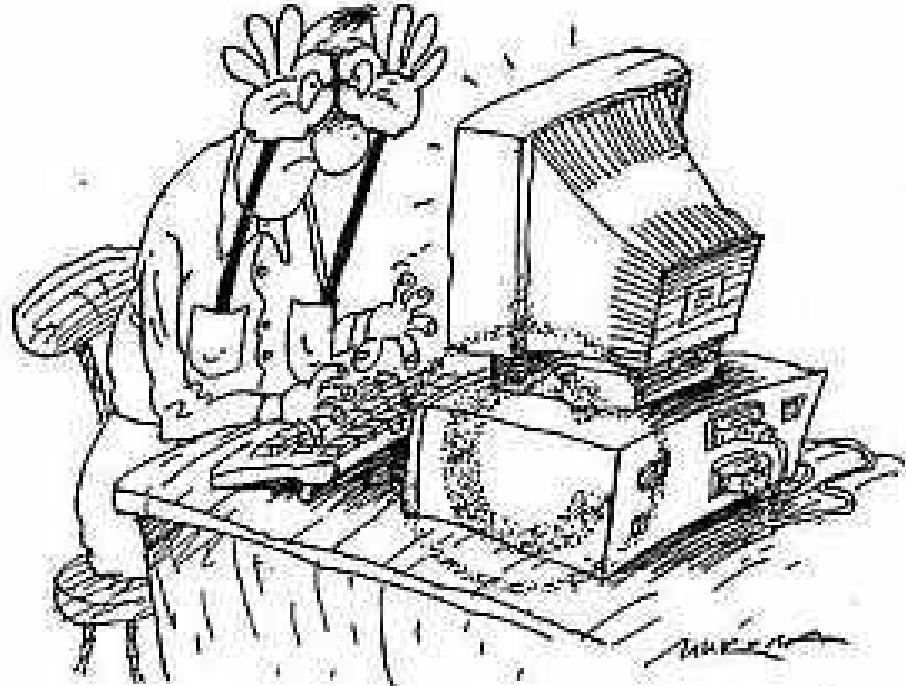
- A user can **actively interact** with WSColab matchmaker to find the right Web service

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 Paraguay/Italy**, **Daniilo 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>