

Composition of Interactive Service-based Applications by End Users

Abdallah Namoune, **Usman Wajid**, Nikolay Mahendjiev
Centre for Service Research
The University of Manchester

Research Motivation

Services: reusable / loosely coupled software components which can be connected to each others to form complex applications.

Services are becoming widespread: over **27.000** services on the Internet from more than **7000** providers (SEEDKA service crawler).

End users of the Internet: millions of users, most users are non-programmers, with no/basic technical background.

Main goals:

promote the consumption of services by ordinary end users, and enhance the development (in the form of composition) of service-based applications

Can ordinary end users, with no/basic computing knowledge, compose services together to form complex applications?

Evaluation Approach

Introduce and familiarise participants with the research topic

Pre-test questionnaires to capture users background knowledge and interests

Focus group

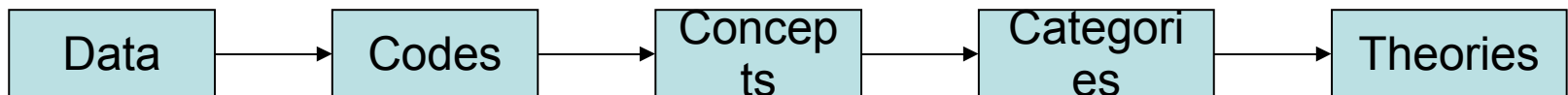
[Focus Groups as Qualitative Research , Morgan 1997]

A well established technique to generate concentrated data on a specific research topic

Grounded Theory

[The Discovery of Grounded Theory, Glaser & Strauss, 1967]

Is a research method which aims to generate theory from collected data.



Evaluation Study

35 Users (25 MSc and PhD students, and 10 researchers at MBS)

All non-technical users

Three separate focus group sessions, 1 hour each

12 users = each focus group

Purpose of study:

What do end users understand by services / service composition,

The likelihood of uptake of software development by end users

What are the problems end users may encounter when developing service-based applications

Inform the design process of the SOA4All Studio

Tasks of the Evaluation

Provide a definition of web services

Listen to a 20-minute “Internet of Services” presentation

Fill in a pre-test service composition questionnaire

Discuss potential risks and benefits, and problems of SC

Suggest possible solutions

Web Services Presentation

Introduce the concept of services and provide examples of SC

Motivating example: Yahoo! Pipes

Motivation behind SOA4All

Meet Friends composite scenario (includes 4 services)

Mockups of a future composition tool (**SOA4All Studio**)

Yahoo Pipes! Example

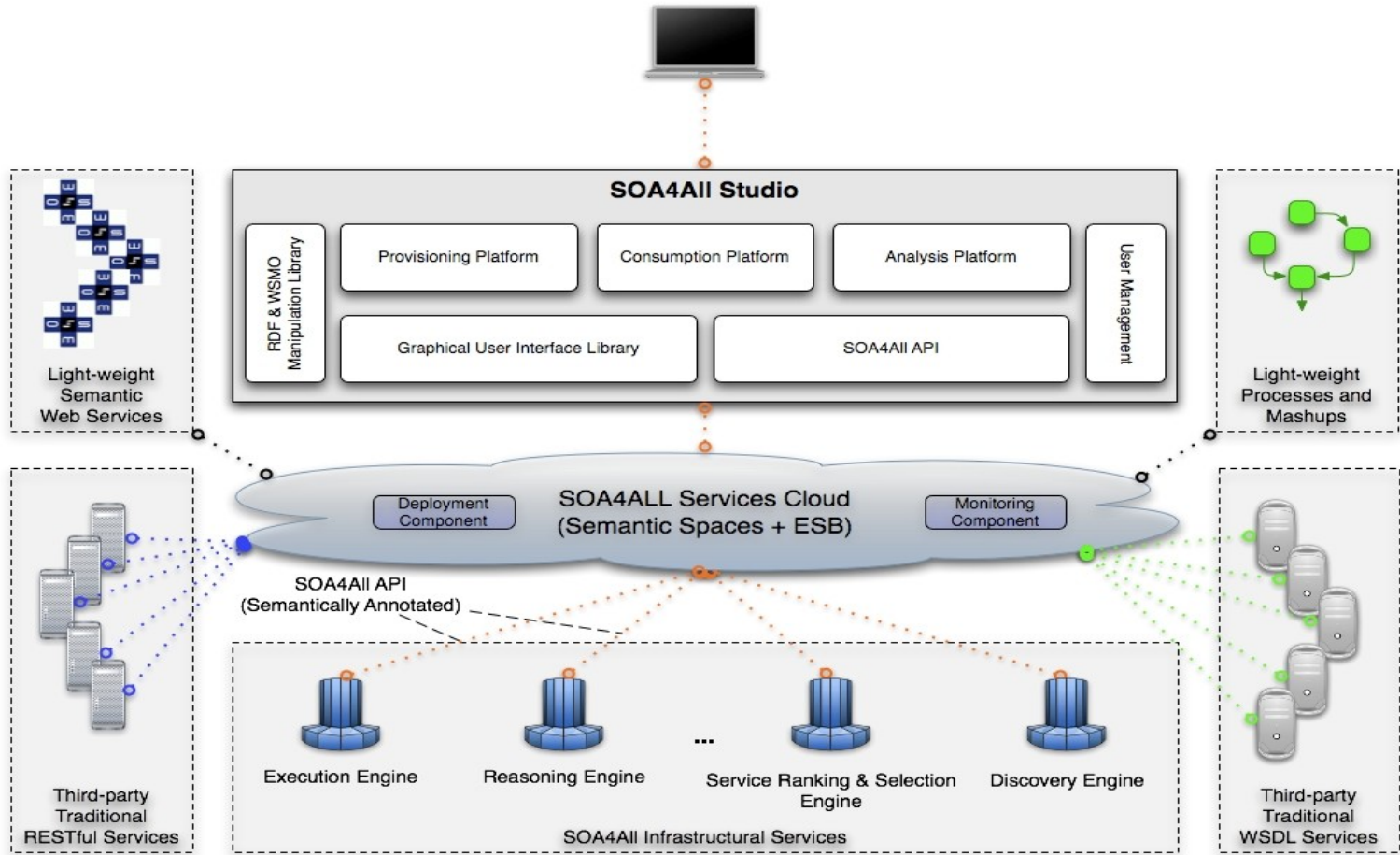
The screenshot displays the Yahoo Pipes web interface. On the left, a sidebar titled "Pipes: editing 'GeoAnnotated Reuters News' - Mozilla Firefox" contains a "URL Builder" panel with the following configuration:

- Base: `http://ws.geo`
- Path elements:
 - `rssToGeoRSS`
 - `text`
- Query parameters:
 - `feedUrl`

Below the URL Builder is a "Fetch Feed" panel with a "url [wired]" field. A blue arrow points from this field to a news item in the main content area. The main content area features a map of Europe with red location pins numbered 1 through 10. A red tooltip over a pin in London reads: "Two UK bomb suspects released without ch...". Below the map, the following text is displayed:

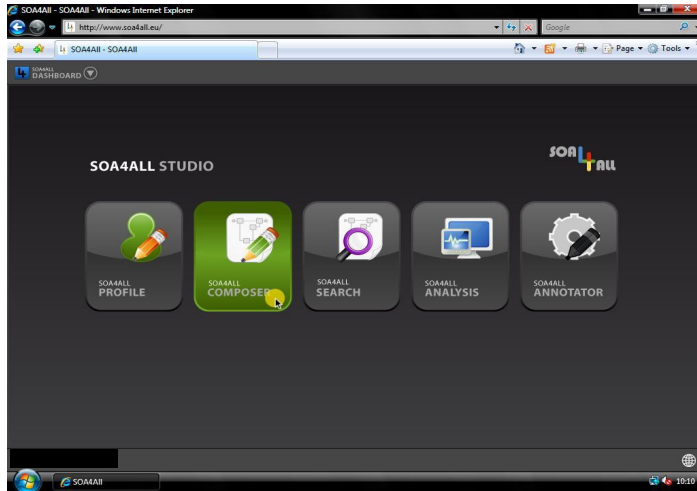
Data ©Navteq, TeleAtlas
6. Two UK bomb suspects released without charge
LONDON (Reuters) - Two men arrested in connection with failed car bomb attacks in London and Glasgow were released without charge on Sunday, British police said.

SOA4All Architecture

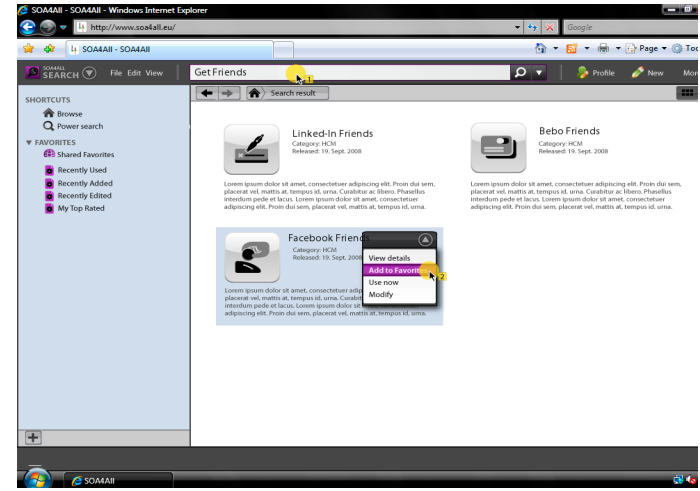


Mockups of SOA4All Studio

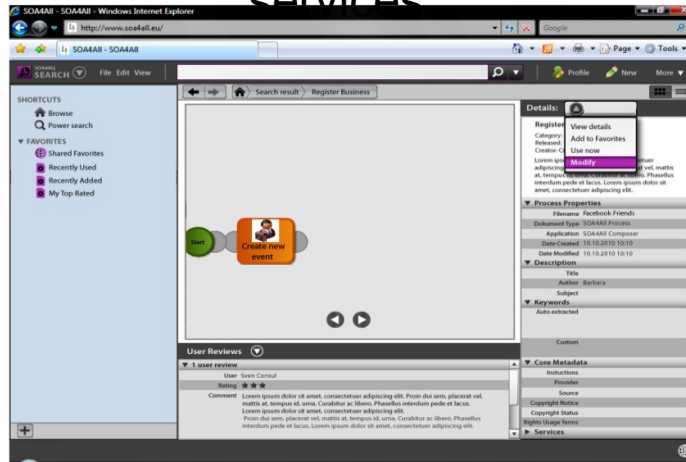
Home page



Search for services



Compose services



Meet Friends Composite Service

A service that allows you to organise a meeting with a group of friends at short notice

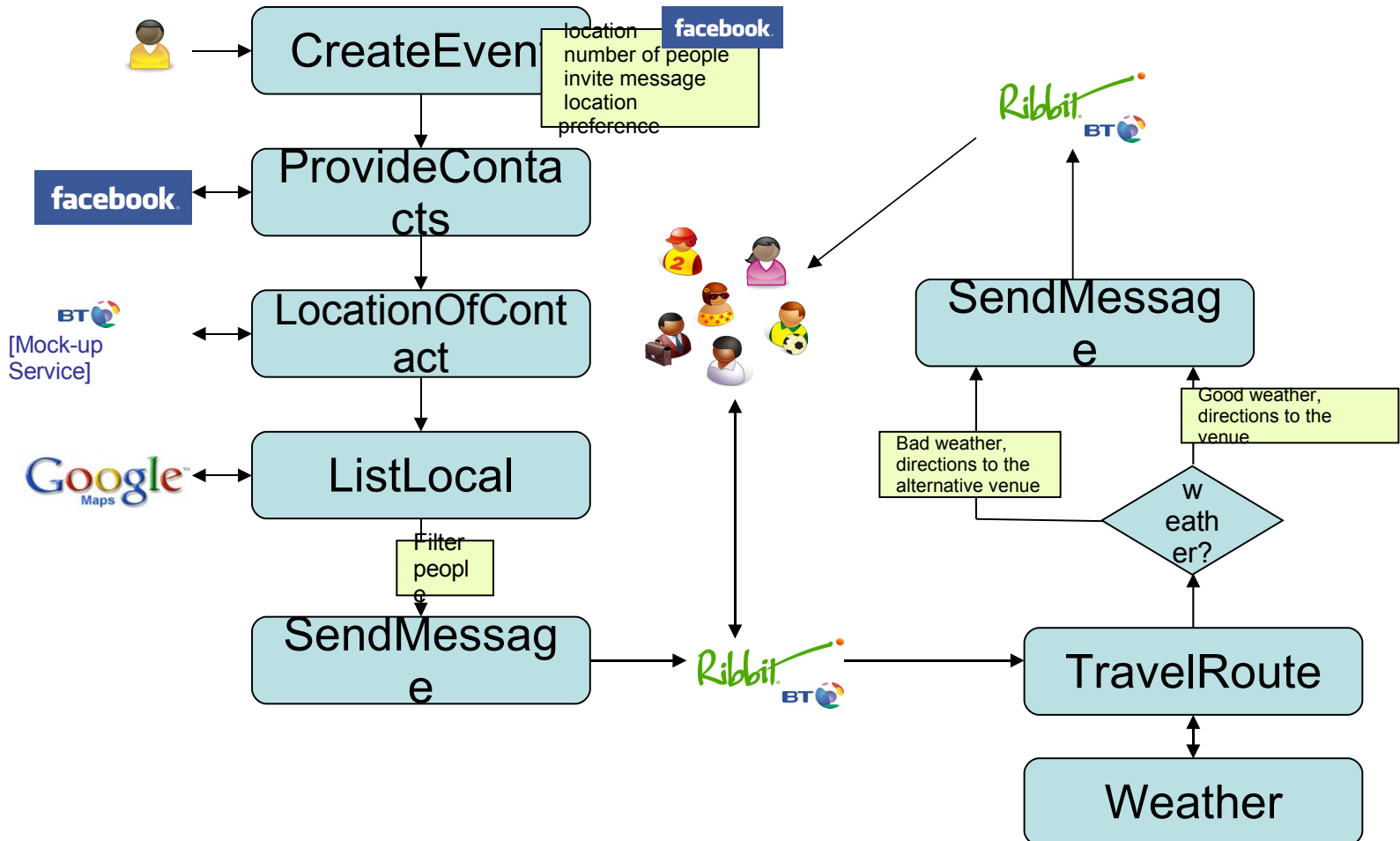
Get list of friends from social networking site (e.g. Facebook)

Find out which ones are in the area using *Ribbit* location service

Find out weather and travel information for proposed meeting venue from 3rd party

Send out invite and directions using *Ribbit* SMS

Meet Friends Mash-up



Results: Service Perception

85% of users not experts in service development

60% of users “never or less often” composed services

25 user comments related to service understanding and definition
features assisting users, information provision, execution of
transaction

Describe attributes and features of services

Describe user interaction with services

Results: ServComp Perception

Service composition by users	Mean answer	SD
... I find web service composition interesting	4.20	0.76
... is useful	4.44	0.82
...brings about a more efficient way of conducting on-line activities	4.12	0.96
...is easy to achieve	3.32	1.19
... is unfeasible	2.26	1.18
... is error-prone	2.54	0.87
... can be used to break organisational rules and policies	3.50	1.08
Ways of encouraging and supporting Service composition by users		
Examples of successful SCU can stimulate one to try it	4.69	0.52
Recognising and rewarding SCU effort will make people more willing to try it	4.15	0.90
Attending a training course could help people to start SCU	4.38	0.77
SCU quality standards and testing will decrease risks	4.32	0.76

Results: Risks & Benefits

Risks

- Exposure of personal information (through friends or service providers)
- Technical difficulty
- Errors in putting information together by inexperienced users

Benefits

- Reuse of services
- Saving time
- Applications tailored to individuals' needs
- The complexity of service composition is reduced via a composition tool

Results: ServComp Problems

Technical complexity of services (operations, parameters, etc)

Compatibility of diverse services

Steps of service composition (what are the steps required to build a composite application)

UI related issues (e.g. manipulation of services)

Results: Recommendations

Service composition is a new concept to end users, hence promote service composition awareness (through examples of SC and publicity)

Abstract from technical complexity

Use user oriented terminology

Simplify service composition, users should not spend days to learn how to compose services

Towards a guided service composition platform (via wizards, tutorials, and help messages)

Conclusions

Ordinary users do not have a technical understanding of services

High likeability and interest towards the idea of composing interactive service based applications

Composing services together saves times, reduces efforts, prevents errors, and promotes reuse.

Service composition should to be simplified and abstracted from technical complexity

Future Work

Recommendations are implemented as part of SOA4All studio

Several user based evaluations will take place to assess and improve the usability of SOA4All studio

A final version of the composition authoring tool will be released in April 2011

For more details, please see our website: www.soa4all.eu

Thank You!
Any questions?