VieTE – ENABLING TRUST EMERGENCE IN SERVICE-ORIENTED COLLABORATIVE ENVIRONMENTS
5th WEBIST, 23-26 March, 2009, Lisboa

Florian Skopik
Co-Authors: Hong-Linh Truong, Schahram Dustdar

Distributed Systems Group
Vienna University of Technology
skopik@infosys.tuwien.ac.at
http://www.infosys.tuwien.ac.at/prototyp/VieTE/VieTE_index.html

Overview

- Motivation and Introduction
- Challenges
- The fundamental Concepts of Trust in SoA
  - Definition
  - Influences on Trust
  - View of Trust
- Approach for Trust Determination
  - From Data to Trust
  - Interaction Analysis
  - VieTE Architecture
- Conclusion

Motivation

- Open dynamic ecosystem
  - humans and services
  - joining/leaving the environment dynamically
  - humans managing work flexibly on their own
- Distributed communication and coordination
  - anytime, anywhere
- Massive Collaboration
  - large sets of humans and services

Flexible Collaboration Environment

Humans and services interacting to perform work described by activities.
Assumptions

- Context-aware collaboration
  - context models describing the activity scopes
- Connecting widely distributed actors
  - Service-oriented Architectures (SoA)
- Dynamically find and use services
  - need for trust in services
- Dynamically find and collaborate with humans
  - need for trust in humans

Challenges

- Identify fundamental concepts of trust in SoA
- Enable automatic determination of trust for dynamic human/service compositions
- Identify data influencing trust
- Architecture enabling collecting, managing and analyzing data for trust determination

One uniform platform to manage trust in humans and in services in distributed service-oriented environments.

Definition of Trust

Trust reflects the expectation

- one entity has about another’s future behavior
- to perform given activities dependably, securely, and reliably
- based on experiences from previous interactions

Use Case in the Area of Software Development

1. delegate the creation of whitebox test cases for module X; trust of Fred in Jane = ?
2. project structure, required skills and knowledge etc.
3. profile: BSc in Computer Science, 3 years experience in SW development
4. previous interactions: only rare e-mail contact, and one joint meeting
5. trust relation(s) wrt. to SW implementation; relation between testing and impl.?
6. partner of Jane in another software testing activity
7. recommendation
8. profiles of recommenders
9. relationships of indirect recommenders -> reputation

How trustworthy is an Entity?

- **Individual View**
  - individual views
  - recommendations

- **Team View**
  - reputation

- **Global View**
  - reputation

From Data to Trust

- Classification of interactions
  - human-human (e.g., instant messaging)
  - human-service (e.g., document management)
  - service-service (e.g., service composition)
  - service-human (e.g., event reminder)

Interaction Analysis

- Interaction metrics
  - describing the collaboration behavior
  - with respect to particular activity scopes
  - from a certain view

Examples:

- **individual view**: a human rates a service based on the rate of successful compared to all interactions.
- **team view**: distribution of service interactions across the participants in an activity
- **global view**: similar to team view but considering a broader activity scope and different teams

VieTE Architecture

The Vienna Trust Emergence Framework
Conclusion

- Contributions
  - definition of fundamental concepts of trust in SOA
  - identification of data on which trust relies
  - design of VieTE’s service-oriented architecture
  - implementation and evaluation of a first prototype

- Future work includes
  - testing of more complex trust metrics
  - algorithms to deal with different data sets
  - refinement of VieTE’s architecture
  - evaluation in real collaboration environments

Thanks.

http://www.infosys.tuwien.ac.at/prototyp/VieTE/VieTE_index.html
skopik@infosys.tuwien.ac.at