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MAPSS, a Multi-Aspect Partner and Service Selection Method

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Agenda

- Method assumptions
- Social protocols
- Information model
- Selection method
- Technical implementation
- Limitations
- Conclusions
- Future works

Method assumptions

Current approaches

- Missing an approach integrating
  - Competence-based approach
  - Performance evaluation
  - **Social aspects**
- Separation of service search from the selection of partners
- Not mature concepts of modeling social requirements

MAPSS method assumptions

- Partner and service selection method supporting
  - Social aspects
  - Competence-based selection
  - Partner and network performance characteristic

The novelty of the proposed method lays in the combination of the concepts

Social protocols

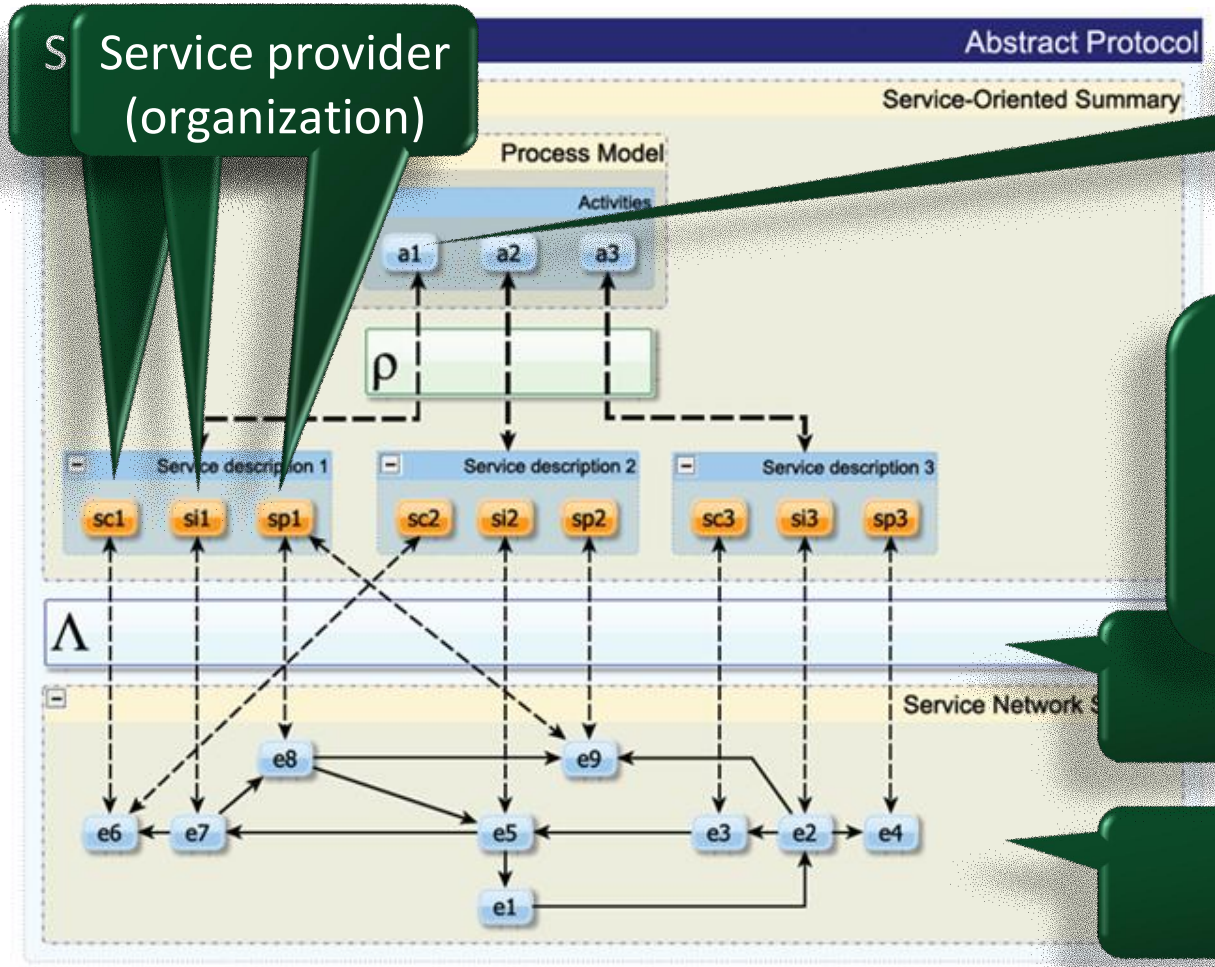
Social protocol

- Process model encompass
  - Process structure
  - Requirements
    - » Roles
    - » Social requirements

Referring to VO **elements**, e.g.
- localization

A set of constraints on the relations among interacting actors (organizations and services), e.g.
- past cooperation
- recognition
- use of service
- recommendation

Abstract protocol



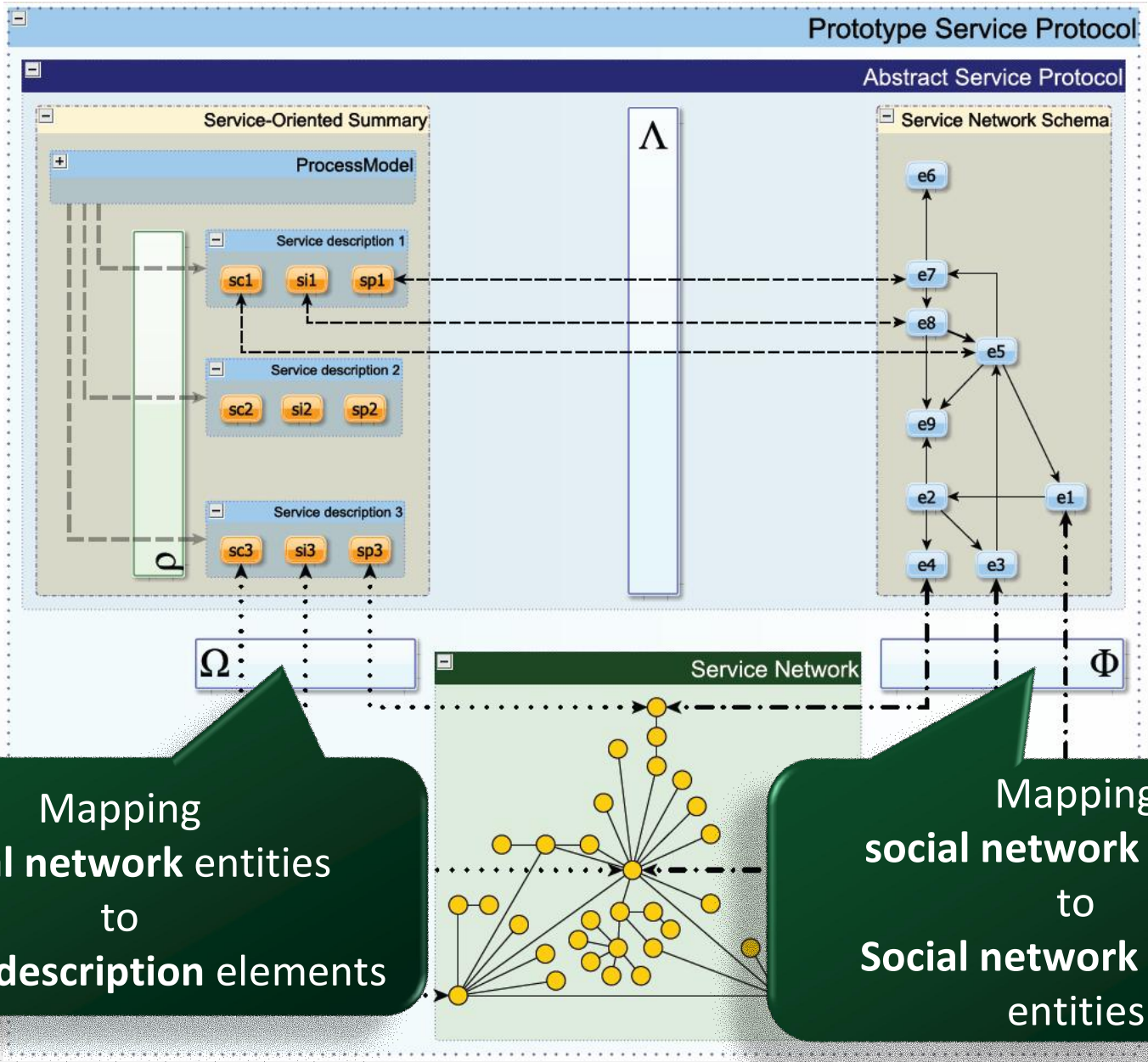
Service provider (organization)

Process activity

Partners and services are referred together as **VO elements**

Mapping function

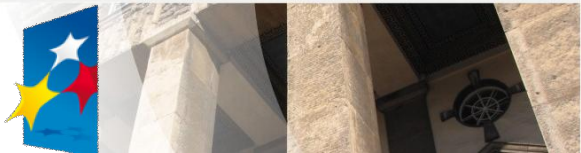
Social network schema



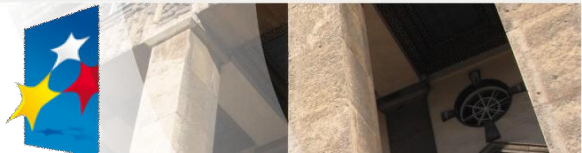
Mapping
social network entities
to
service description elements

Mapping
social network entities
to
Social network schema
entities

Multi-aspect partner and service selection (MAPSS)



Method information model



Competence description module
Service description module

- Structured description of organization's competences and services
- **Basis for definition of roles**
- Organization/service search based on submitted criteria
- Evaluation of the conformance of an organization to a set of requirements

In the current implementation
a modified 4-C model (Ermilova, Afsarmanesh) is used

Social network module

- Contents
  - Virtual organizations
  - Virtual organization partners
  - VOBE members
  - Individuals
  - Virtual Organization variants
  - Services
- **Basis for definition of social requirements**

Indicator module
Monitoring module

Not only **performance** indicators

- Definition of **complex requirements** involving various aspects in a single indicator, e.g.
  - competences and social relations

- Monitoring of requirement values and notification of changes

Selection method

Method outline

1. Definition of VO specification
2. Selection of partners and services for roles
3. VO variant generation
4. Performance evaluation
5. VO inception

In every phase, **human action** may lead to requirements redefinition, preference modification, repetition of a steps, and reconfiguration of used supporting tools

1 Definition of VO specification

- Set of requirements
- VO planner’s preferences
- VO planner’s fitness functions and acceptable requirement conformance levels

1 Definition of VO specification

- Requirement types
  - Roles
  - Social requirements
  - Indicators i.e. performance requirem
- Aspects
  - VO elements
  - Process
  - Subsets of partners
  - Subsets of services

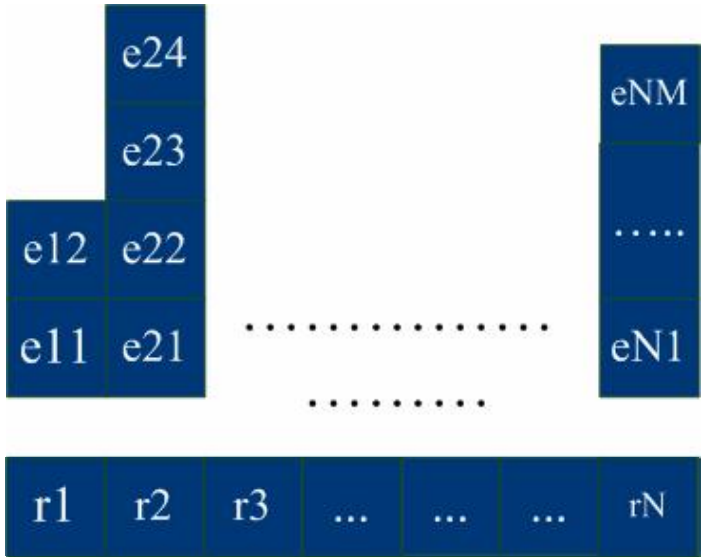
Defined in **abstract social protocol**

User defined

2 Selection of partners and services for role

- Set of services or organizations for each role
- Sorting and filtering out elements

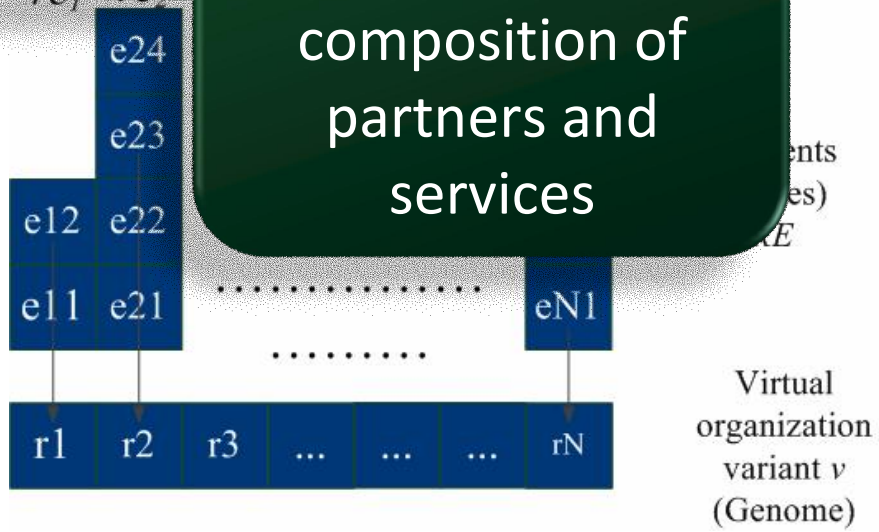
- Requirements used
  - **Roles**



3 Generation of VO variants

- ***Genetic algorithm*** - determination of the best fitted VO variants
- ***Fitness function -*** estimation of the level of satisfaction of social requirements
- ***Threshold value*** - used to filter out the VO variants

VO Variant - possible composition of partners and services

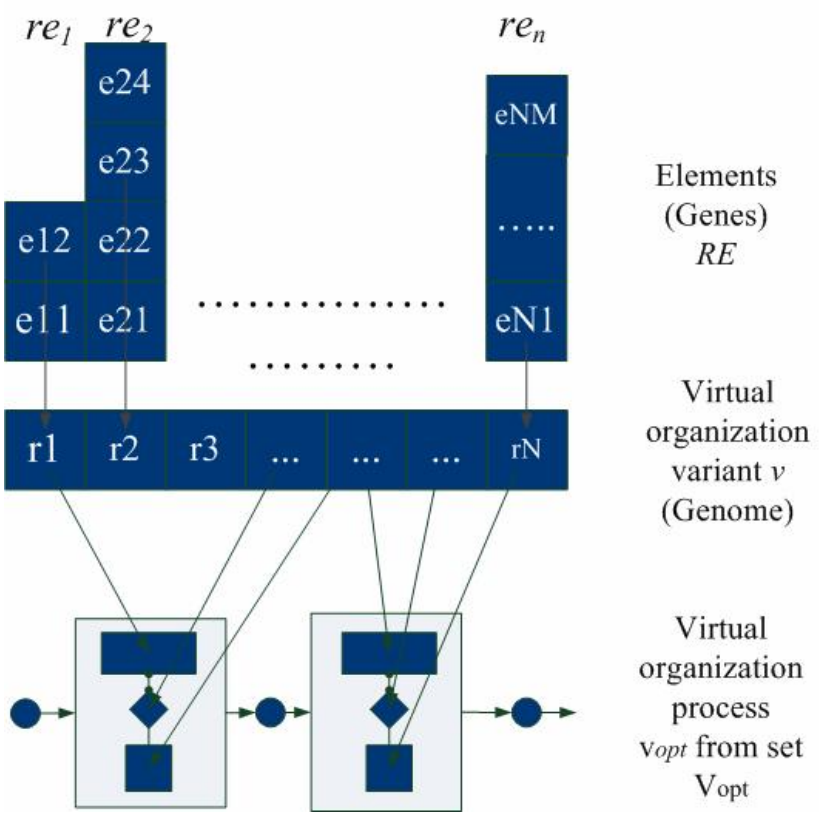


- Requirements used
  - **Social requirements**

4 Performance evaluation

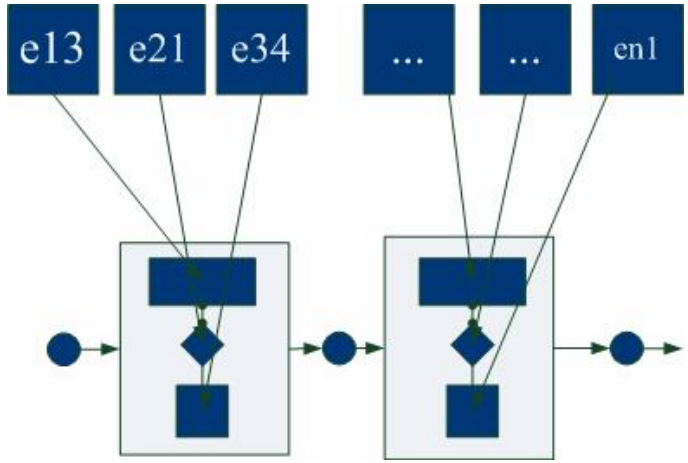
- ***Fitness performance function*** - taking into an account various performance aspects, including
  - Operational performance
  - Effectiveness
  - Responsiveness
  - Cost

- Requirements used
  - **Performance requirements**



5 VO inception

- Choosing the “winning” VO variant
- Registration as a VO in
  - competence description
  - social network



VO specification structure

Aspects	Roles	Social req.	Performance req.
Partner	Phase 2	-	-
Service	Phase 2	-	-
Subset of partners	-	Phase 3	-
Subset of services	-	Phase 3	Phase 4
Process	-	-	Phase 4

Phase 2. Selection of partners and services for roles
Phase 3. VO variant generation
Phase 4. Performance evaluation

Technical implementation

System implementation

- ErGo system

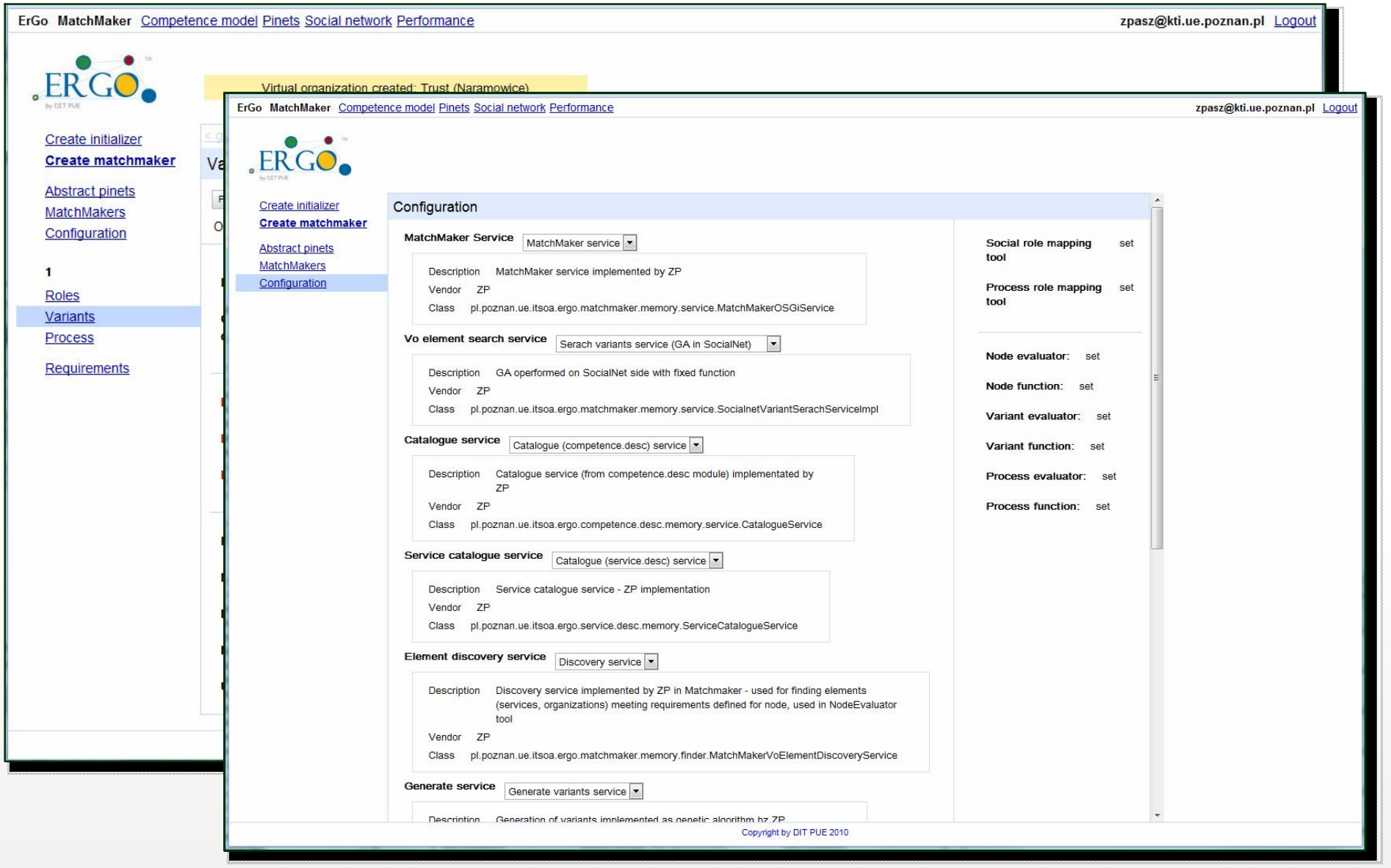
- To be used in constructing sector

Implementation environment

- Programming platform
  - Java
- Web application
  - Google web Toolkit
- System modularity
  - OSGi
- Genetic algorithm
  - Java Genetic Algorithm Package
- Social network
  - Java Universal Network Graph Framework

OSGi™

JGAP
Java Genetic Algorithms Package


ErGo MatchMaker Competence model Pinets Social network Performance
zpasz@kti.ue.poznan.pl Logout
Virtual organization created: Trust (Naramowice)
Create initializer
Create matchmaker
Abstract pinets
MatchMakers
Configuration
1
Roles
Variants
Process
Requirements
ErGo MatchMaker Competence model Pinets Social network Performance
zpasz@kti.ue.poznan.pl Logout
Create initializer
Create matchmaker
Abstract pinets
MatchMakers
Configuration
Configuration
MatchMaker Service
MatchMaker service
Description MatchMaker service implemented by ZP
Vendor ZP
Class pl.poznan.ue.itsoa.ergo.matchmaker.memory.service.MatchMakerOSGiService
Vo element search service
Serach variants service (GA in SocialNet)
Description GA operformed on SocialNet side with fixed function
Vendor ZP
Class pl.poznan.ue.itsoa.ergo.matchmaker.memory.service.SocialnetVariantSerachServiceImpl
Catalogue service
Catalogue (competence.desc) service
Description Catalogue service (from competence.desc module) implementated by ZP
Vendor ZP
Class pl.poznan.ue.itsoa.ergo.competence.desc.memory.service.CatalogueService
Service catalogue service
Catalogue (service.desc) service
Description Service catalogue service - ZP implementation
Vendor ZP
Class pl.poznan.ue.itsoa.ergo.service.desc.memory.ServiceCatalogueService
Element discovery service
Discovery service
Description Discovery service implemented by ZP in Matchmaker - used for finding elements (services, organizations) meeting requirements defined for node, used in NodeEvaluator tool
Vendor ZP
Class pl.poznan.ue.itsoa.ergo.matchmaker.memory.finder.MatchMakerVoElementDiscoveryService
Generate service
Generate variants service
Social role mapping tool set
Process role mapping tool set
Node evaluator: set
Node function: set
Variant evaluator: set
Variant function: set
Process evaluator: set
Process function: set
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Limitations

Limitations

- Instantiation of the whole social protocol before process launching
- Single user approach
- Privacy related issues are not addressed
- Static method

Conclusions

Conclusions

- Combination of **social aspects**, **competence**-based selection and **performance** characteristic
- Already implemented
- Ongoing validation in constructing sector
- Source of social data

Future works

Future works

- Continuous selection
- Collaborative method
- Dynamic selection method

Method configurability
+
method instance logging
=
recommendation method based on
process mining techniques

***MAPSS*, a *M*ulti-*A*spect**
***P*artner and *S*ervice *S*election Method**

Thank you

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***MAPSS*, a *M*ulti-*A*spect**
***P*artner and *S*ervice *S*election Method**

Thank you

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Processes within VO

- Processes of adaptation
- Collaborative process modeled as a social protocol
- Partner and service selection process throughout VO existance

User tools and services

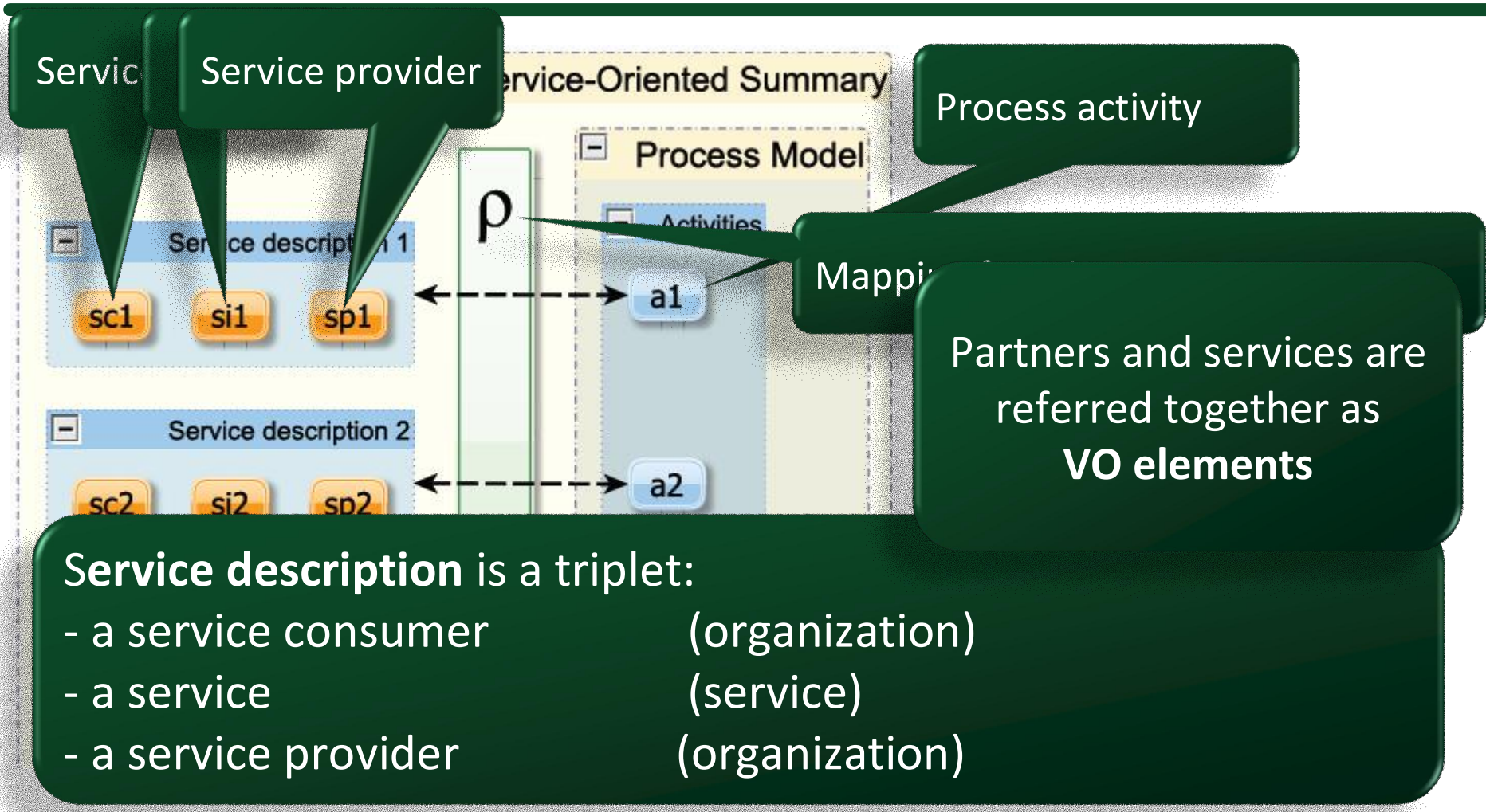
- Evaluators of node/variant/process
- Functions for evaluation of node/variants/process
- Mappers to roles/activities
- Services
  - Organization/service catalogue service
  - VO variant search service
  - Element discovery service
  - Social network service
  - Indicator service

Method high configurability

Social protocols – basic concepts

- Service description
- Service-oriented summary
- Social network schema
- Abstract protocol

Service-oriented summary



Social network schema

- A graph in which ***entities*** are **roles** and ***links*** are **social requirements** concerning actors playing these roles