Pro-Active Service Entity Framework

Towards better mapping between Business and Software

Motivation – I

Servic
e

Service

Servic
e

Service

Motivation – II

- Client satisfaction
- Business Process
- Resource Management
- Marketing
- …

Business Perspective

- Remote Procedure Calling
- Input-Parameters
- Output Results
- Interoperability
- WS Composition
- …

Software Perspective

Motivation – III

Web Service Approach Limitations

- Functional Restriction
- WS are Static entities
- Provider Selection Difficulties
  - Client Perspective
  - Provider Perspective
- Catalogues out of date
- No Aggregation

Suggested Approach-I

- Service concept

Definition 1 – **Service**: is a software construct **materializing the value an entity can provide to clients** in exchange for some reimbursement, that can be represented by a tuple S=(SR, C, D, RO), where:

- SR – a **reference** to the actual (technical) service, enabling the functional call or the i-content provision launch;
- C – the **category** of the service;
- D – the detailed **description** of the service. Depending on the specific Service and Category, this description may include format or semantic specifications, for the case of an i-content service; or input parameters and results' information, for the case of a functional service.
- RO – the reference **ontology**.

Suggested Approach-II

- Service Entity concept

Definition 2 – **Service Entity**: is a tuple SE= (CR, AT, SS), representing a CBE member (perspective of a service provider), where:
- CR – **reference** to the **CBE** member represented by the service entity;
- AT = $\{attr_i \mid i \in N\}$ – the Set of **Attributes** of the corresponding CBE member;
- SS = $\{s_i \mid i \in N\}$ – the **Set of Services** the represented CBE member can provide.

Suggested Approach-III

- Behavior concept

Definition 3 – **Behavior Definition**: a tuple BD = (D, PREC, POSC, TM, BWD), where:

- D – a **description** including the aim of the BD;
- PREC –**Pre-Conditions** – verified before the behavior is triggered;
- POSC – **Pos-Conditions** – verified to assess the behavior success;
- TM – **Triggering Mechanism** – timings, frequency and data-flow conditions specifying the execution launch;
- BWD – **Behavior Workflow Definition** – specification of the base functions that are used within the behavior, their input parameters and their execution flow graph.

Suggested Approach-IV

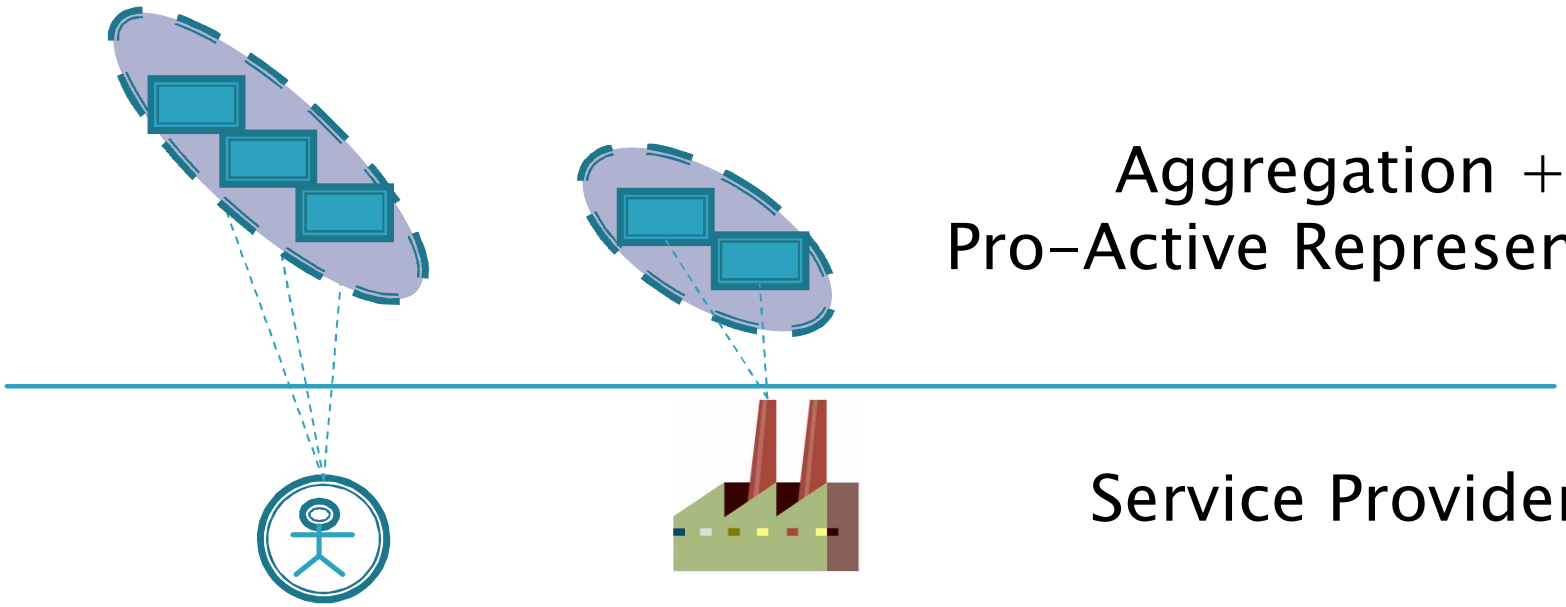
- Pro-Active Service Entity concept

Definition 4 – **Pro-Active Service Entity**: a tuple PSE = (SE, AT, BD), where:

- SE – **Reference** to the represented and promoted **Service Entity**,
- AT = $\{at_i \mid i \in N\}$ – a set of the "**base functions**" aiming **representation purposes** that can be performed by the PSE in the defined behaviors.
- BD = $\{bd_i \mid i \in N\}$ – a **set of Behavior Definitions** – that identify the triggering mechanisms, the timings, the frequency and the workflow of a given behavior.

Suggested Approach-IV

- Pro-Active Service Entity concept



Suggested Approach-V

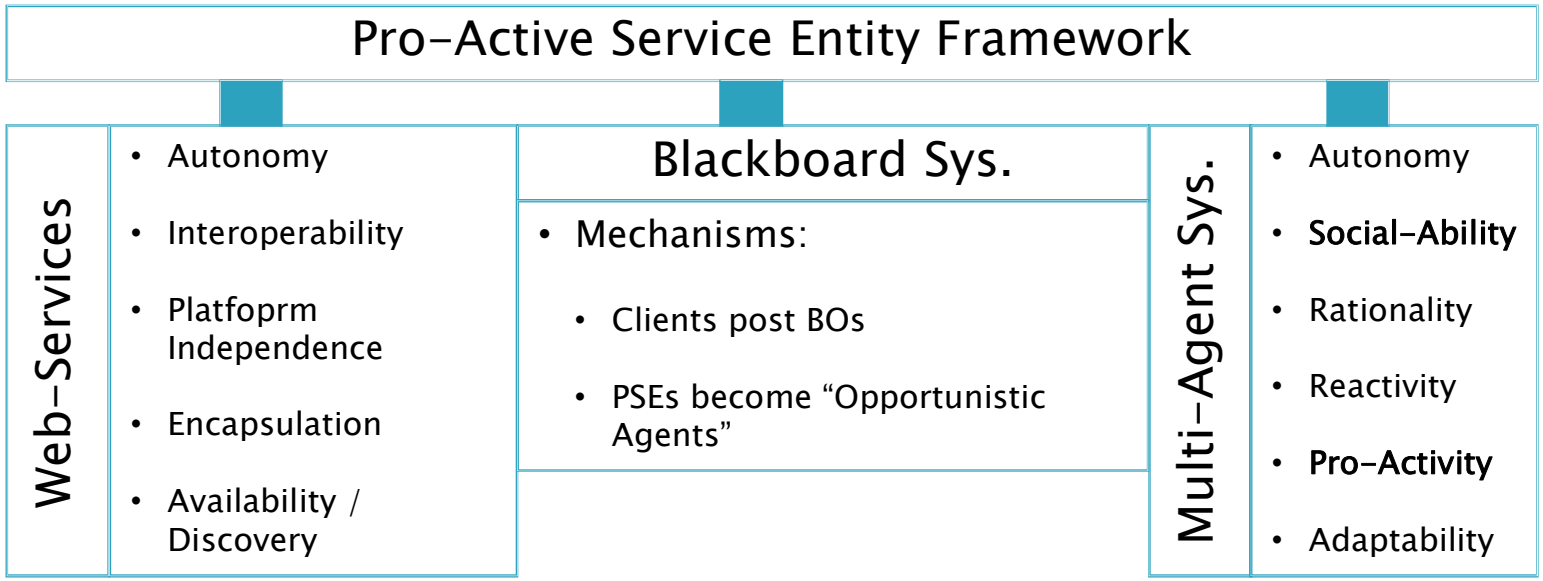
- Pro-Active Service Park concept

Definition 5 – **Pro-Active Service Park** – a tuple PSE-Park = (PS, BO, PM, CR, BF), where:

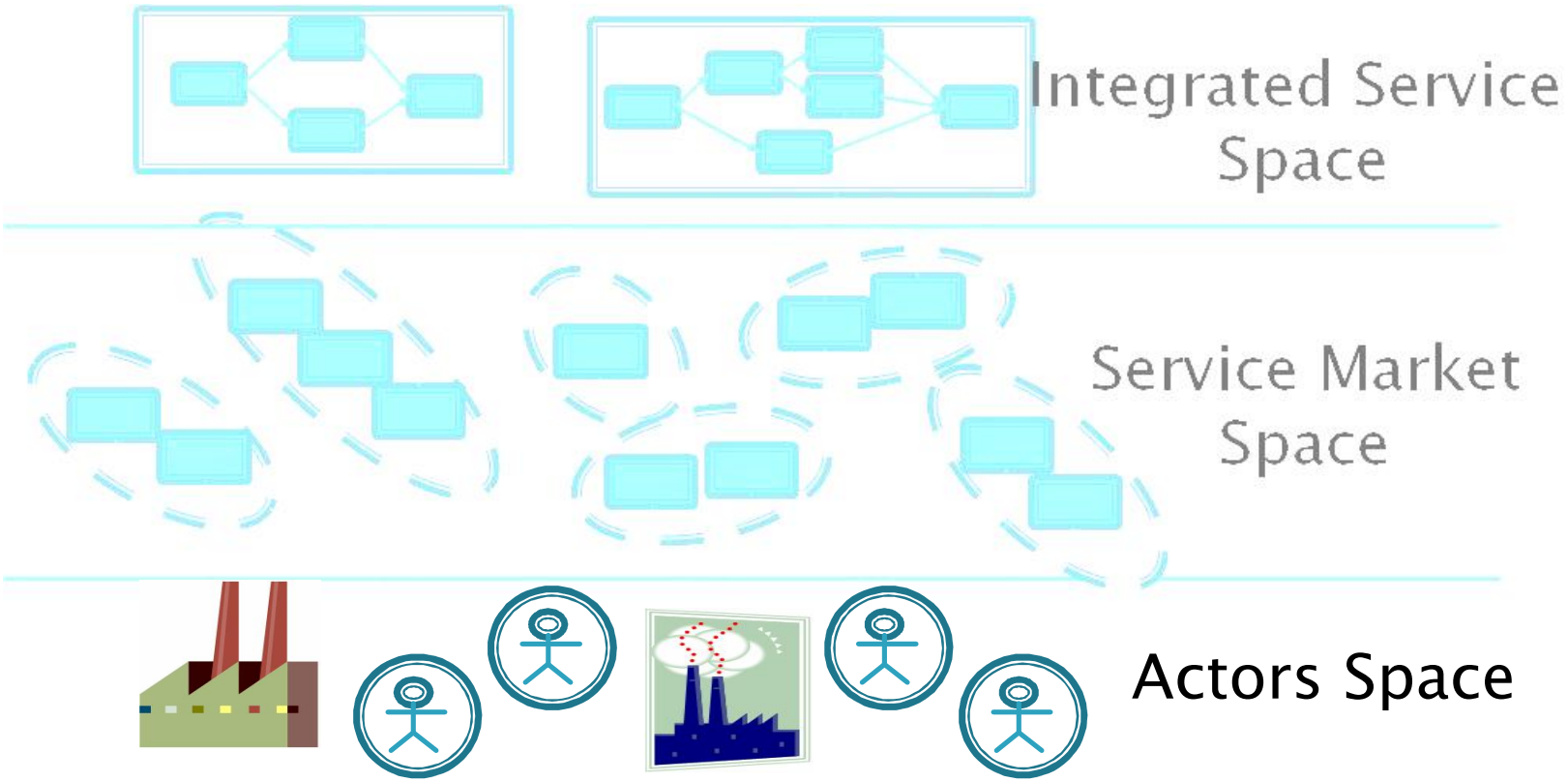
- PS = $\{pse_i \mid i \in N\}$ – set of registered **PSEs**;
- BO = $\{bo_i \mid i \in N\}$ – set of specified needs / **BOs**;
- PM = $\{pm_{i,j} \mid (\forall\ pm_{i,j}\ \exists\ pse_i \in PS \wedge \exists\ bo_j \in BO\}$ – set of **Performance Measurement Information** for each PSE used in every BO (historic data).
- CR = $\{cse_i \mid (\forall\ cse_i\ \exists\ pse_i \in PS)\}$ – set with **certification information** on PSEs.
- BF = $\{f_1, f_2, f_3, f_4\}$ – 4 **built-in functionality**

f_1 (PSE Registration)
f_2 (BO Posting)
f_3 (Performance Measurement)
f_4 (Certification)

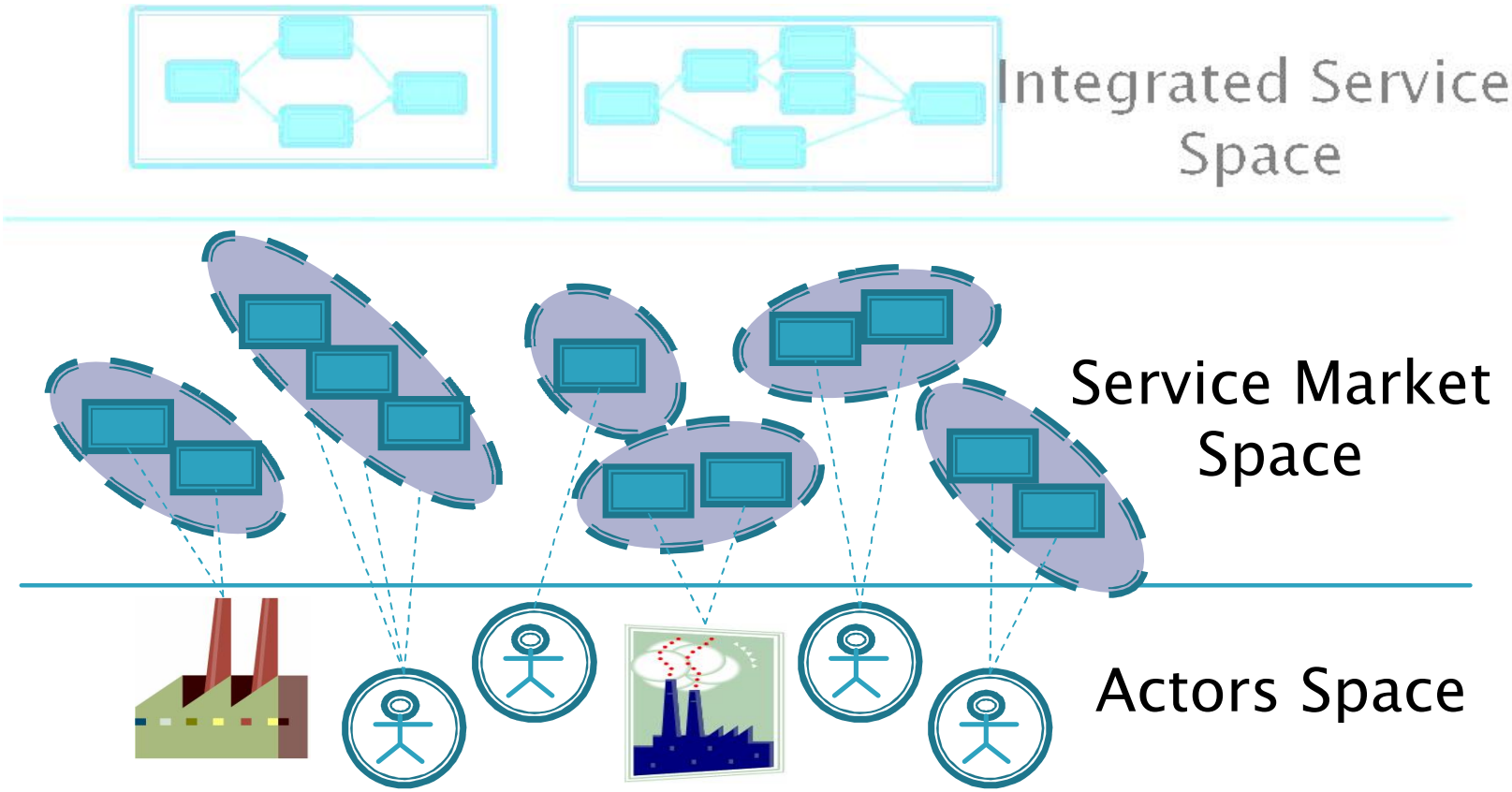
Inspiring contributions



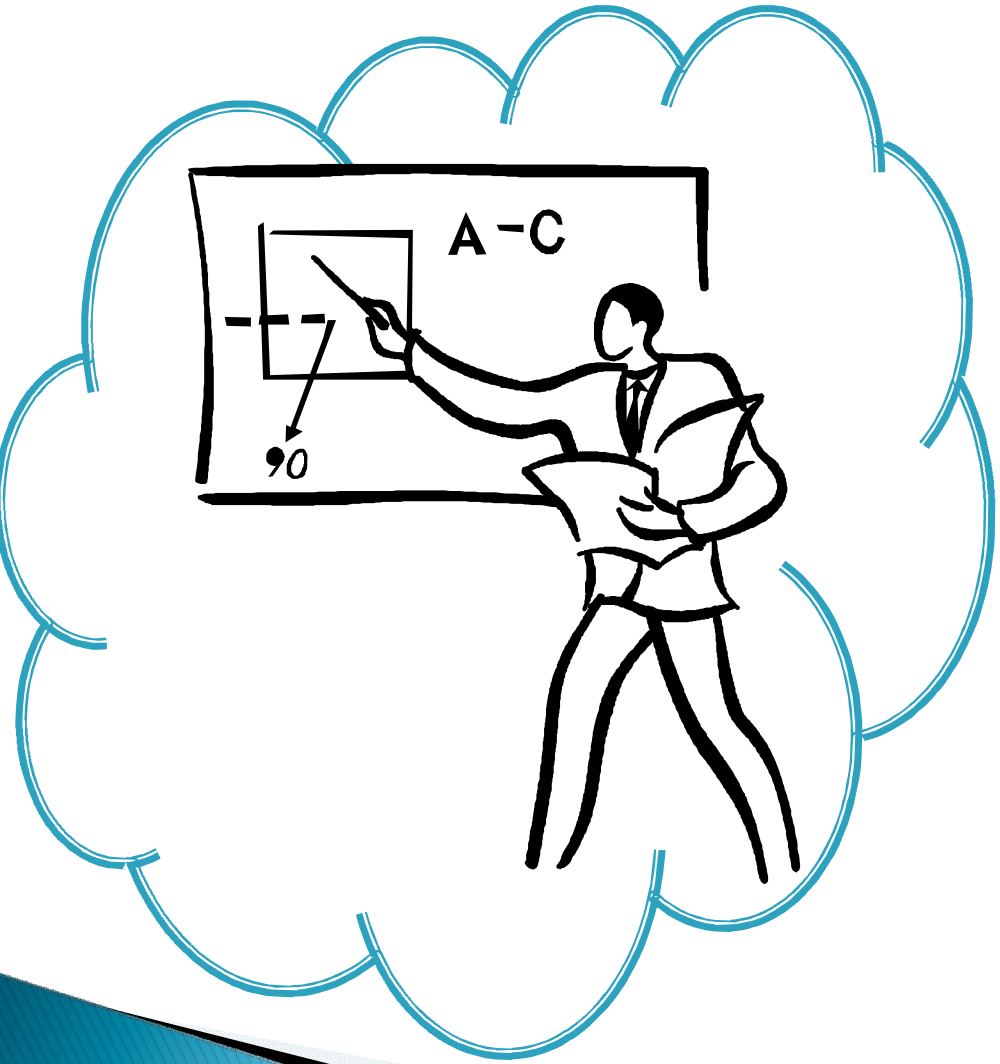
Logical Architecture



Logical Architecture

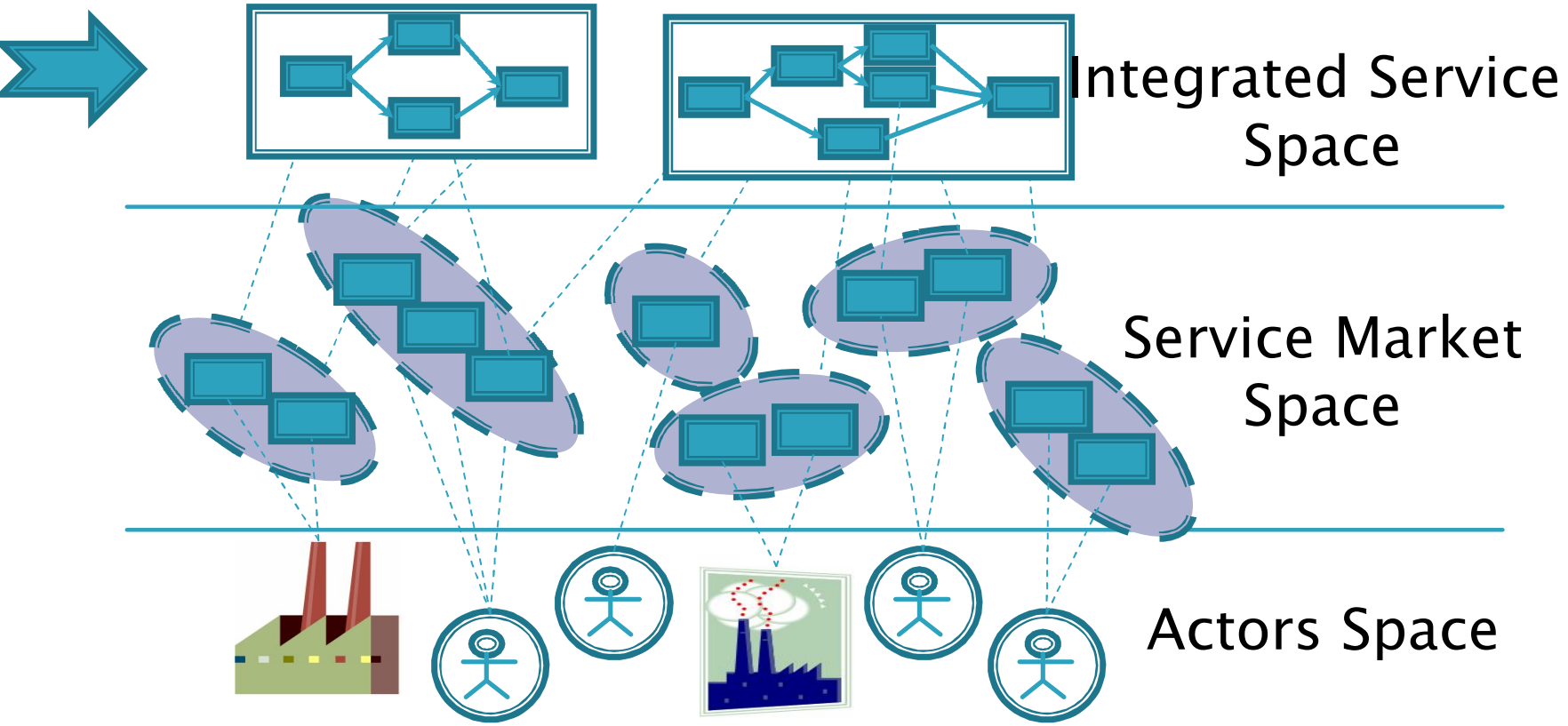


Logical Architecture



Client Need Specification

Logical Architecture



Actors & Roles

CBE Member – Service Providers

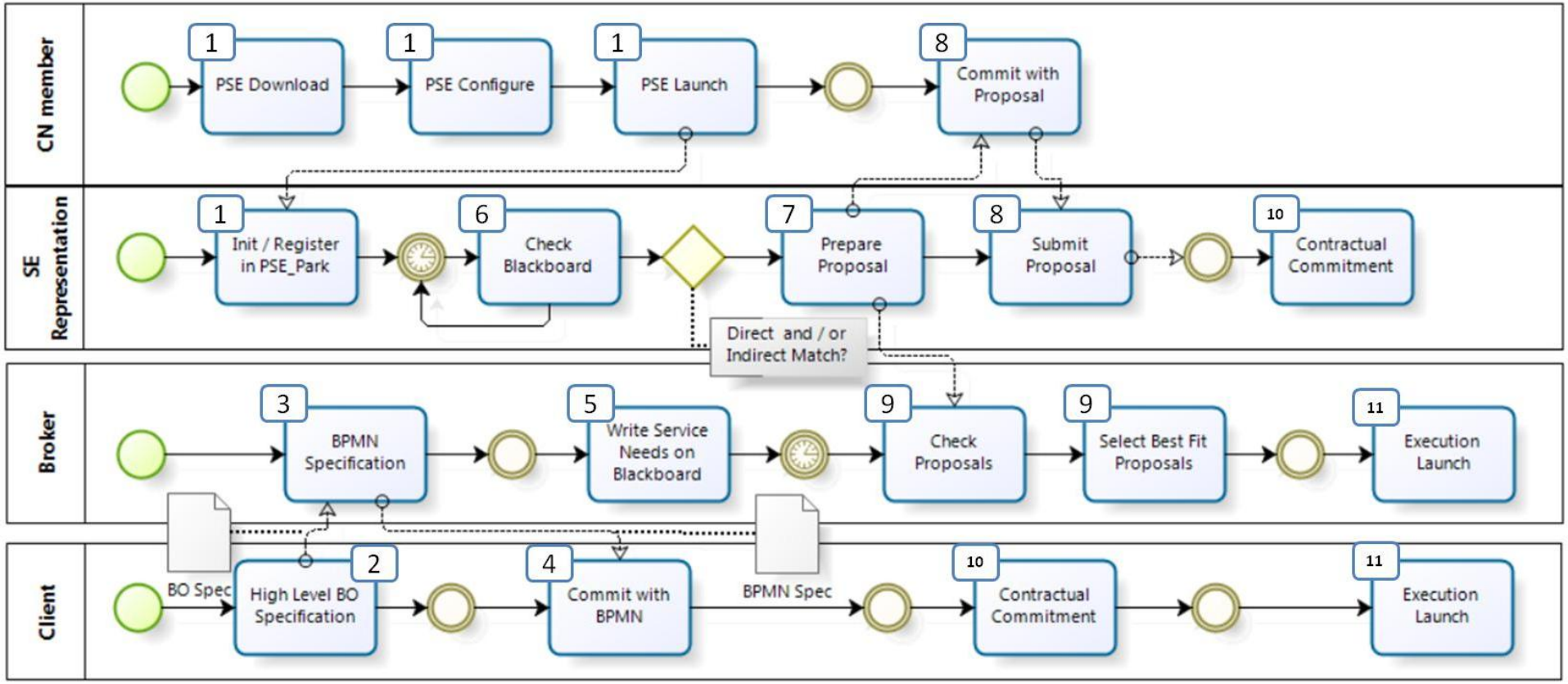
Clients – making high-level specifications of the needs / BOs

Brokers – responsible to prepare proposals for clients' needs and to select the Services that best fit these needs,

Pro-Active Service Park Administrator

Pro-Active Service Entity- Represents a Service Entity

Service Composition Process



Implementation Approach – I

JAVA + JADE

- Main Classes:

•PSE_ParkGUI

2 •BusinessOpportunity

3 •CallForProposals

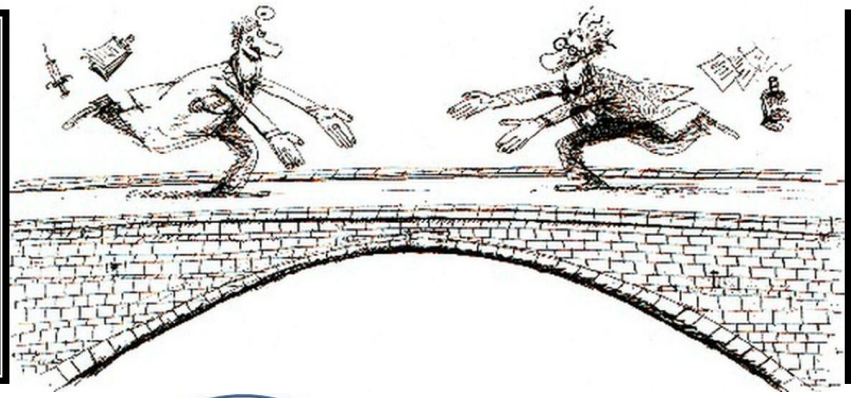
•ClientAgent / ClientGUI

1 ClientNeed

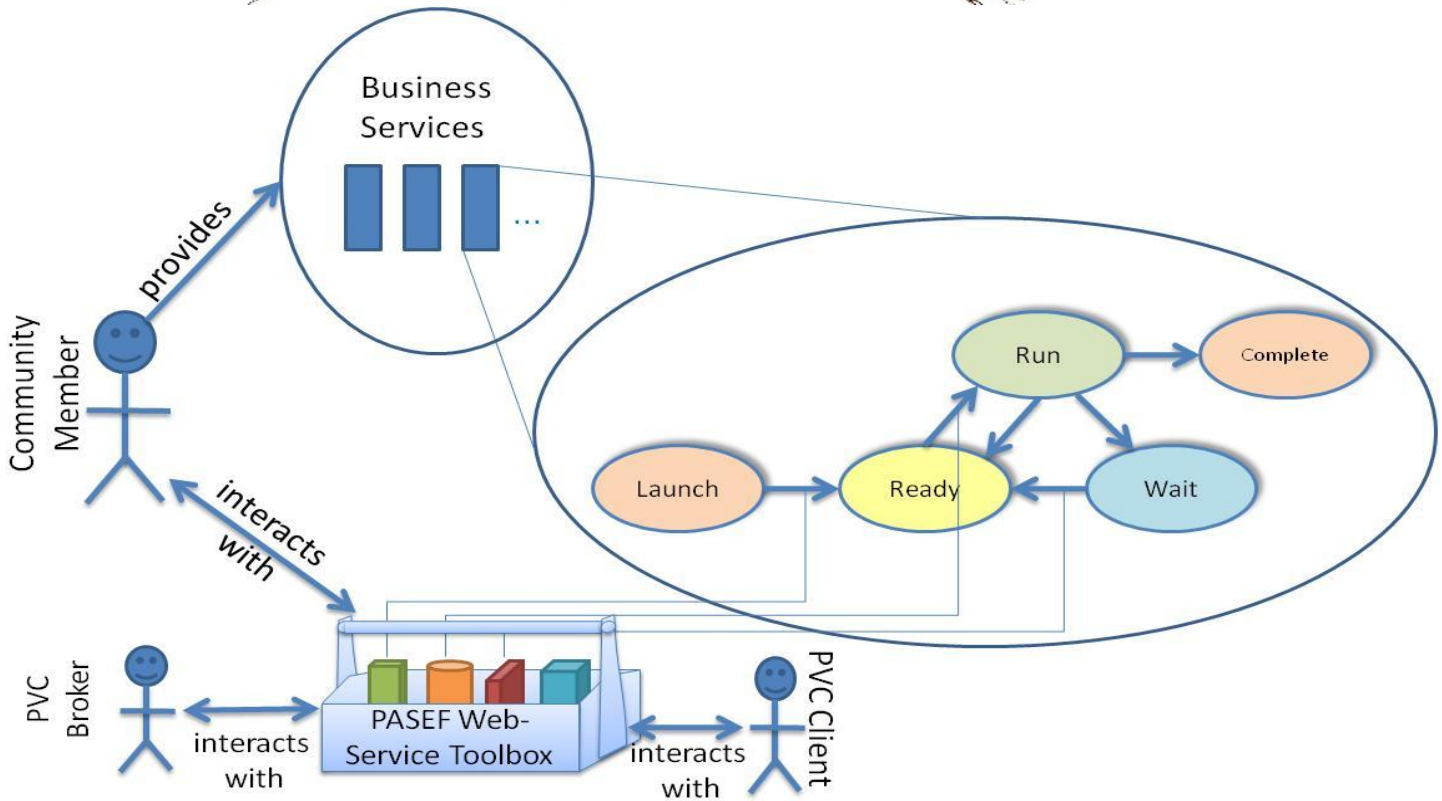
•PSE

4 •Proposal

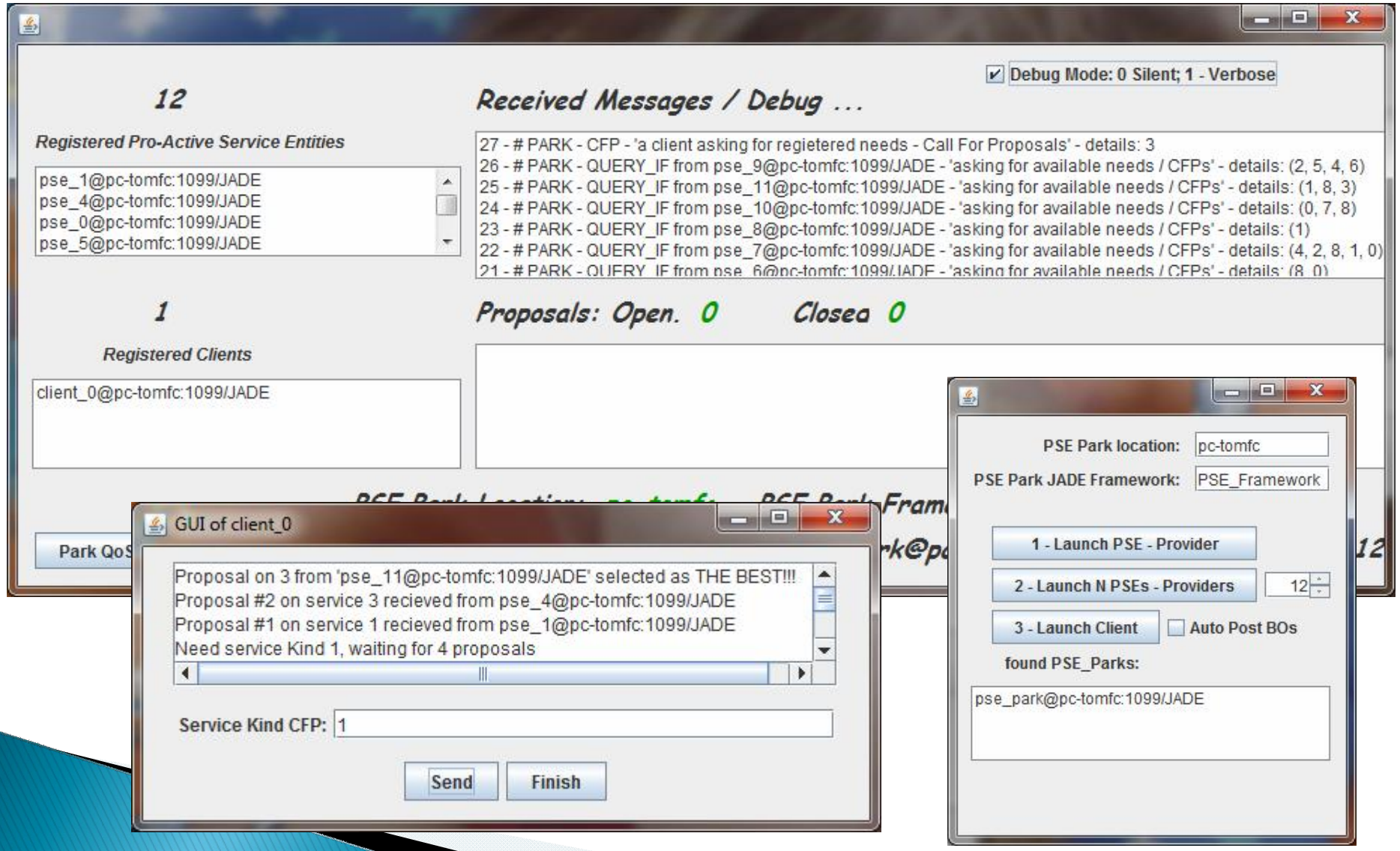
Business Services



PASEF Tech. Services (WS)



Implementation Approach – II



Concluding Remarks-I

- Reduction of distance between Business & Software perspectives
  - PSE represents and promotes services provided by a PVC member
  - PSE is not a static entity
    - Instead of waiting for client's initiative, the PSE tries to find BOs
    - PSE acts as an "Ambassador"
- Proposals recieved are up-to-date / their providers are "alive"

Concluding Remarks-II

- Ongoing work
  - Quality of Service
  - Development of co-creation space for:
    - PVC Clients
    - PVC Intermediaries
    - PVC members – the service providers
- Prototype improvement

Pro-Active Service Entity Framework

Towards better mapping between Business and Software

Thank you ...

Questions?