Enterprise COllaboration & INteroperability

COIN Platform Demonstration

COIN Summer School
Aachen, October 20th 2010

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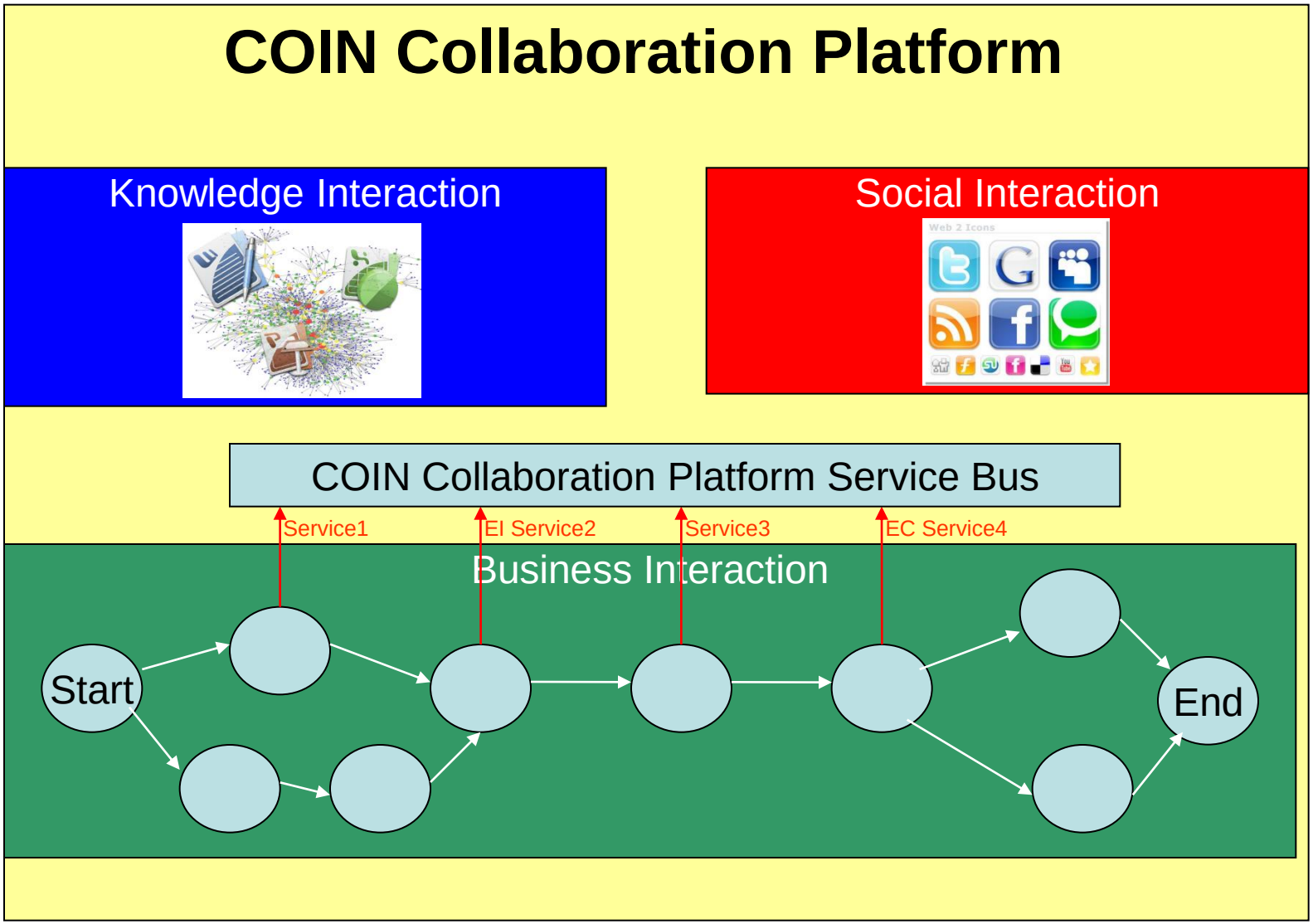
TXT e-solutions S.p.A.

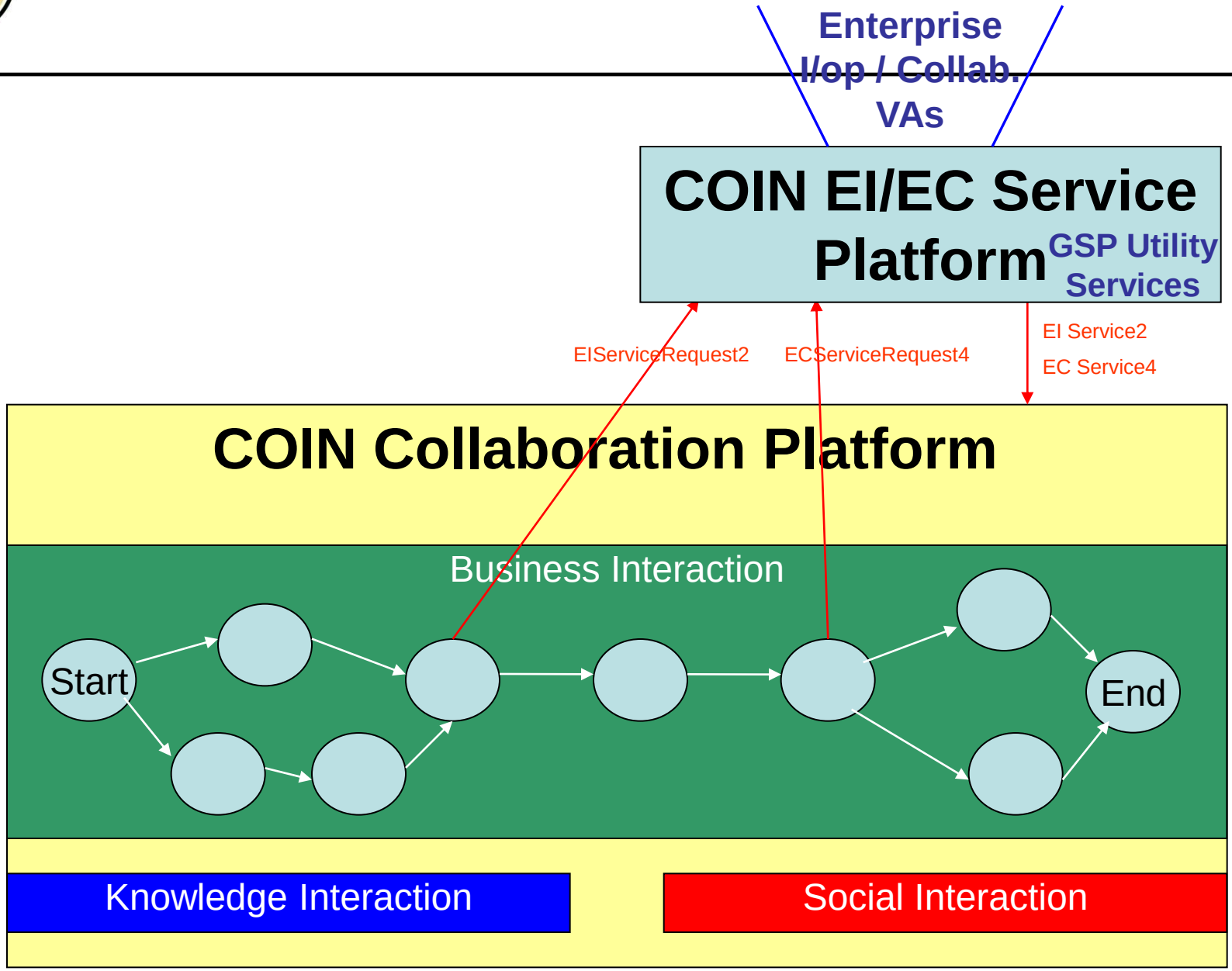
Contents

- COIN Step II Integration Technical Overview
- Service registration in the GSP
- Step II Search & discovery & ranking & execution (CP – GSP Communication - pull)
- Step II GSP WatchDog (push)
- Step II GSP Execution Monitoring
- COIN Platform - Step III vision

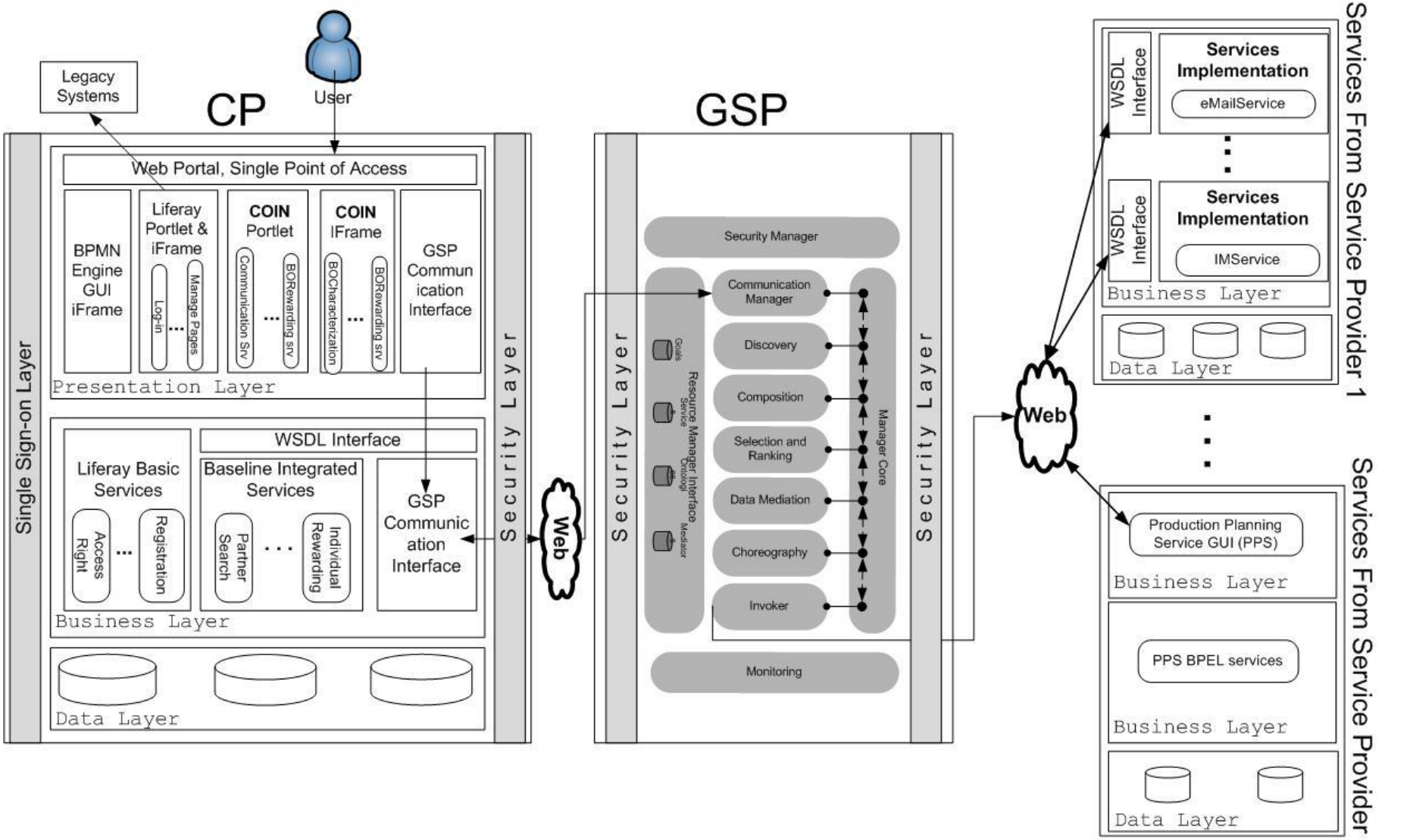
Integration STEP 1



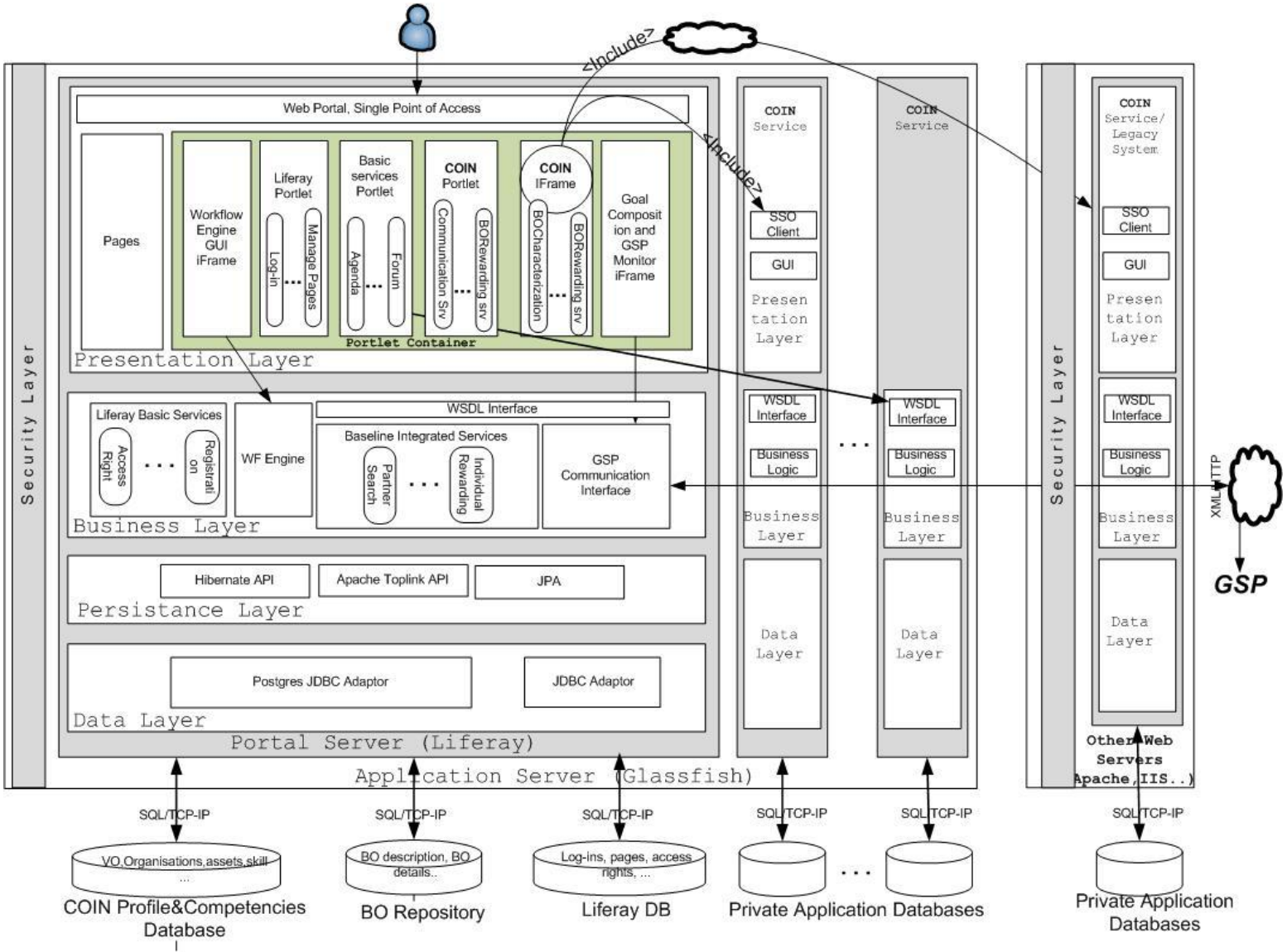
Integration STEP 2



COIN Integrated Service Platform



COIN Collaboration Platform



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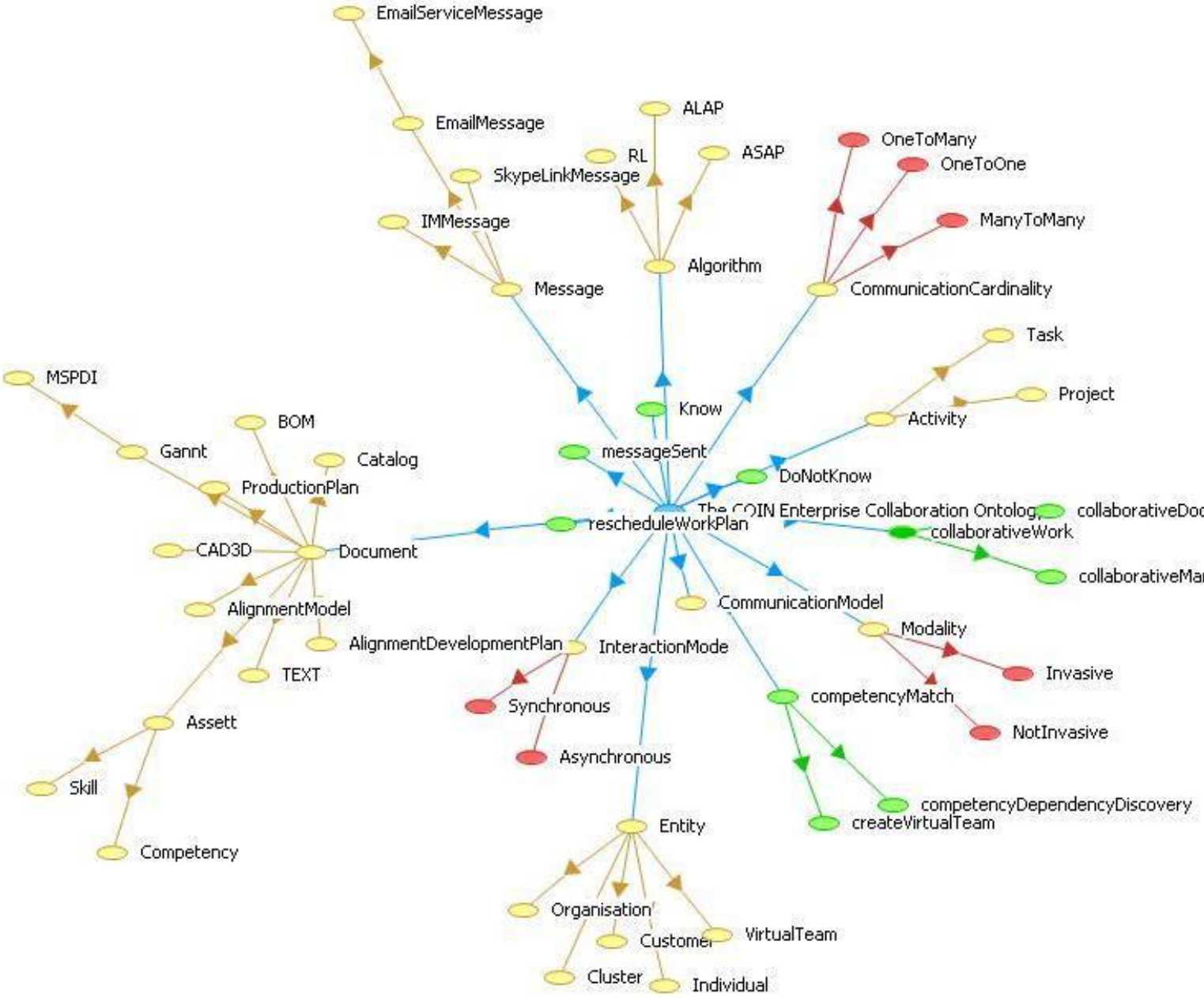
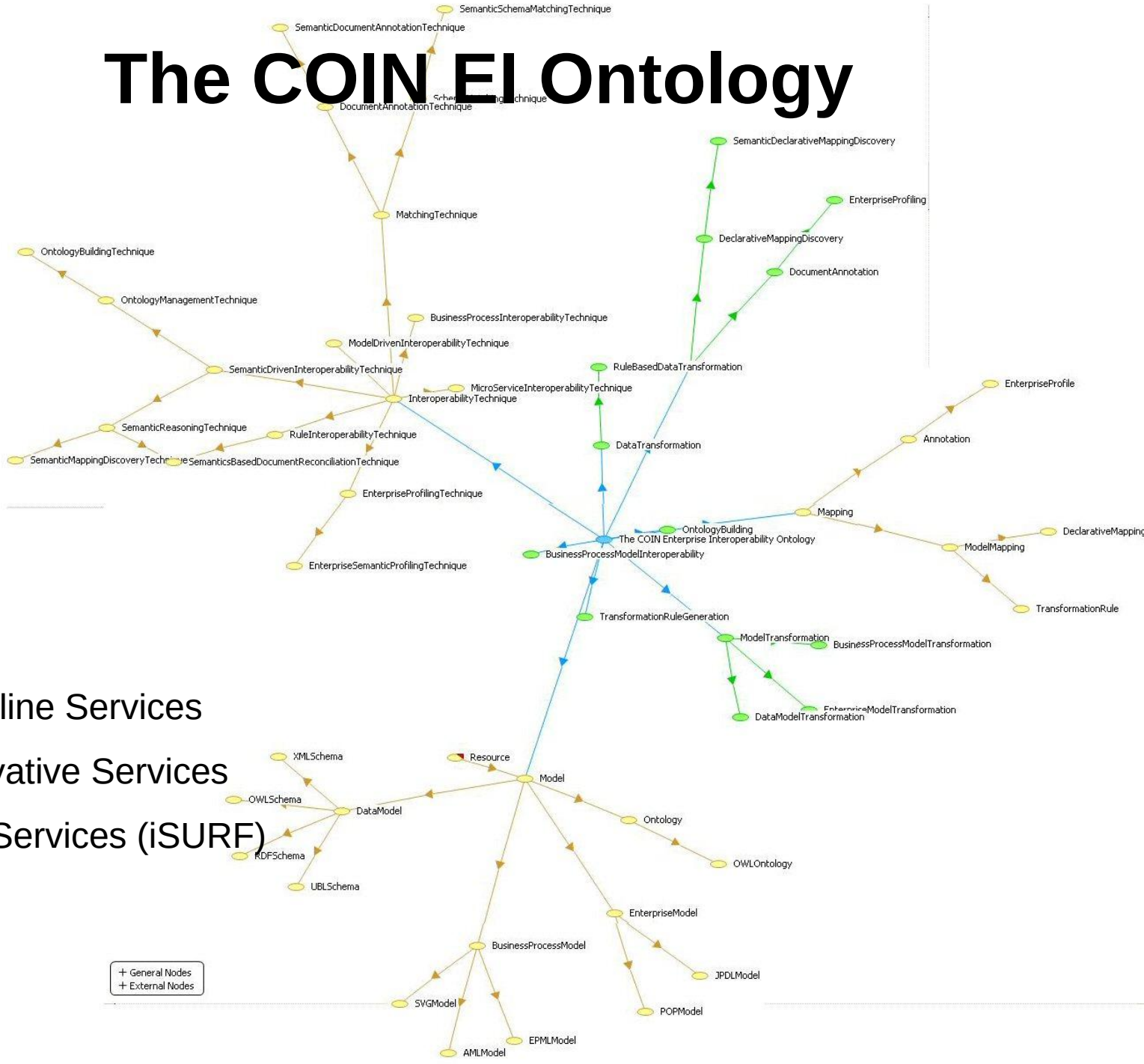
The COIN EC Ontology



- 35 Concepts
- 22 Relations
- 10 COIN EC Baseline Services
- 15 COIN EC Innovative Services
- 1 non-COIN EC Service (ECOSPACE)

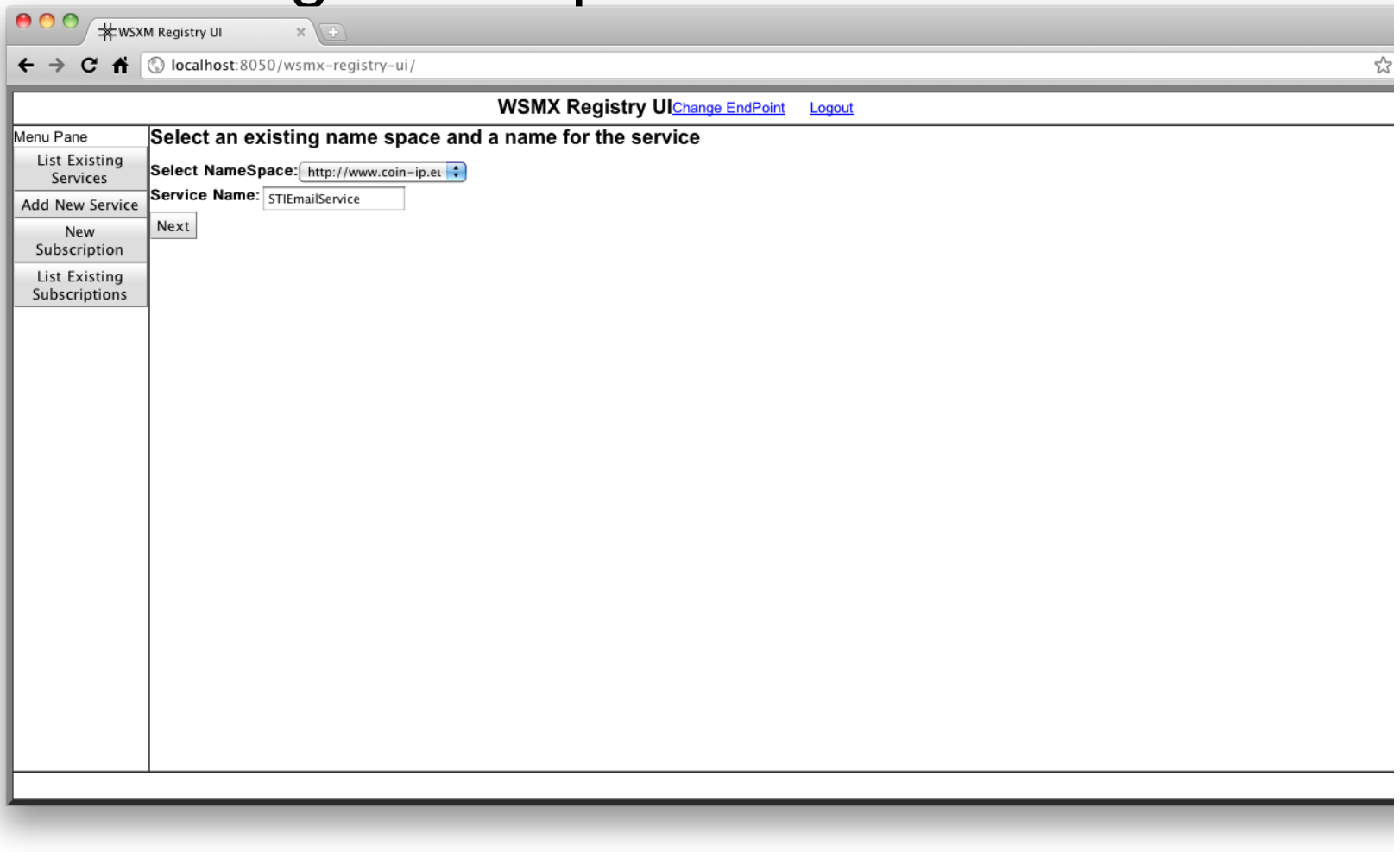
The COIN EI Ontology



- 39 Concepts
- 14 Relations
- 7 COIN EI Baseline Services
- 9 COIN EI Innovative Services
- 2 non-COIN EI Services (iSURF)

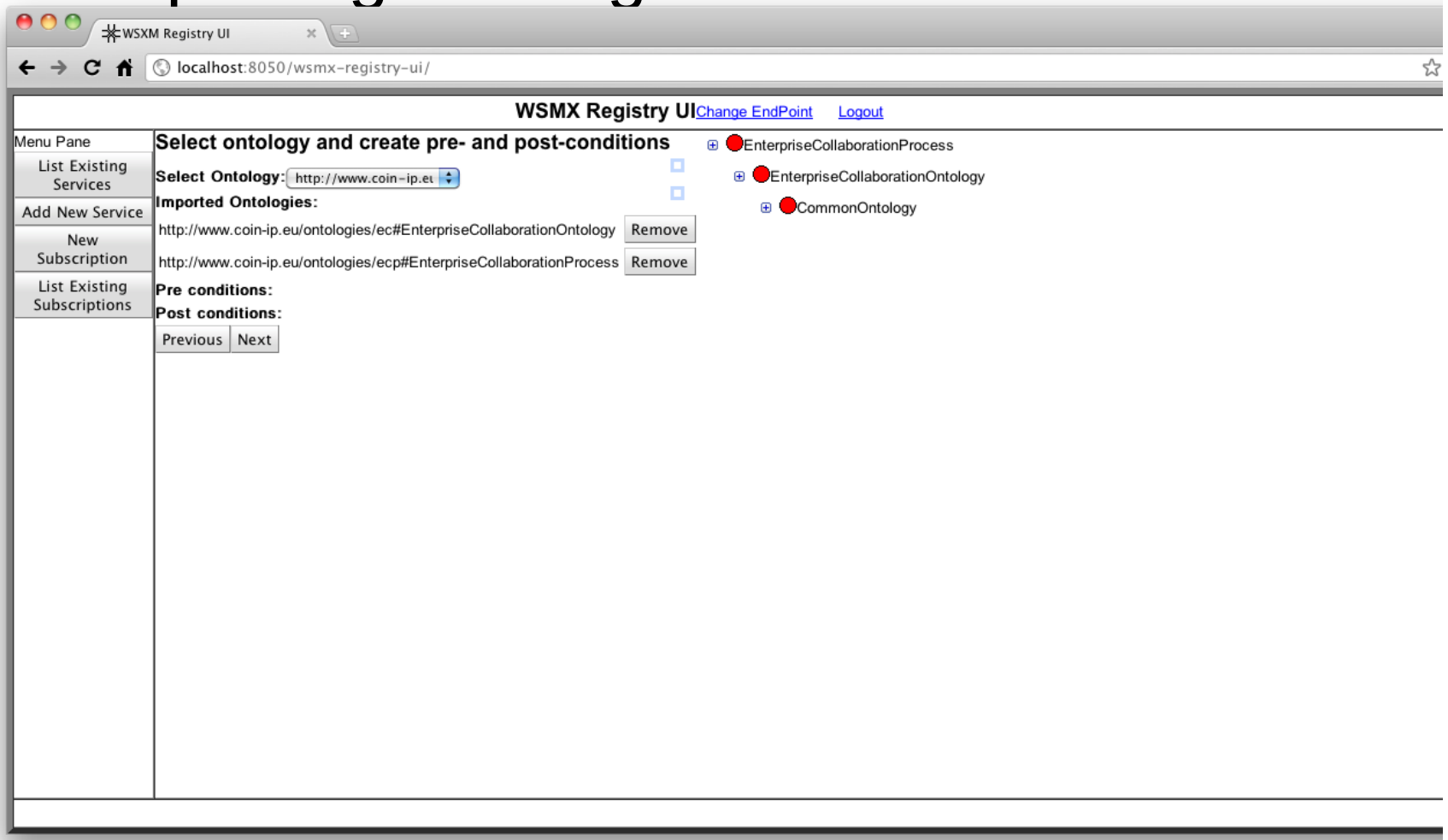
Registration process

- Selecting namespace and SWS identifier



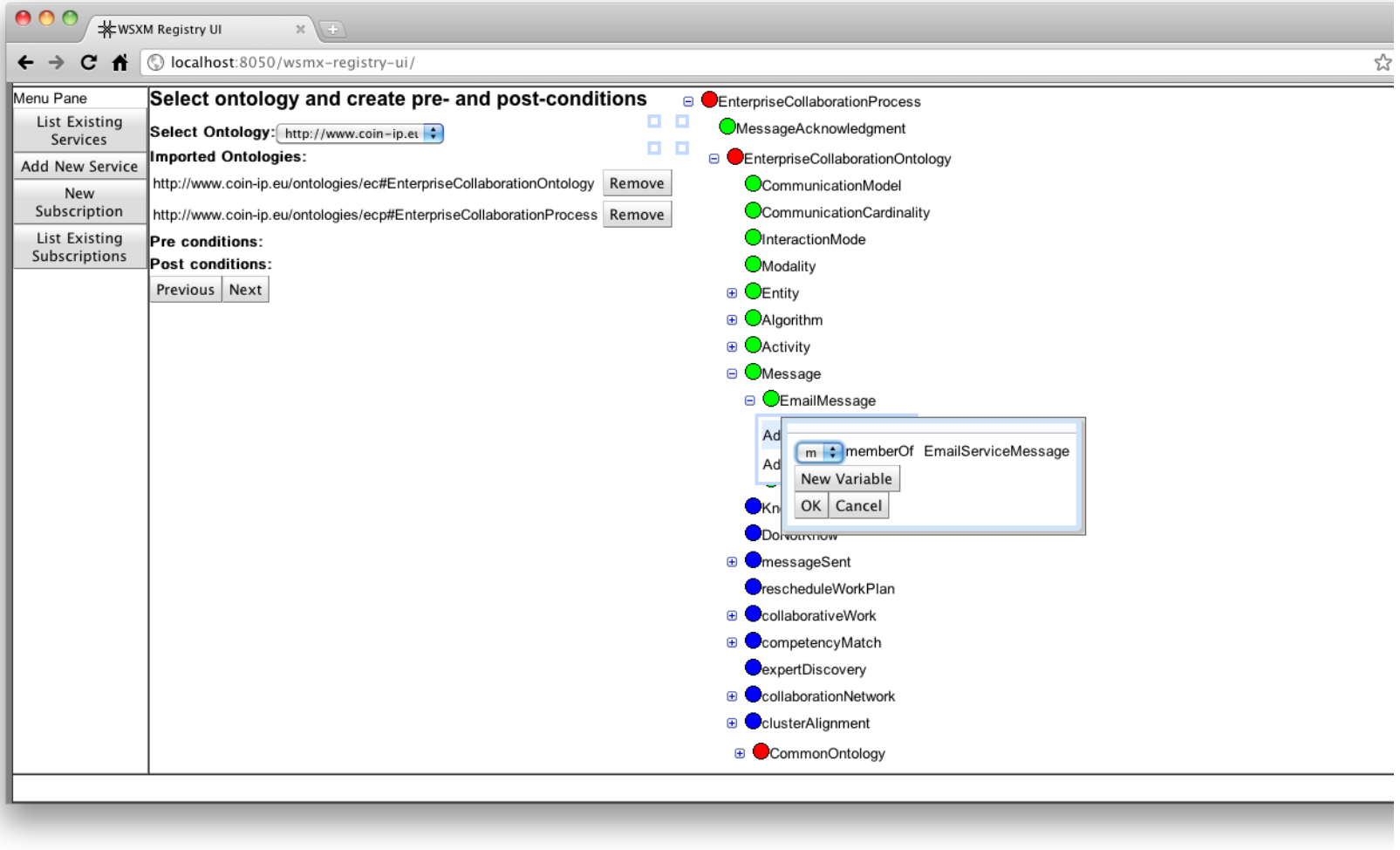
Registration process

- Importing ontologies



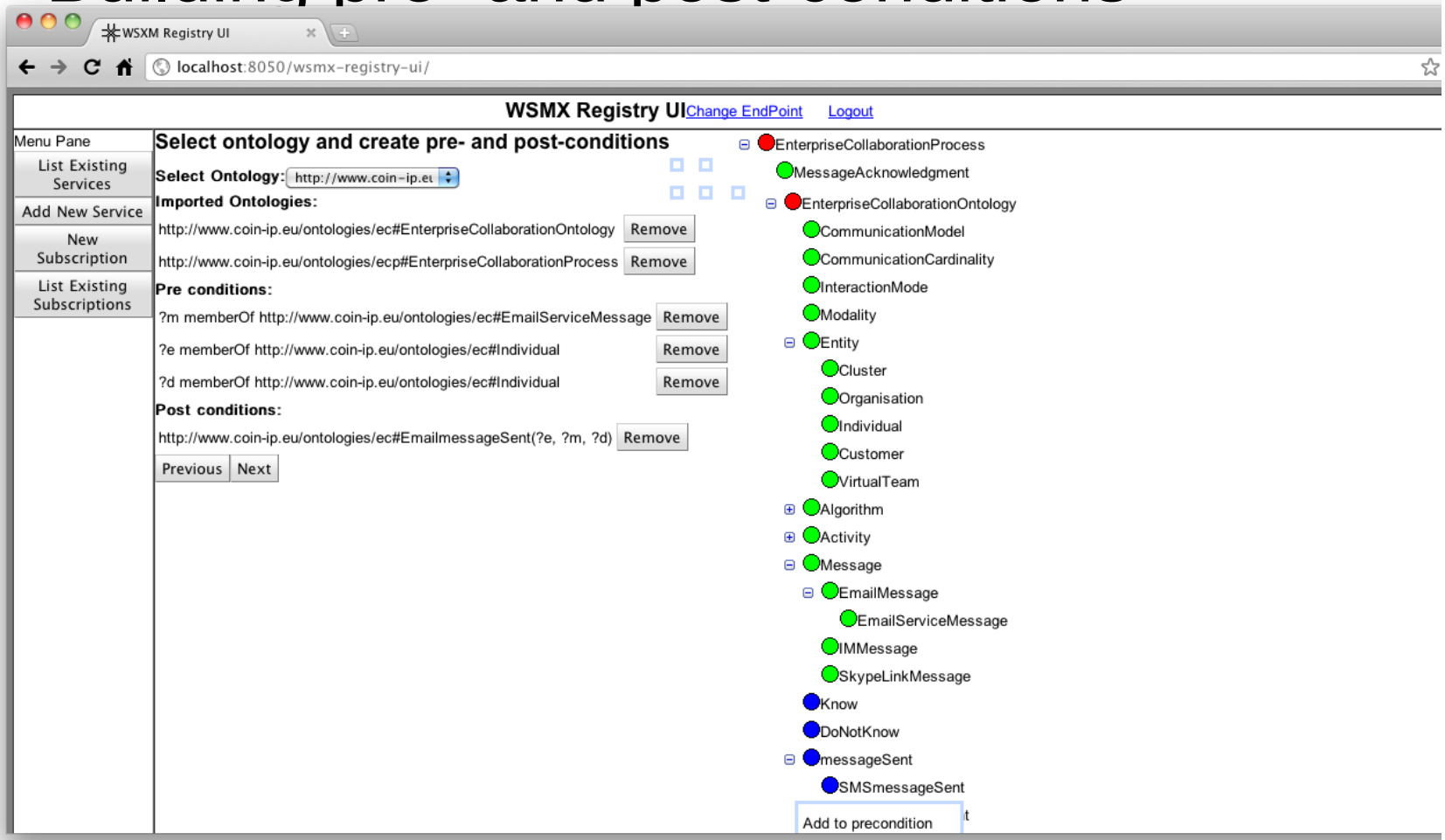
Registration process

- Building pre- and post-conditions



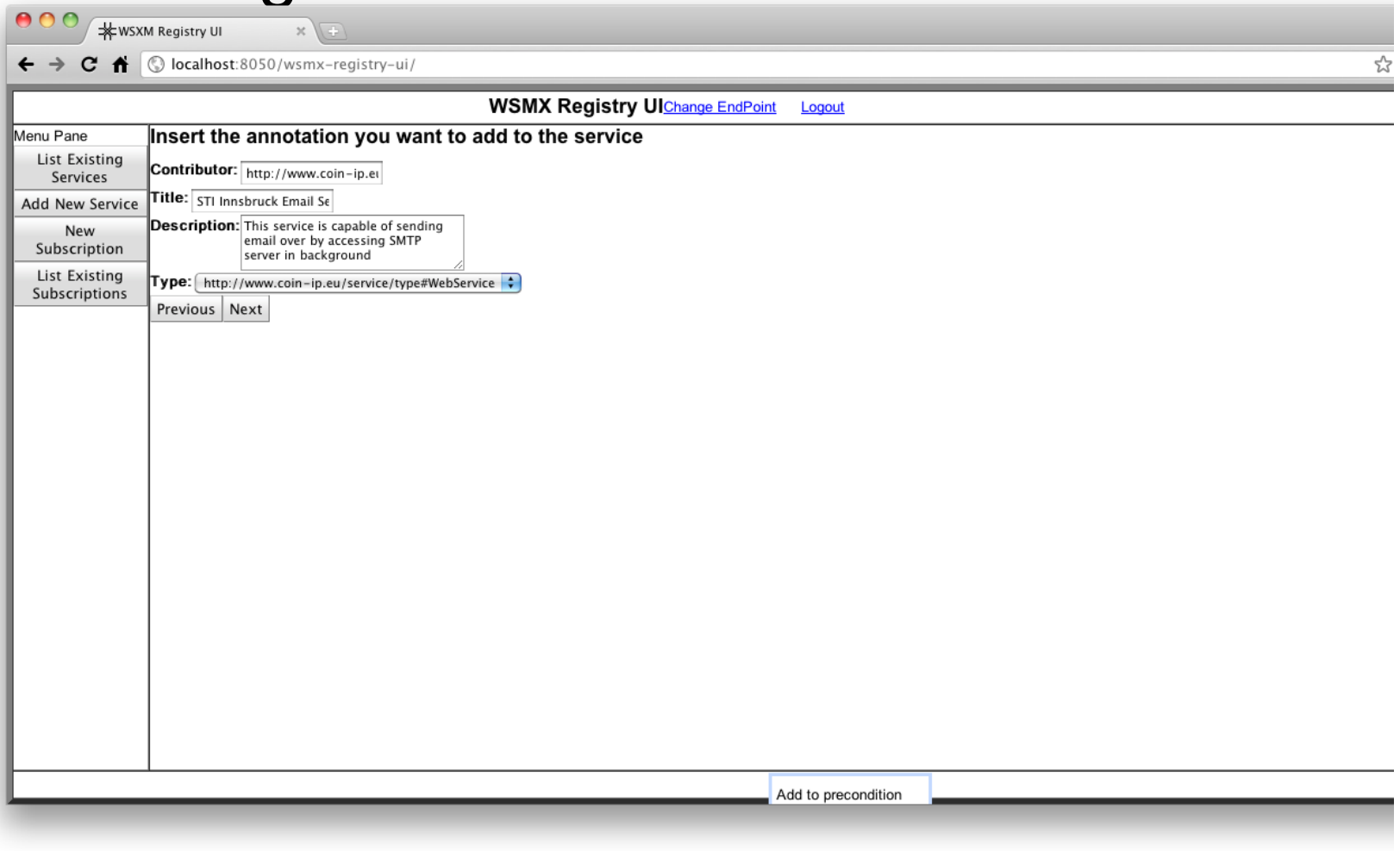
Registration process

- Building pre- and post-conditions



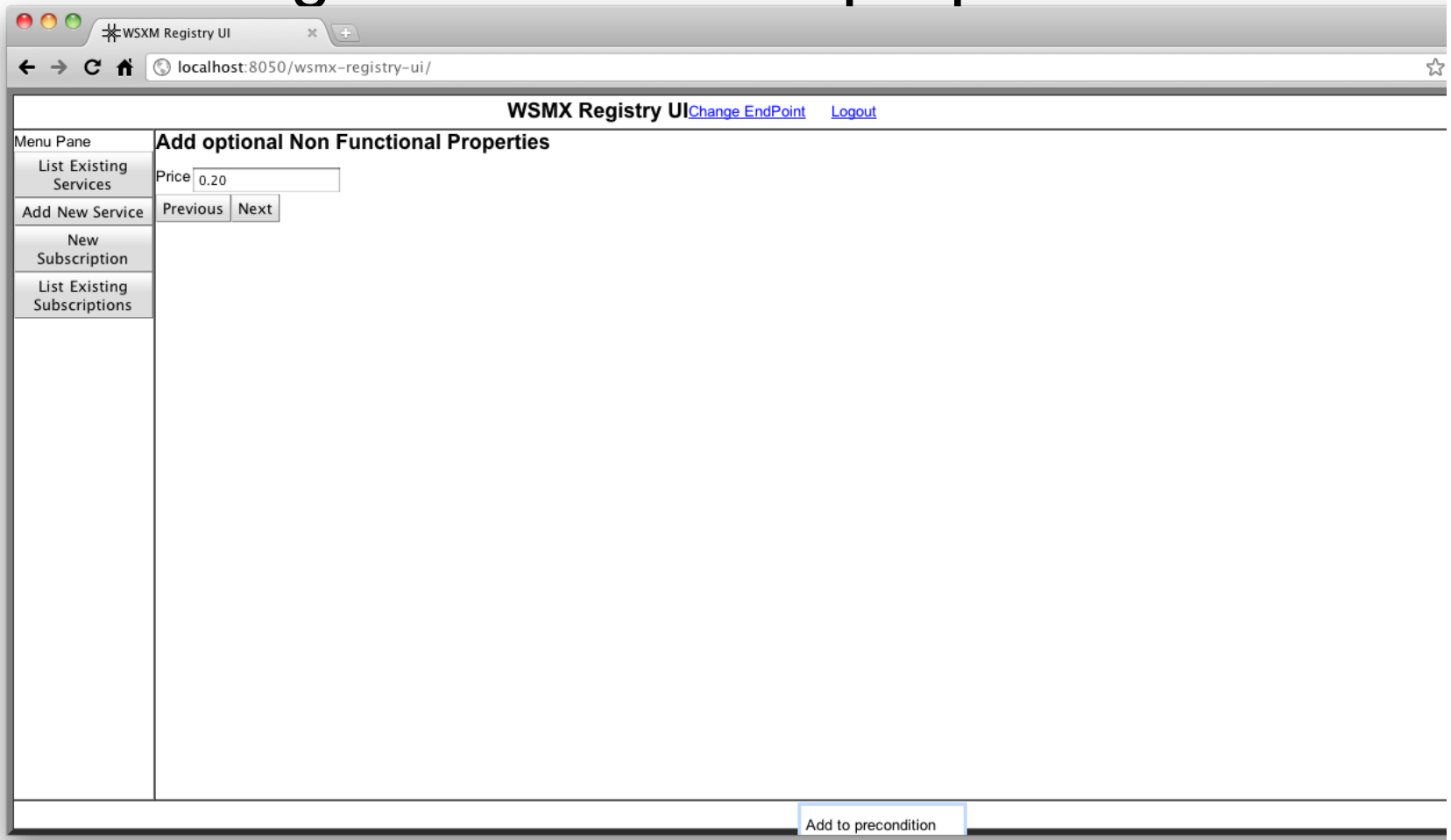
Registration process

- Defining annotations



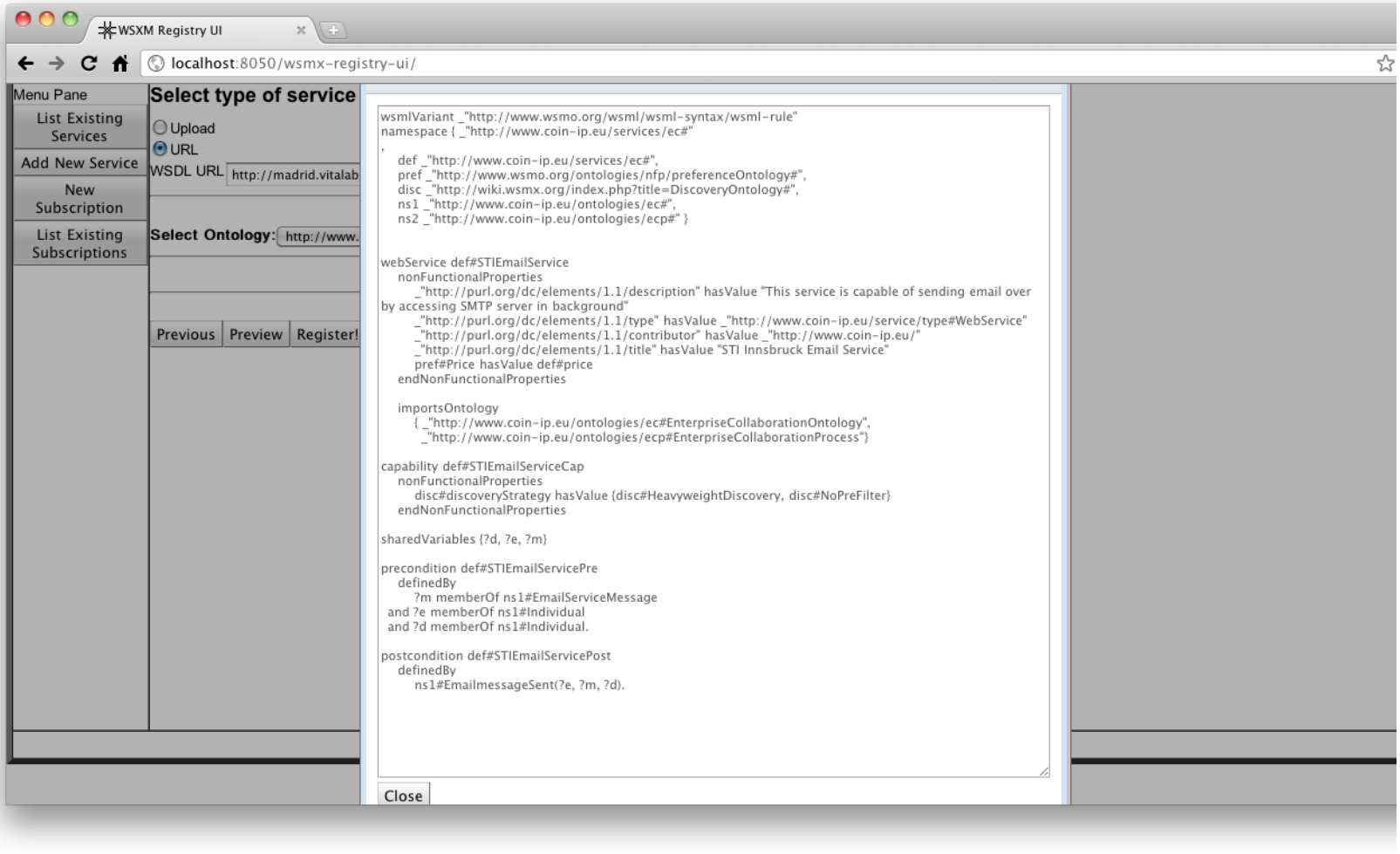
Registration process

- Defining non-functional properties



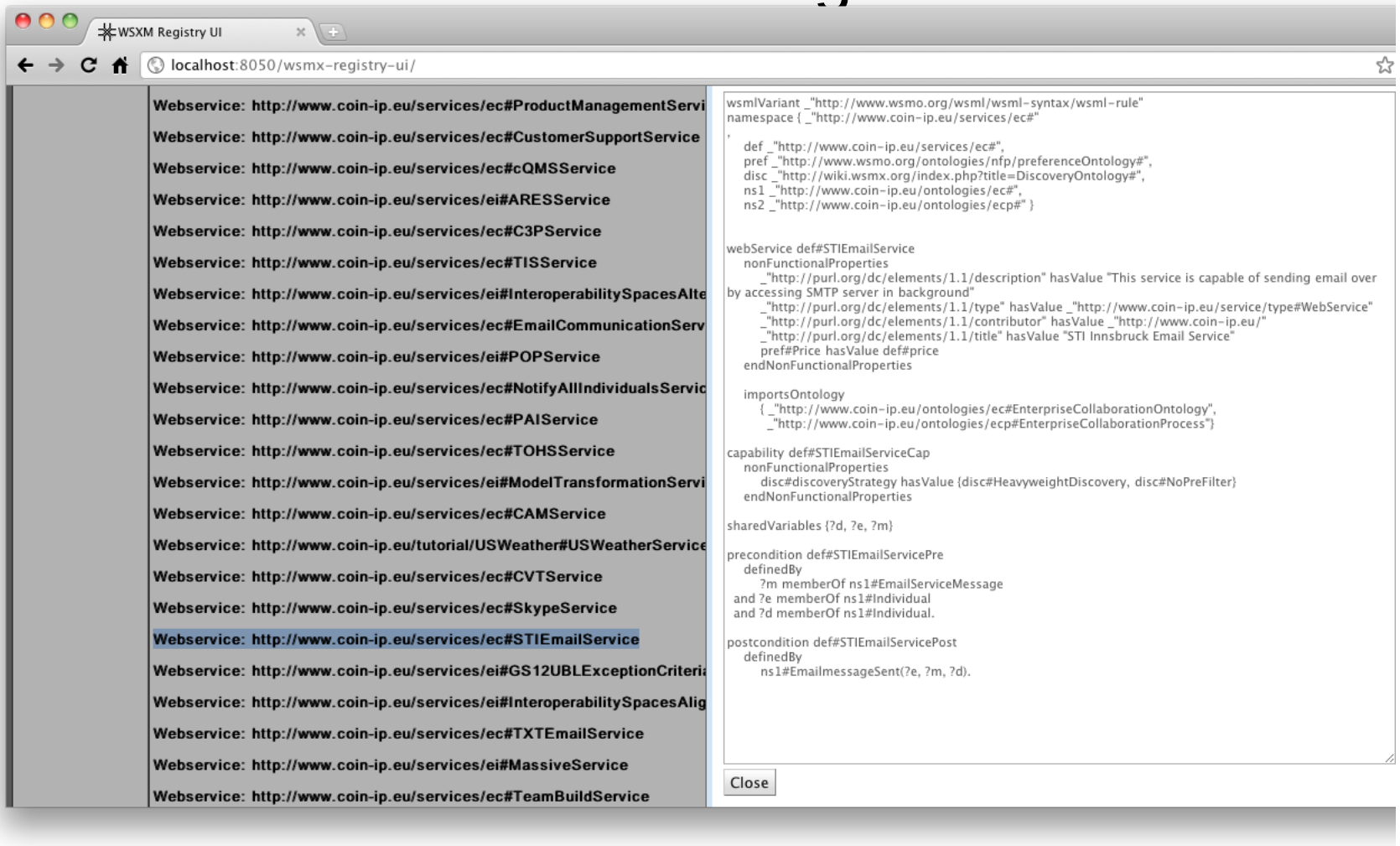
Registration process

- Final shape of the service description



Registration process

- The service has been registered in WSMX



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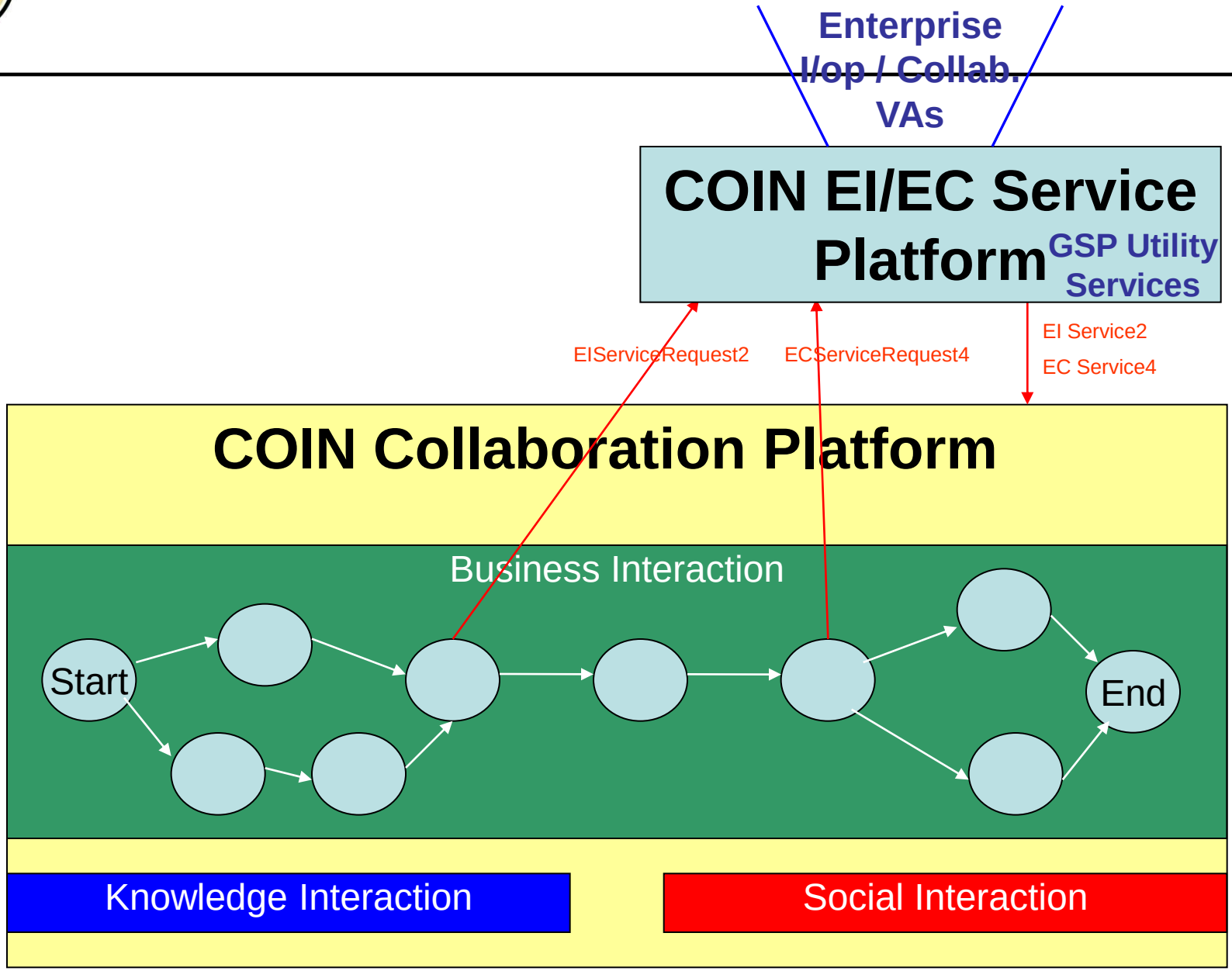
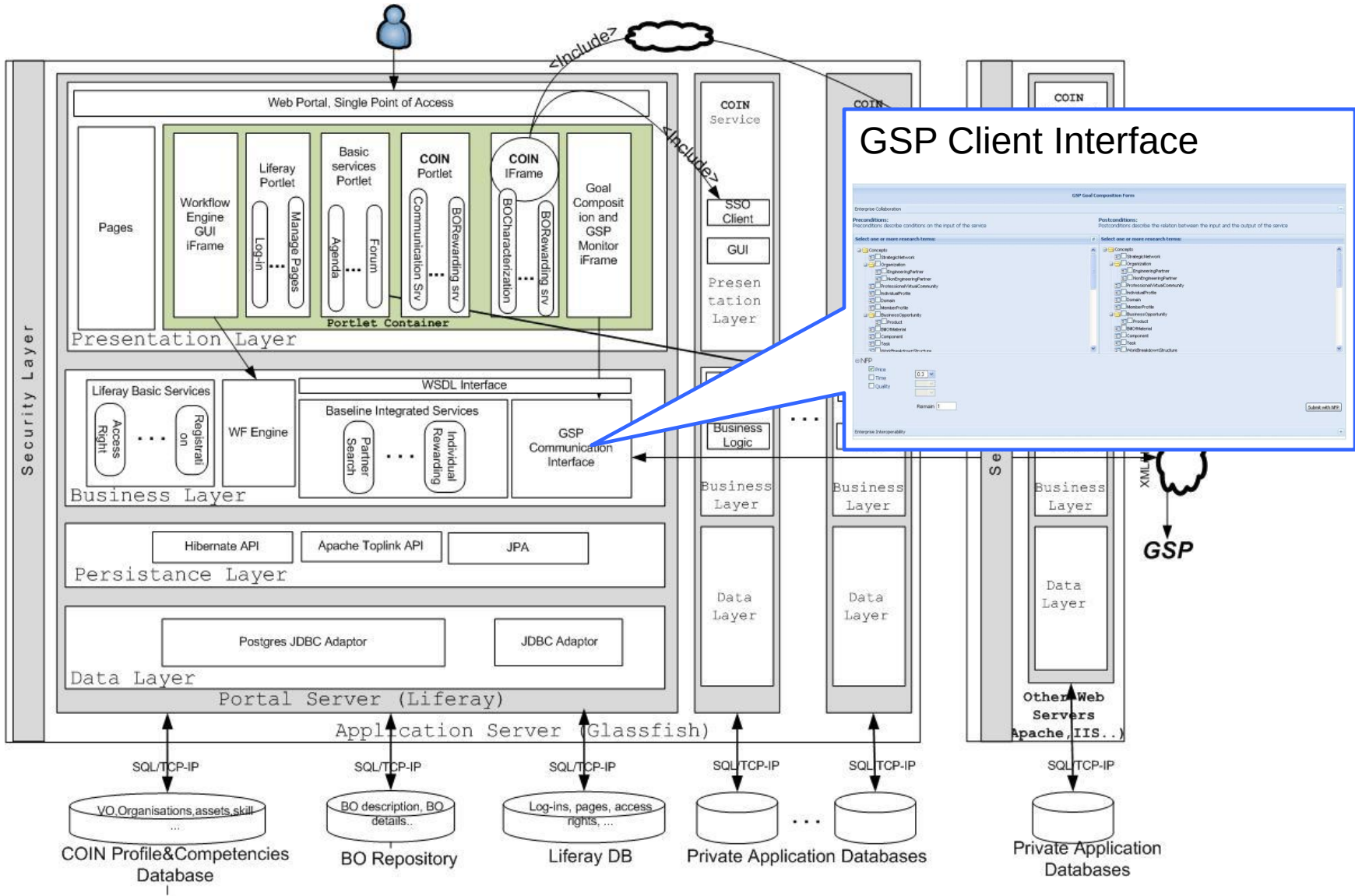
Integration STEP 2

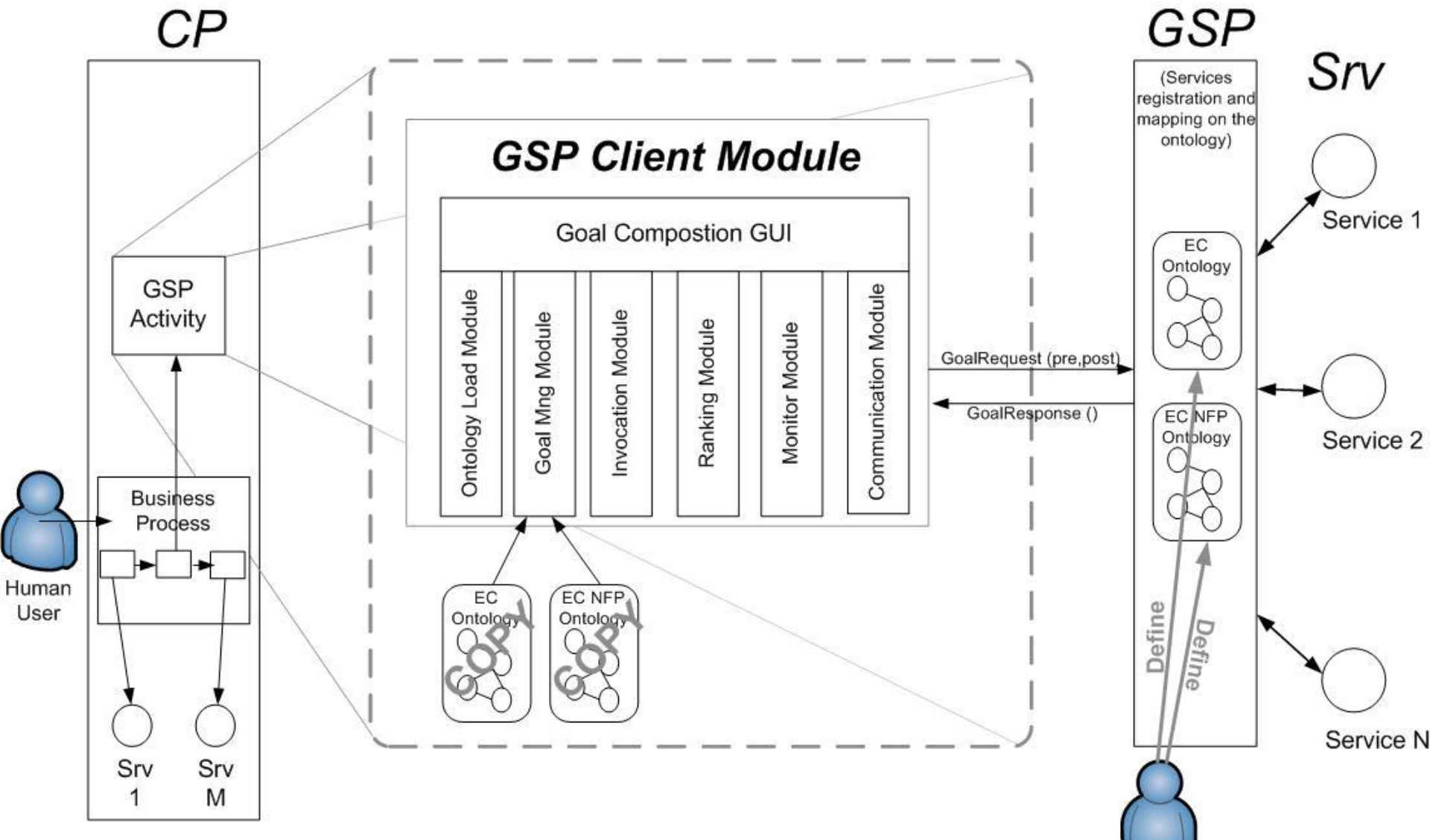


a) COIN Guest CP - GSP

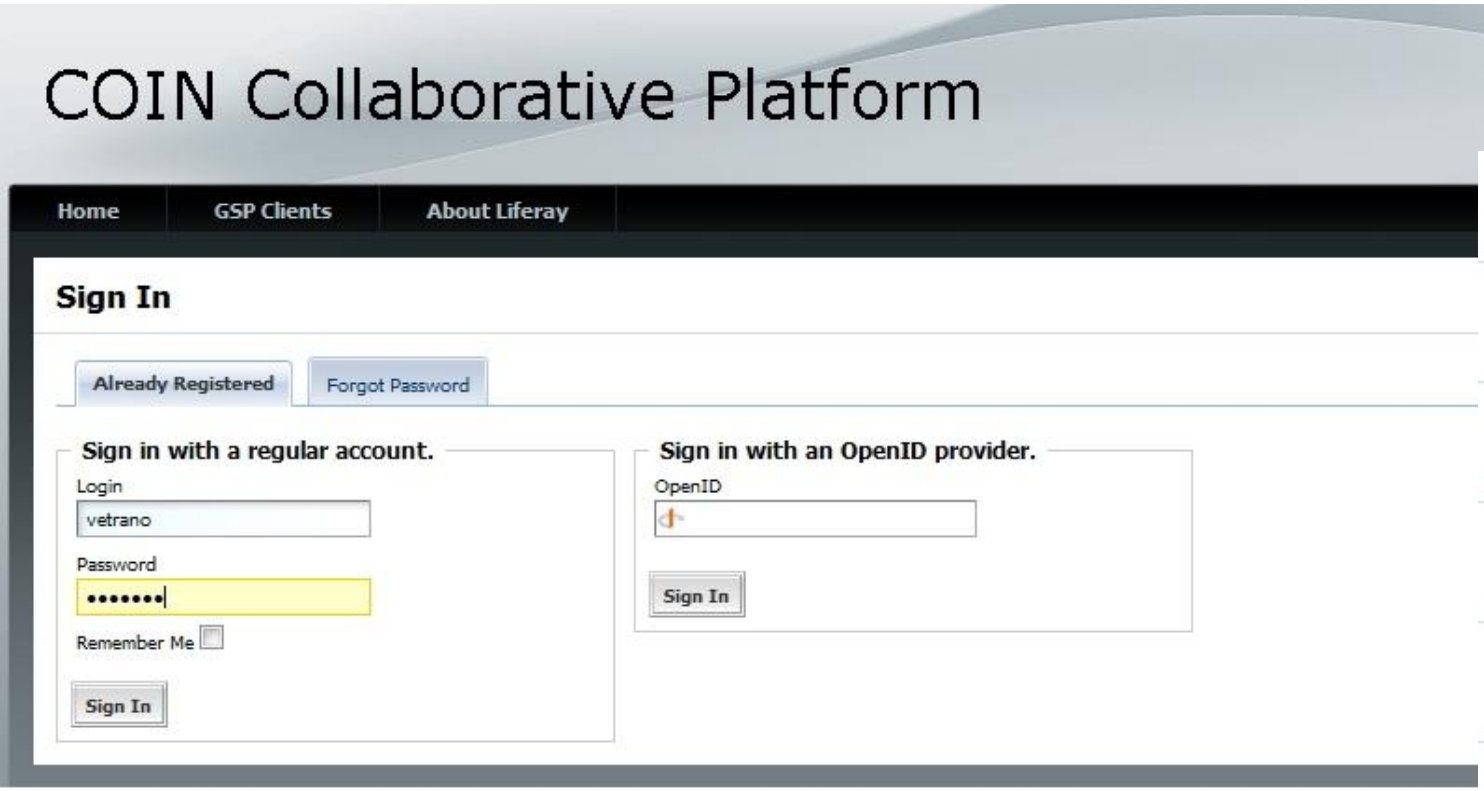


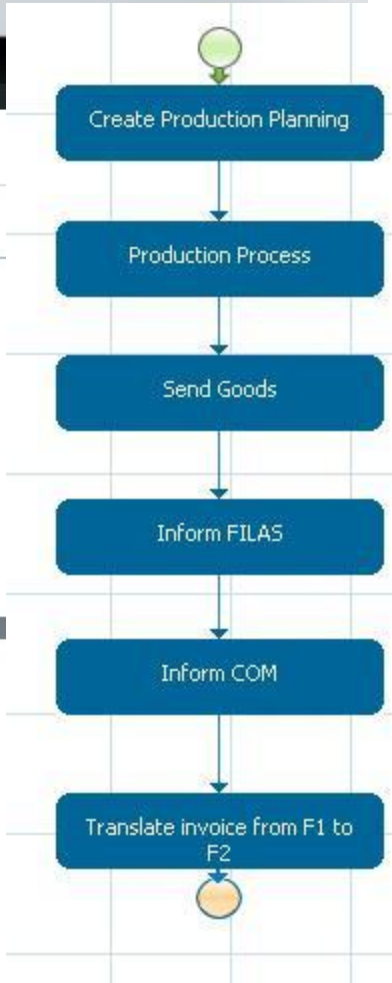
GSP Client Interface

CP-GSP Integration

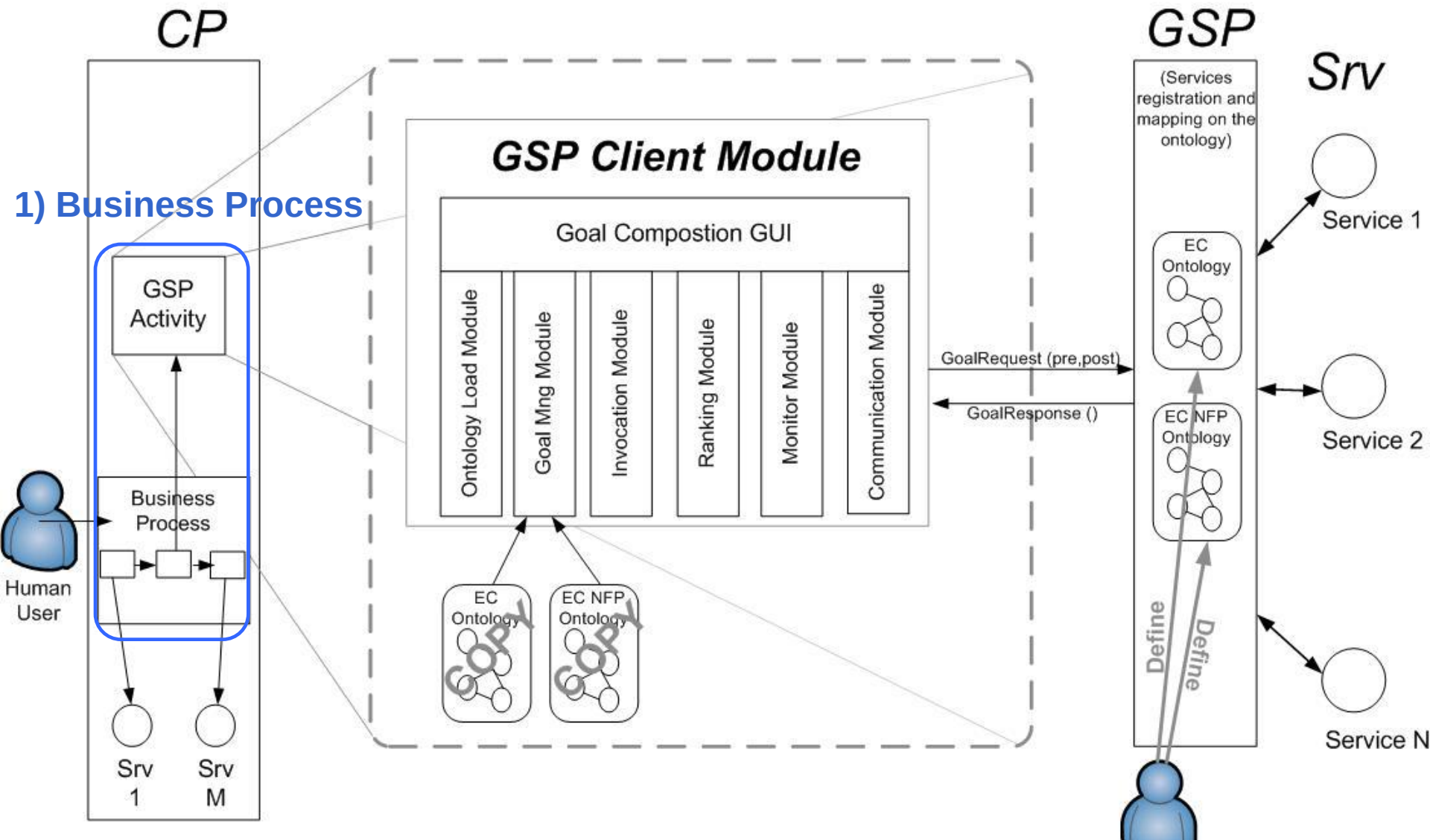


ProcessMaker (BPM) in the CP





Business Process Definition

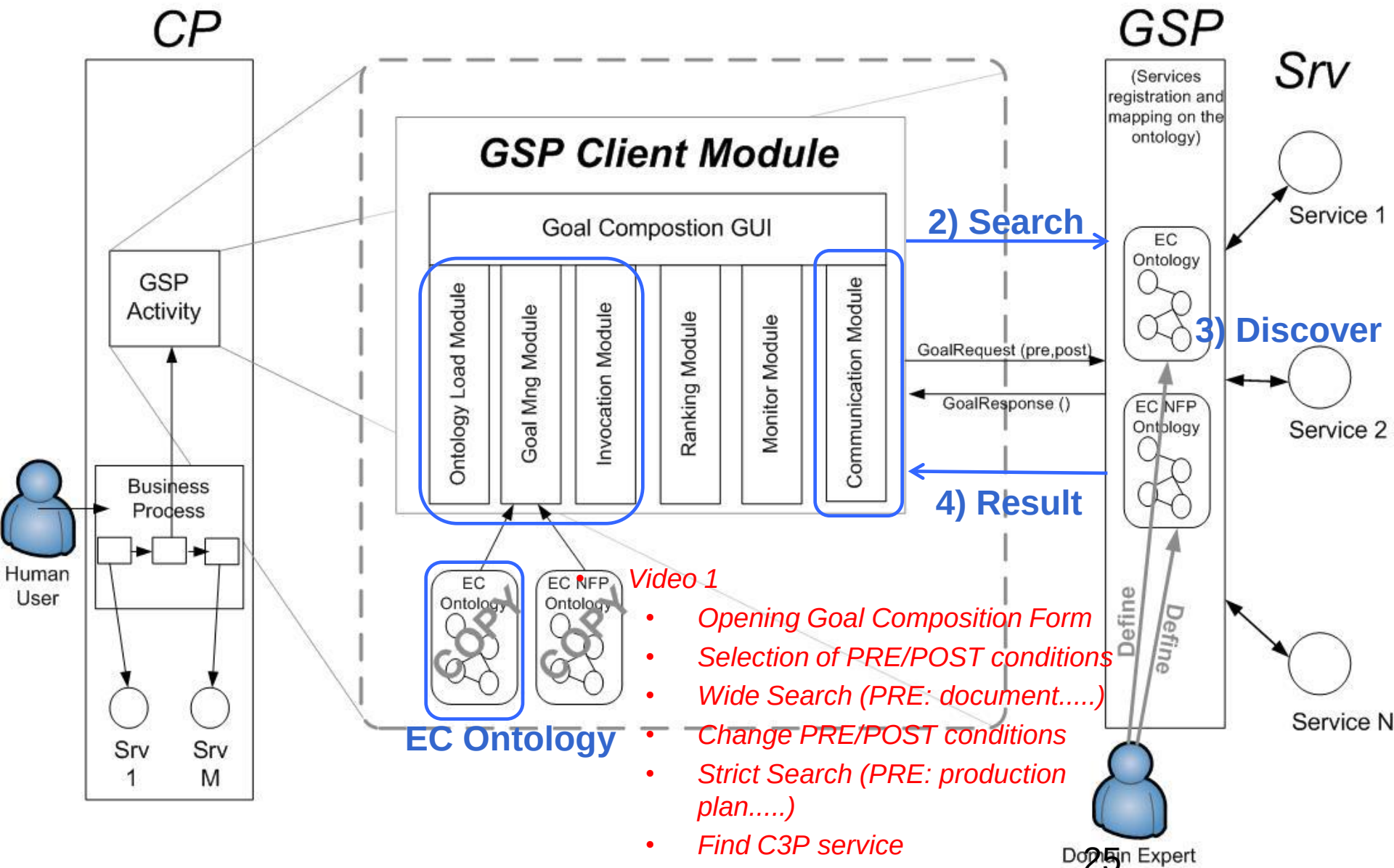


Scenario

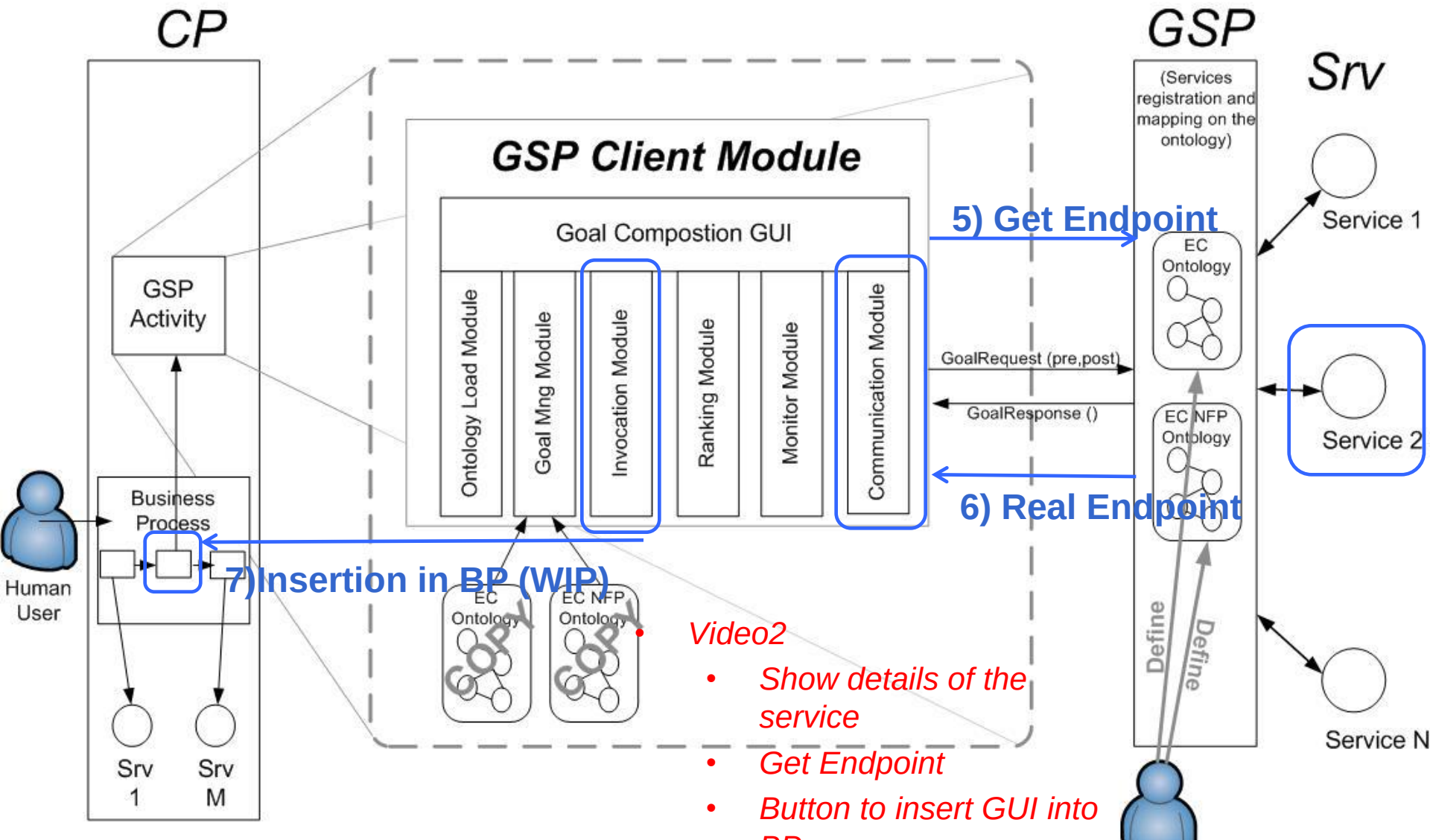
- Business Process (adapted from FILAS)

Step	
TeS and COM needs to make a shared production plan	? – no service available
COM complete the production process	manual
COM receive goods	manual
Vetrano from TeS should be informed by email	? – no service available
Rossi from COM should be informed by email	? – no service available
COM send Invoice	? – no service available

Search EC Service (1)



Search EC Service (2)

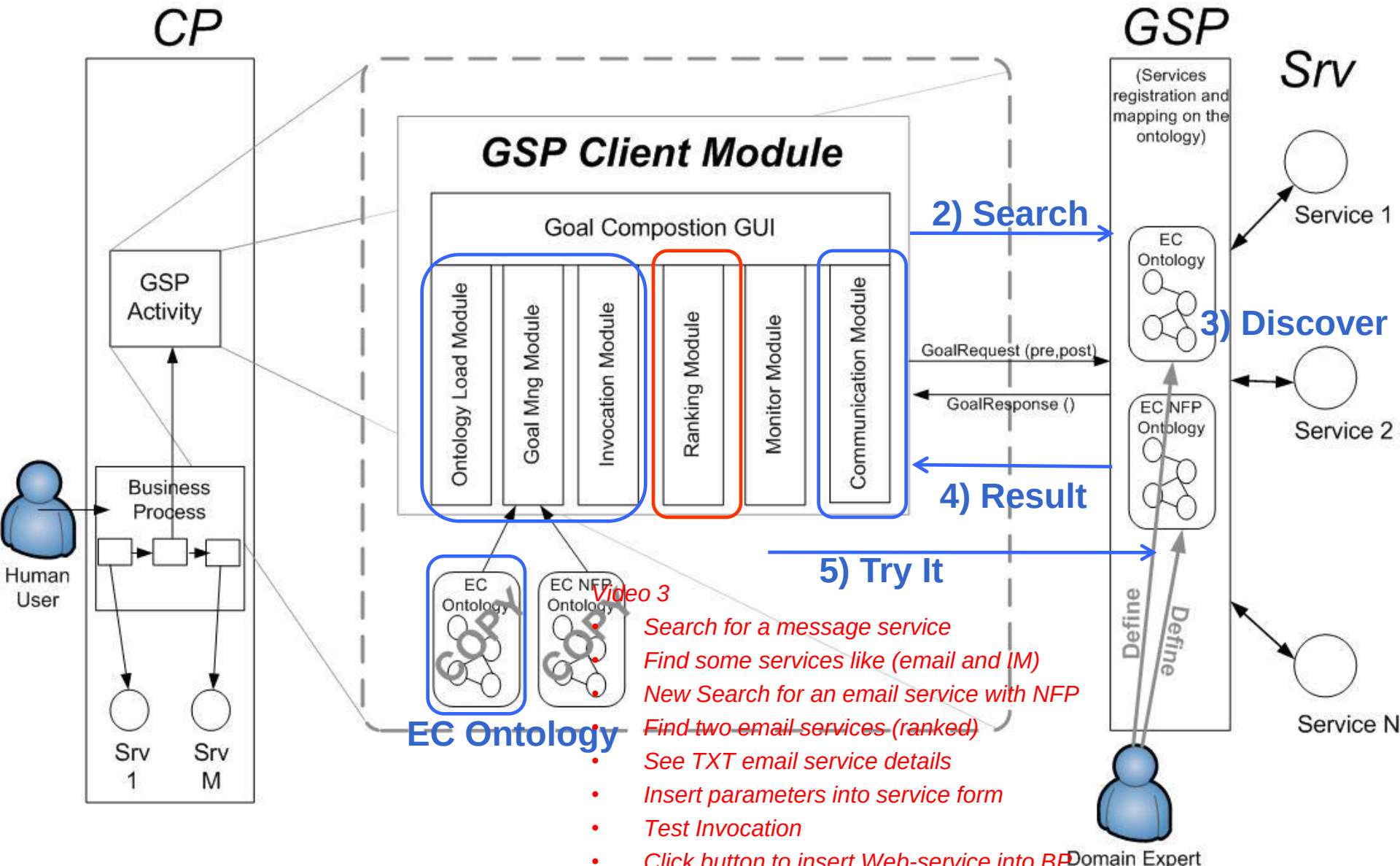


Scenario

- Business Process (adapted from FILAS)

Step	
TeS and COM needs to make a shared production plan	C3P Service (EC GUI)
COM complete the production process	manual
COM receive goods	manual
Vetrano from TeS should be informed by email	? – no service available
Rossi from COM should be informed by email	? – no service available
COM send Invoice	? – no service available

Search & Rank & Invocation



Video 3

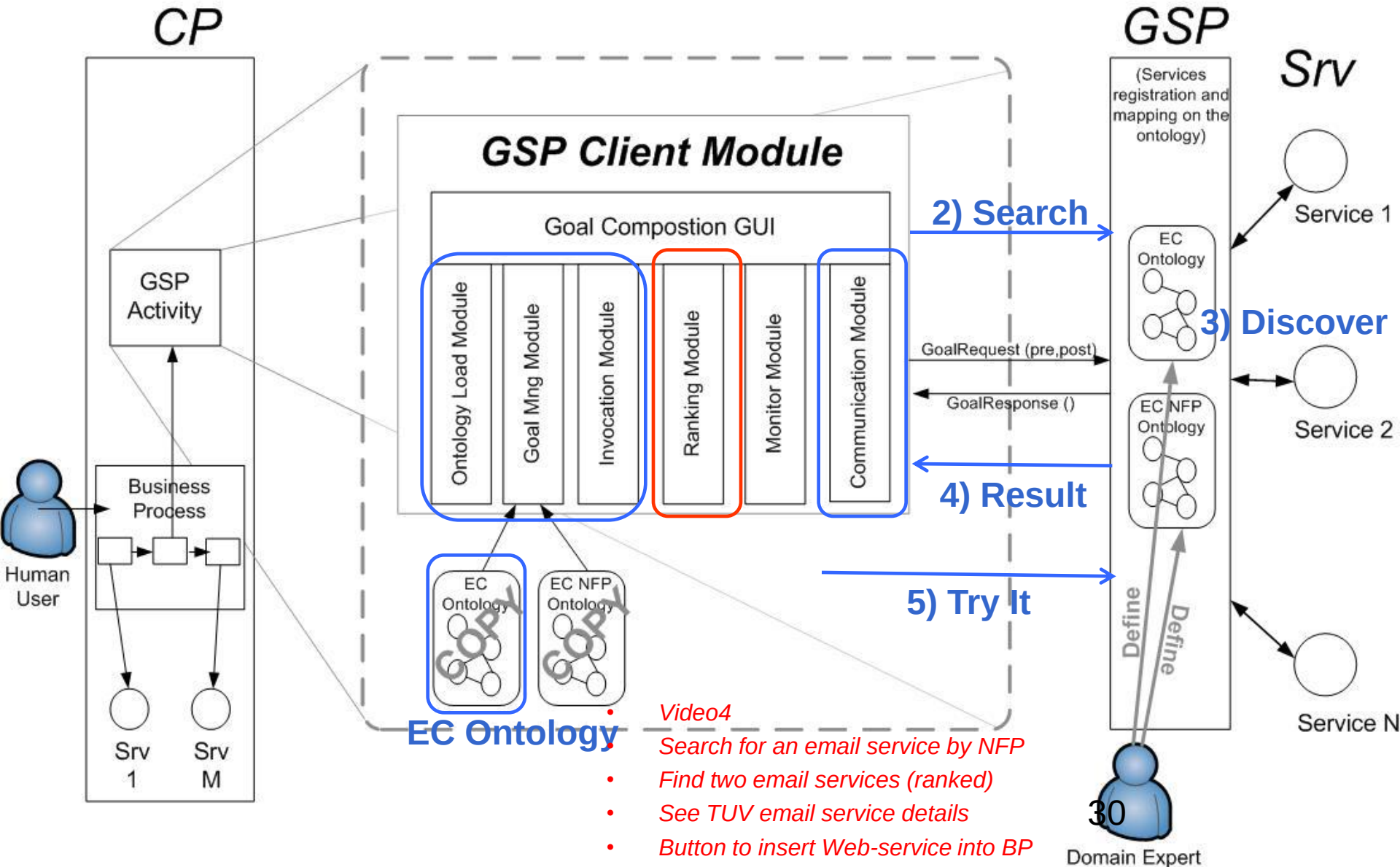
- *Search for a message service*
- *Find some services like (email and IM)*
- *New Search for an email service with NFP*
- *Find two email services (ranked)*
- *See TXT email service details*
- *Insert parameters into service form*
- *Test Invocation*
- *Click button to insert Web-service into BP*

Scenario

- Business Process (adapted from FILAS)

Step	
TeS and COM needs to make a shared production plan	C3P Service (EC GUI)
COM complete the production process	manual
COM receive goods	manual
Vetrano from TeS should be informed by email	TXT email service (EC WS)
Rossi from COM should be informed by email	? – no service available
COM send Invoice	? – no service available

Search & Rank



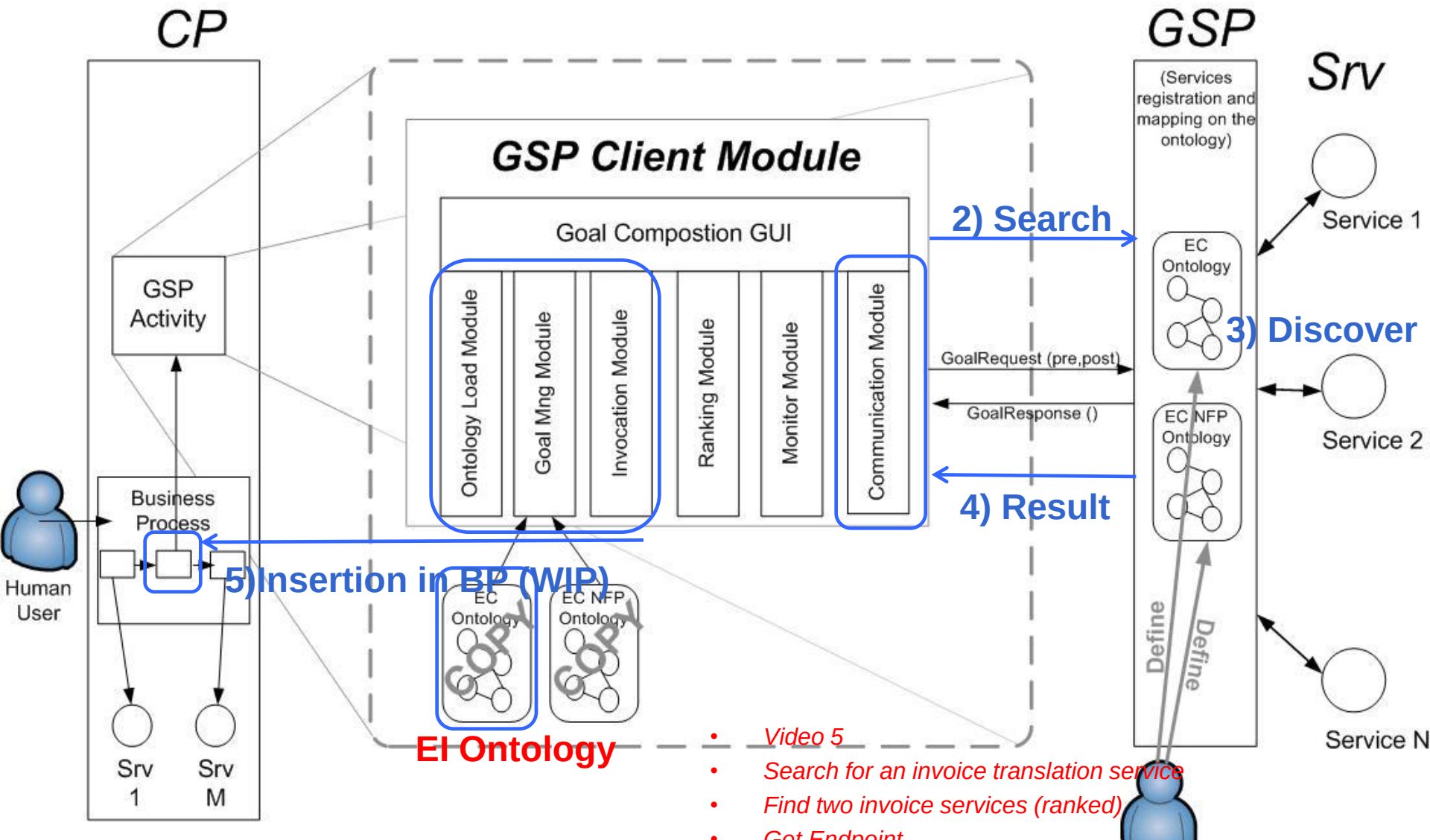
- *Video4*
- *Search for an email service by NFP*
- *Find two email services (ranked)*
- *See TUV email service details*
- *Button to insert Web-service into BP*

Scenario

- Business Process (adapted from FILAS)

Step	
TeS and COM needs to make a shared production plan	C3P Service (EC GUI)
COM complete the production process	manual
COM receive goods	manual
Vetrano from TeS should be informed by email	TXT email service (EC WS)
Rossi from COM should be informed by email	TUV email service (EC WS)
COM looks for UBL invoice 1.0-2.0 Interoperability	? – no service available

Search



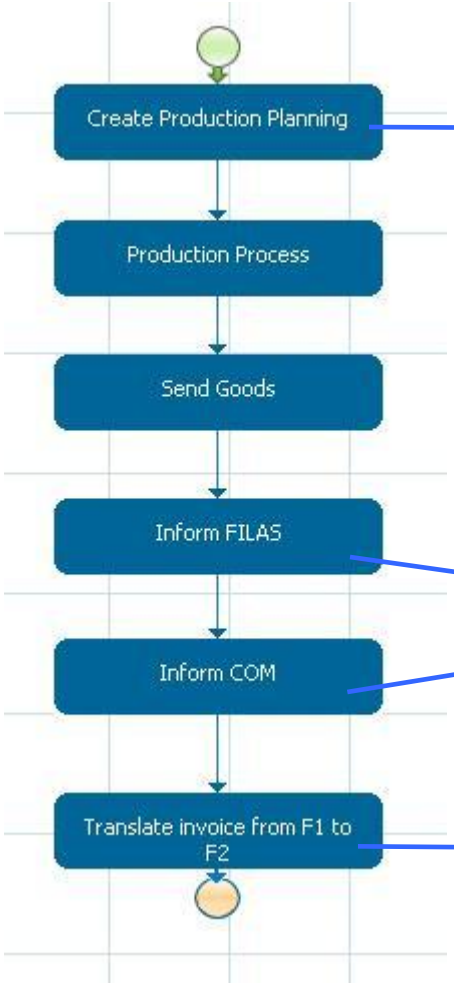
- *Video 5*
- *Search for an invoice translation service*
- *Find two invoice services (ranked)*
- *Get Endpoint*

Scenario

- Business Process (adapted from FILAS)

Step	
TeS and COM needs to make a shared production plan	C3P Service (EC GUI)
COM complete the production process	manual
COM receive goods	manual
Vetrano from TeS should be informed by email	TXT email service (EC WS)
Rossi from COM should be informed by email	TUV email service (EC WS)
COM send Invoice	Invoice service (EI GUI)

Final Business Process



C3P Service

Automatic steps

Federated Interoperability Service

- *Run BP*

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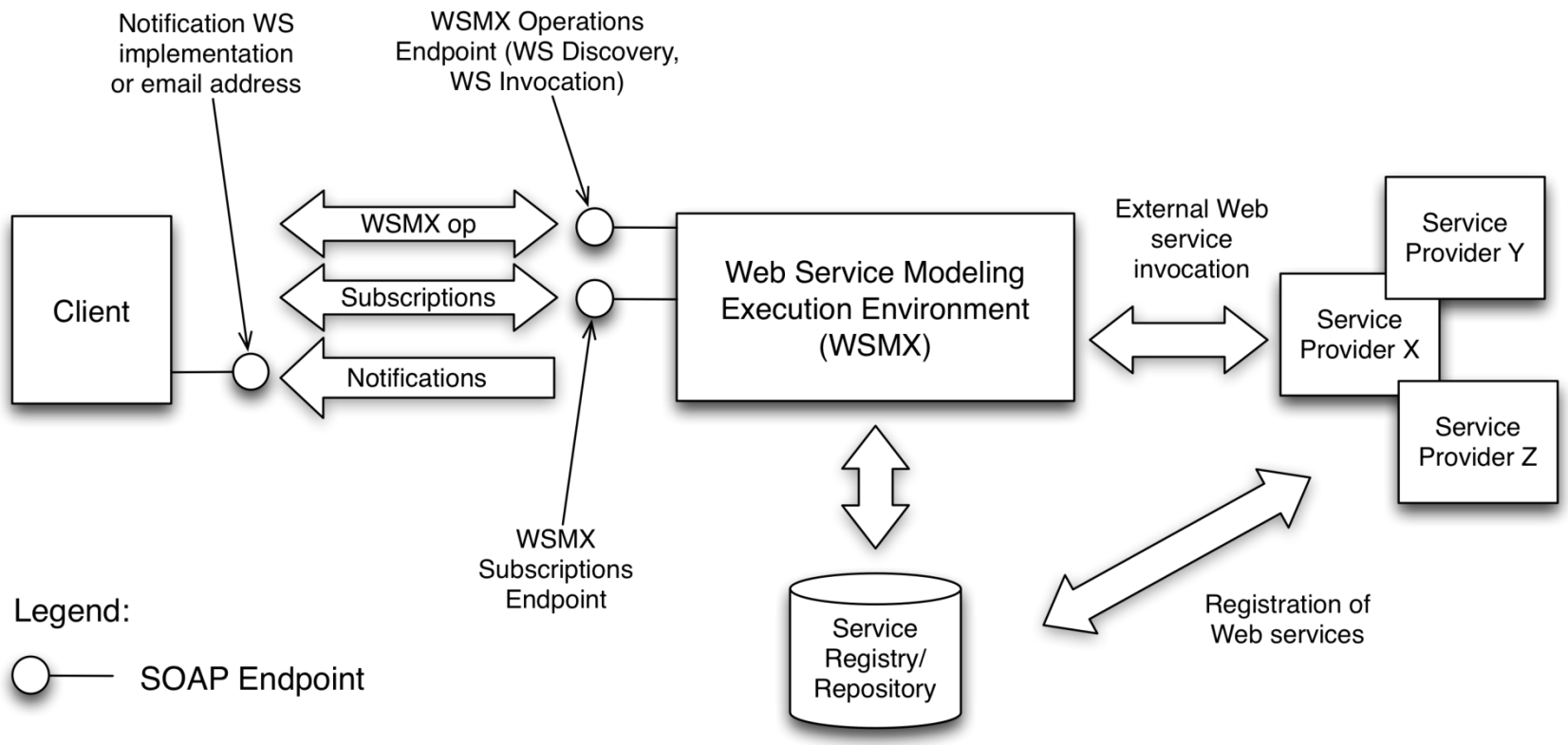
Motivation

- GSP has exhibited only synchronous polling discovery mechanism
  - Client sends a goal describing the required capabilities,
  - GSP discovers Web services capable of fulfilling the required functionality, and
  - Results are returned to the user in the form of wgMediators.
- Clients may want to subscribe their goals in order to…
  - … be notified about the events of interest (e.g. registration of a new Web service capable of fulfilling requirements).
  - … continue to operate until the situation of interest emerges.

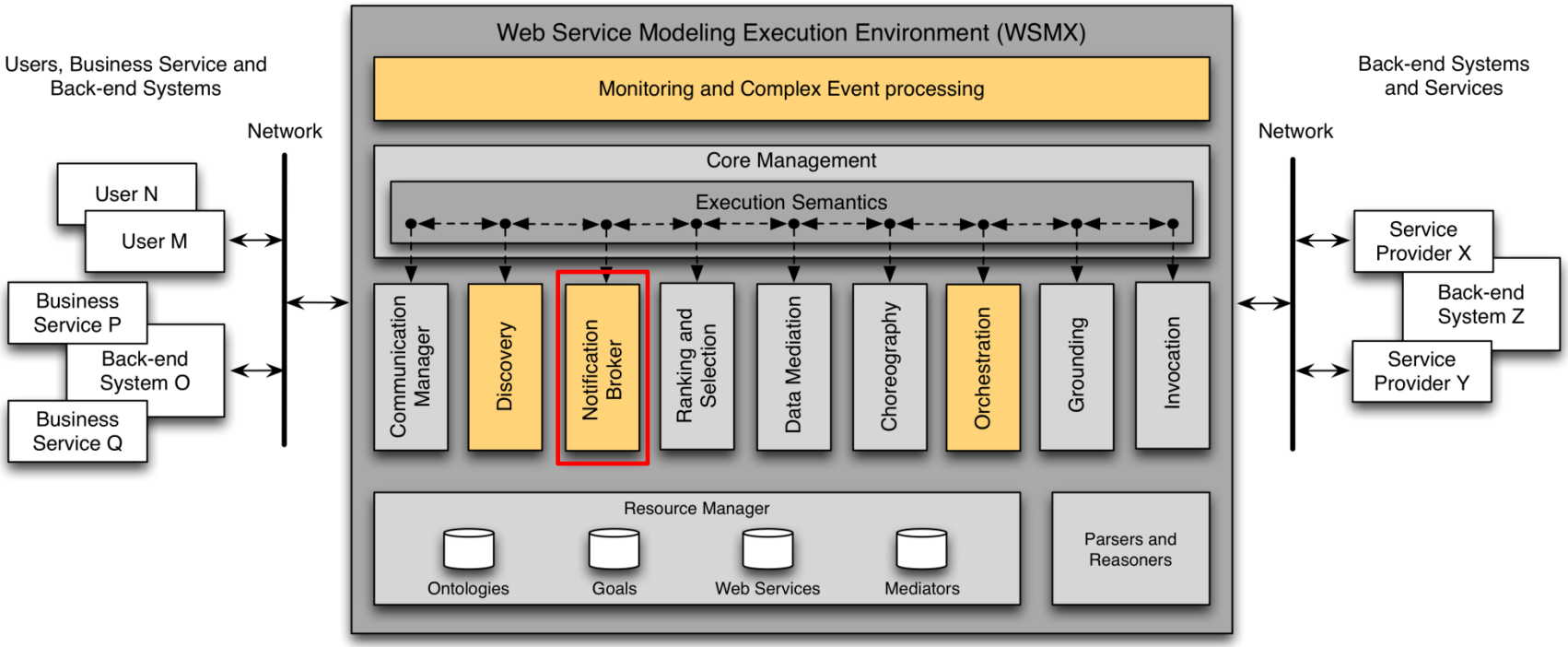
- Clients want to have asynchronous discovery mechanism which relies on the push paradigm.

Technical solution



GSP Goal Subscription Environment

Technical solution



WSMX Architecture

Technical solution

- NotificationBroker is responsible for the following tasks:
  - Accepting subscription requests,
  - Managing a list of subscriptions,
    - Subscriptions are persisted
  - Executing the discovery process when needed
    - New subscriptions, and
    - Service registrations.
  - Notifying subscribers over the designated channel:
    - Email
    - Web service invocation
  - Taking care of temporal subscription constrains

Technical solution

- New WSMX SOAP endpoint
  - http://localhost:8050/axis/services/WSMXSubscriptionService
- Provides following methods
  - retrieveSubscription
    - retrieves subscription details for specified subscriptionId,
  - retrieveSubscriptionIDs
    - retrieves all subscriptionIDs,
  - subscribe
    - subscribes a user,
  - unSubscribe
    - invalidates subscription for specified subscriptionID,
  - unSubscribeAll
    - invalidates all subscriptions.

Technical solution

- Notification Service endpoint
  - notify method (one-way method)
    - subscriptionID – id of the subscription which triggered notification
    - wsmlMessage – the payload in the form of wgMediators

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:axis="http://ws.apache.org/axis2">
  <soap:Header/>
  <soap:Body>
    <axis:Notify>
          <axis:subscriptionID>1</axis:subscriptionID>
          <axis:wsmlMessage>…</axis:wsmlMessage>
    </axis:Notify>
  </soap:Body>
</soap:Envelope>
```

Technical solution

Subscription request – email notification

```
<soapenv:Envelope
        xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
        xmlns:web="http://webservices.deri.ie">
  <soapenv:Header/>
  <soapenv:Body>
    <web:subscribe>
      <web:userID>1</web:userID>
      <web:userEndPoint>mailto:srdjan.komazec@sti2.at</web:userEndPoint>
        <web:wsmlMessageGoal>http://www.coin-
ip.eu/goals/ec#MessageServiceGoal</web:wsmlMessageGoal>
        <!-- <web:expireDate>?</web:expireDate> -->
    </web:subscribe>
  </soapenv:Body>
</soapenv:Envelope>
```

Technical solution

Subscription request – Web service notification

```
<soapenv:Envelope
                xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
                xmlns:web="http://webservices.deri.ie">
   <soapenv:Header/>
   <soapenv:Body>
     <web:subscribe>
       <web:userID>1</web:userID>

<web:userEndPoint>http://localhost:8088/axis2/services/NotificationReceiver</web:userEndPoint>
                <web:wsmlMessageGoal>http://www.coin-
ip.eu/goals/ec#MessageServiceGoal</web:wsmlMessageGoal>
                <!-- <web:expireDate>?</web:expireDate> -->
     </web:subscribe>
   </soapenv:Body>
</soapenv:Envelope>
```

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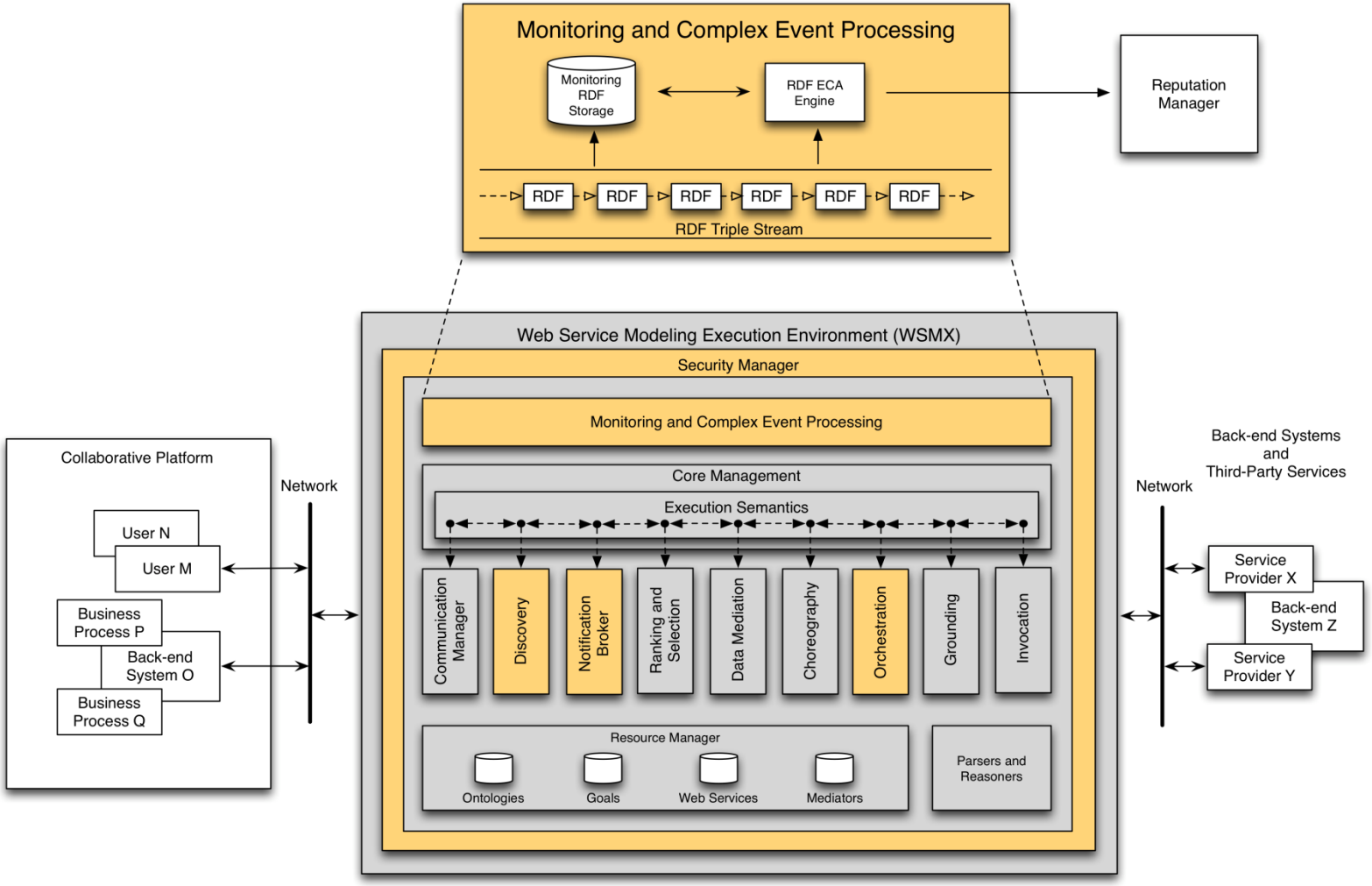
Motivation

- COIN mission statement

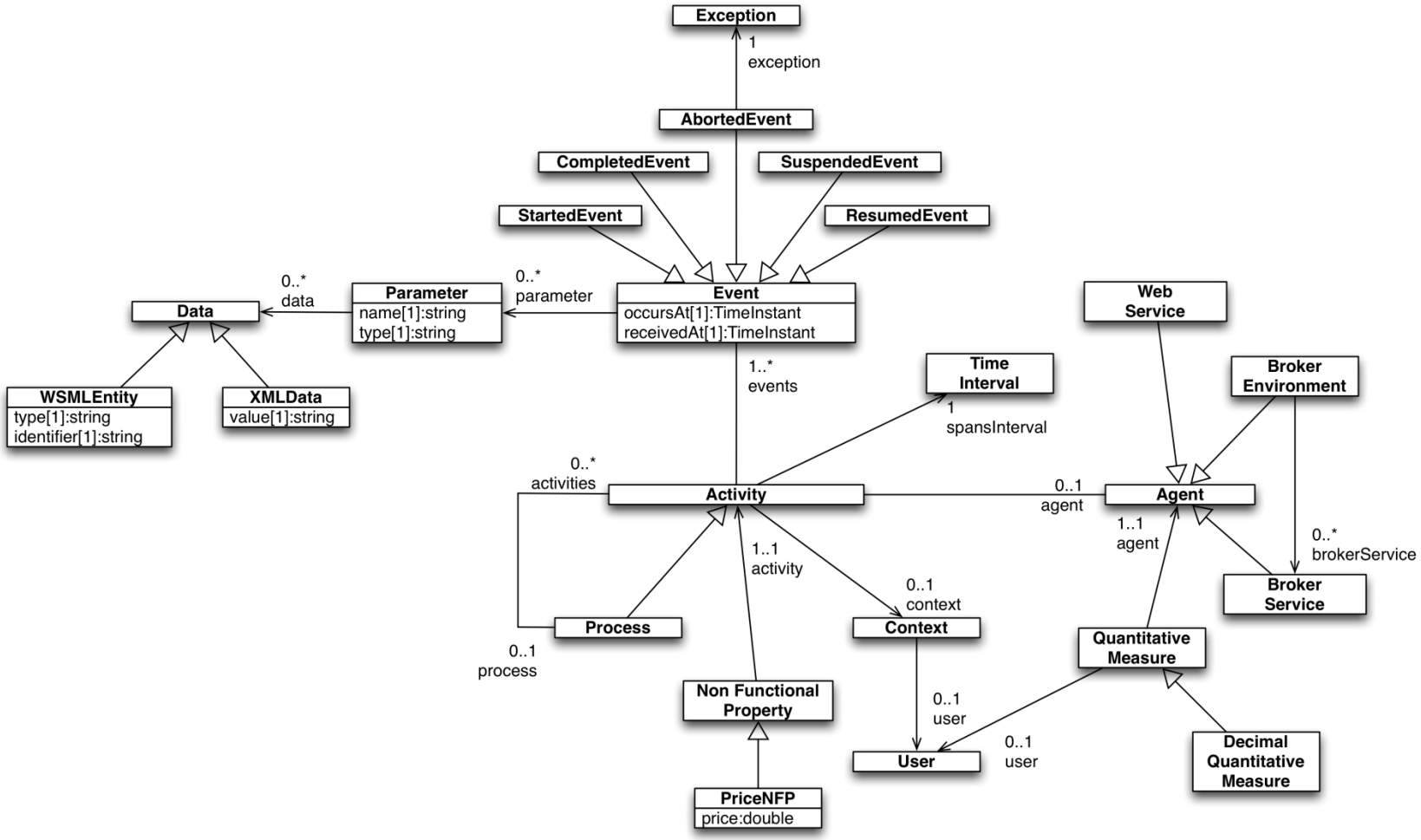
The COIN project will develop an original business model based on the SaaS-U (Software as a Service-Utility) paradigm where the open-source COIN service platform will be able ***to integrate both free-of-charge and chargeable, open and proprietary services*** *depending on the case and business policies.*

Technical solution



GSP Monitoring Environment

GSP Monitoring Ontology



GSP Monitoring Ontology

Technical solution

- Monitoring Manager is responsible for the following tasks:
  - Extracting data of monitoring interest,
  - Transforming data into the appropriate format according to the monitoring ontology,
    - Monitoring Ontology API
  - Storing the observed data in the Monitoring RDF Storage
  - Notifying interested parties about occurrences of observed data

- Monitoring Manager relies on a synchronized buffer in communicating with the Monitoring RDF Storage
  - Decoupling primary and supporting GSP functionalities
  - Fostering scalability

Technical solution

Monitoring Web Service invocation price

- *Context-based price definition*
  - Negotiated price value
- *Axiom-based calculation of price*
  - Evaluation of the price axiom on top of the NFP ontology and Web Service input ontology

```
wsmlVariant _"http://www.wsmo.org/wsml/wsml-syntax/wsml-rule"
namespace { _"http://www.coin-ip.eu/services/ec#",
         ec _"http://www.coin-ip.eu/ontologies/ec#",
        ecp _"http://www.coin-ip.eu/ontologies/ecp#",
         dc _"http://purl.org/dc/elements/1.1/",
        ecs _"http://www.coin-ip.eu/services/ec#",
       pref _"http://www.wsmo.org/ontologies/nfp/preferenceOntology#"}

webService EmailCommunicationService
  nonFunctionalProperties
    pref#Price hasValue ecs#price
    pref#Reputation hasValue ecs#reputation
    pref#InvocationTime hasValue mo#AverageTimeConfiguration
  endNonFunctionalProperties

  importsOntology {
    ...
    EmailCommunicationServiceNFP
  }

  capability EmailService_Cap
  ...

ontology  EmailCommunicationServiceNFP
  nfp
    pref#isNFPOntology hasValue "true"
  endnfp

  axiom EmailCommunicationServicePriceAxiom
    definedBy
      price(1.0).

  axiom EmailCommunicationServiceReputationAxiom
    definedBy
      reputation(0.5).
```

Technical solution

- RDF Complex Event Processing Engine
  - Implements Event-Condition-Action (ECA) rules paradigm
- Event
  - SPARQL query over the stream of RDF triples
- Condition
  - SPARQL query over the Monitoring RDF Storage and variables bonded in the Event step
- Action
  - Arbitrary activity which may rely on the variables bound in the previous two steps,
  - Activity can be CRUD operation over Monitoring RDF Storage, Web Service invocation, E-mail, execution of Java code.

Technical solution

- Currently implemented ECA rules
  - Update Average Invocation Time
    - Calculates the average invocation time for a third-party Web Service and stores it in the Monitoring RDF Storage
  - Update Average Invocation Time Per User
    - Calculates the average invocation time per user for a third-party Web Service and stores it in the Monitoring RDF Storage
    - Useful for SLA evaluation
  - Notifying Reputation Manager
    - Invokes Reputation Manager endpoint in order to notify it regarding the monitored data.

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Collaboration example

People to be Connected

Context:

project (WBS, task allocation)

role (internal / external person)

location (office / travel / home)

agenda (free / busy / available)

context (alone / with s.body)

job (idle / priority / ordinary)

device (PC, PDA, phone)

Collaboration Business Process

Invite to a Meeting

Discuss/Send Agenda

Remind Meeting

Run a Meeting

Send Minutes

Collaboration Services

Services:

File transfer (Skype)

Instant messaging (COIN)

Phone call (Skype)

Phone ring (Skype out)

SMS / MMS (Skype out)

e-mail (COIN)

Audio-videoconf. (Skype)

Desktop sharing (Skype)

Collaboration example

People to be Connected	Collaboration Business Process	Collaboration Services
Context: project (WBS, task allocation) role (internal / external person) location (office / travel / home) agenda (free / busy / available) context (alone / with s.body) job (idle / priority / ordinary) device (PC, PDA, phone)	Invite to a Meeting Discuss/Send Agenda Remind Meeting Run a Meeting Send Minutes	**Services:** File transfer (Skype) Instant messaging (COIN) Phone call (Skype) Phone ring (Skype out) SMS / MMS (Skype out) e-mail (COIN) Audio-videoconf. (Skype) Desktop sharing (Skype)

Collaboration example

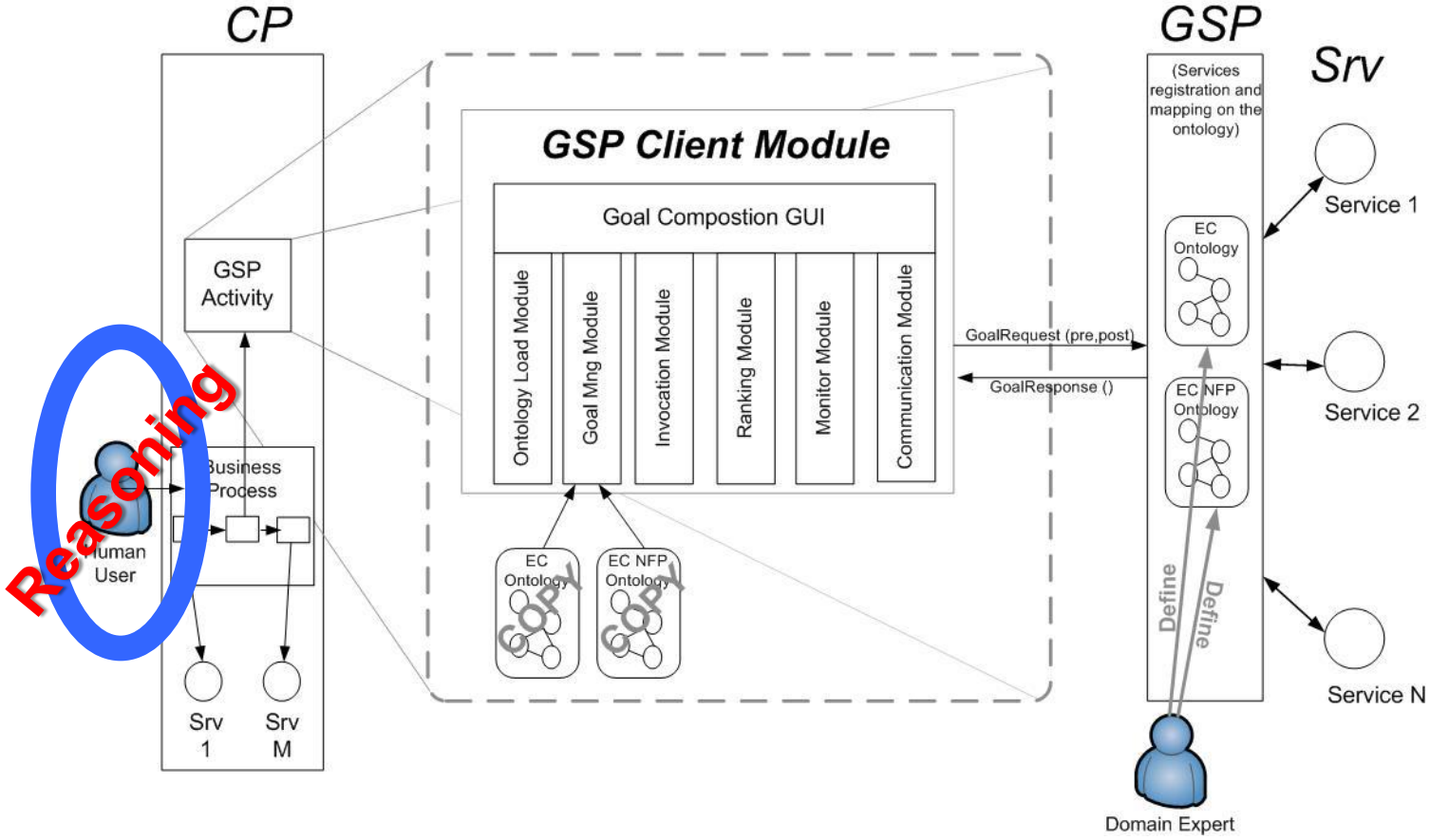
The **Problem**: ProjectX - WPY Leader has to send invitations to all

The **Context** is stored in a DB of the CP (e.g. the WBS of the project, the names of the participants with the context info).

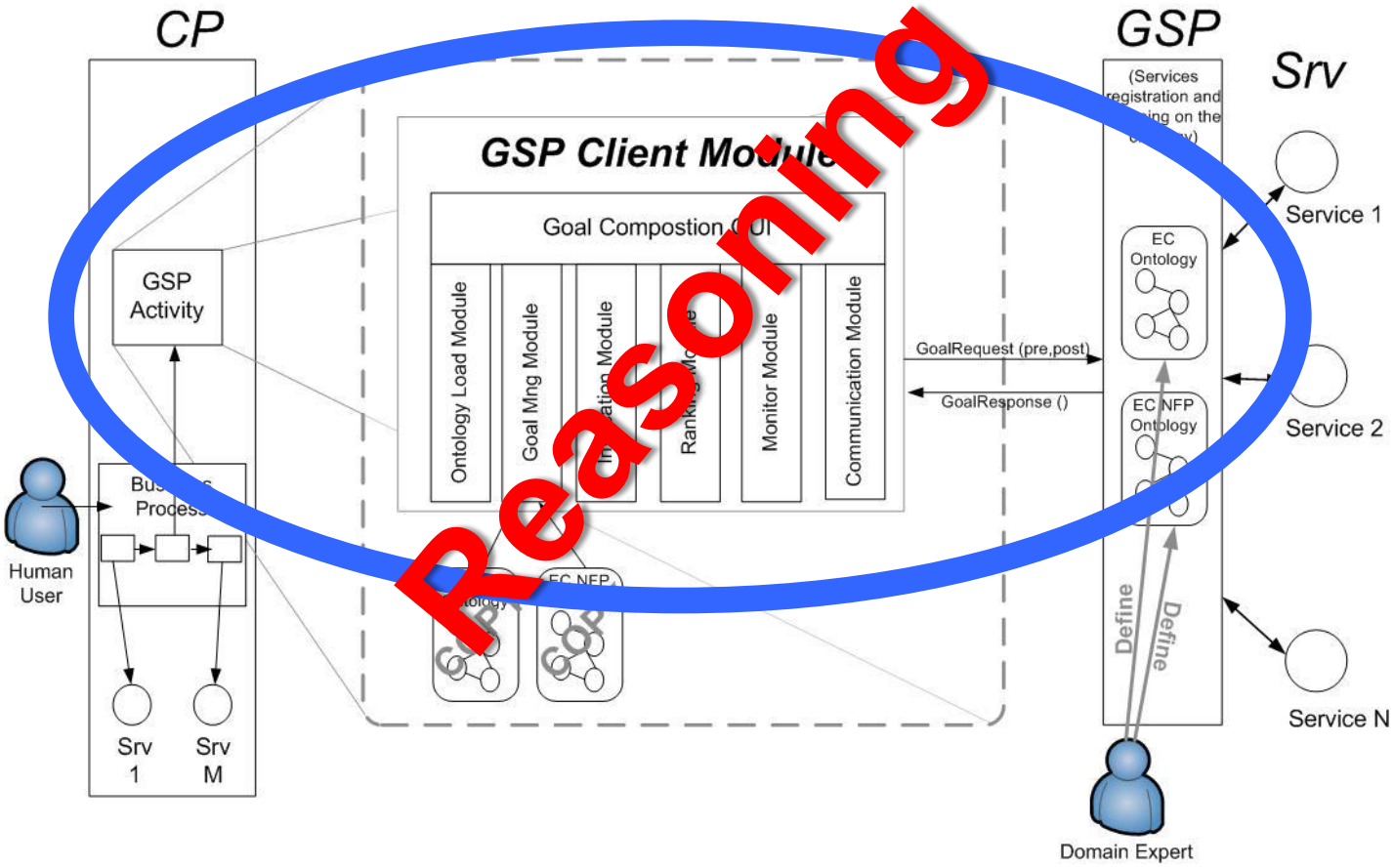
Step 0 The ProjectX-WPY Leader has to look at the people involved in the WP and their contextual information. He will use different **separated ad-hoc tools** to choose ad-hoc the most suitable communication services for invitations, discuss agenda and send documents.

Step 1 The ProjectX-WPY Leader accesses the **COIN EC Web Site** via his workspace and selects the most suitable communication services for each person

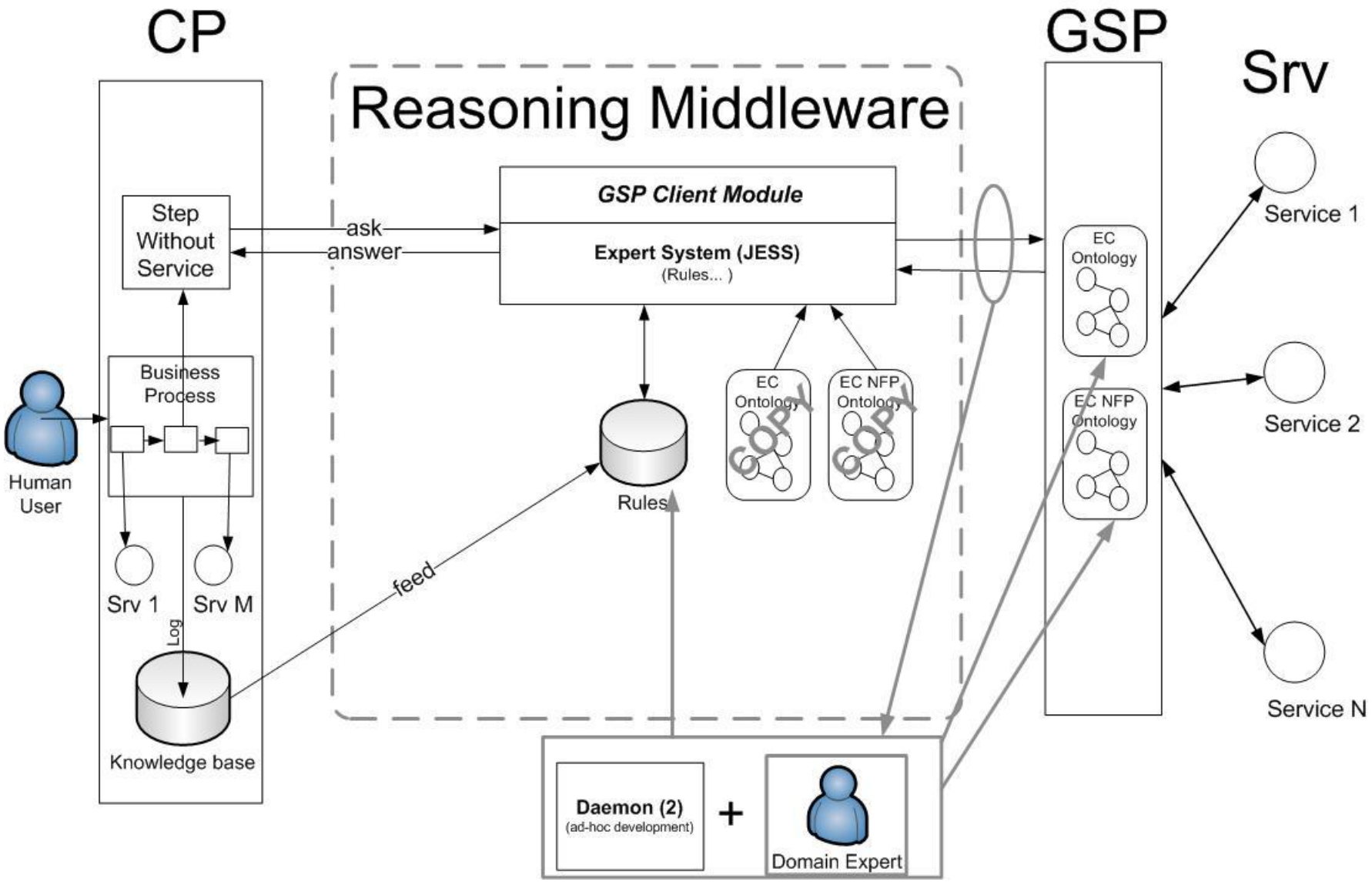
Step 2 The ProjectX-WPY Leader accesses the **COIN EC Service Platform** which is able to search-discover-compose-rank-execute the “best” communication services. He needs to write a Service Specification (i.e. a Service Request or a Goal for the Platform).



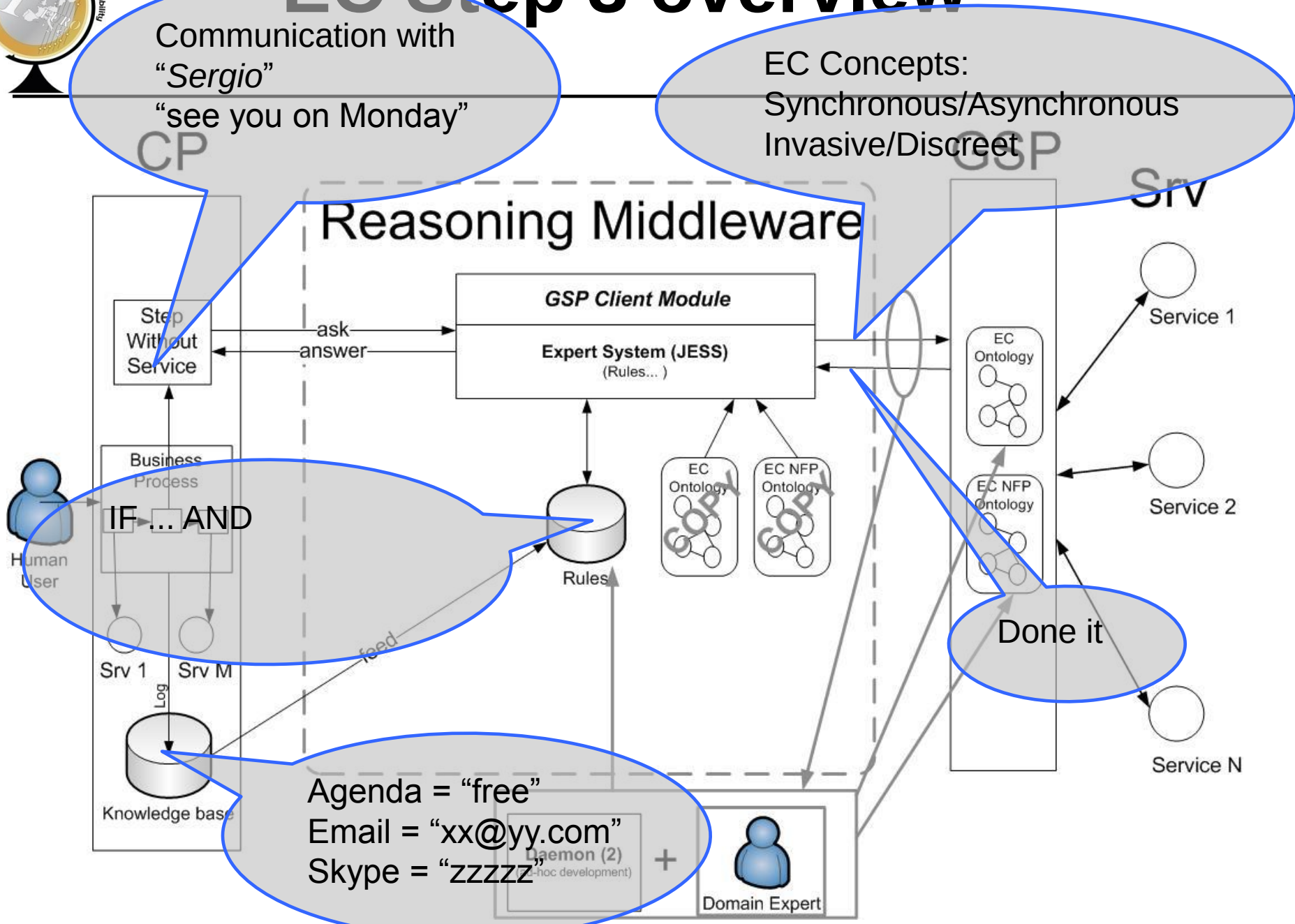
Step 3 The ProjectX-WPY Leader accesses the **COIN Intelligent EC Service Platform**, which is able to interpret the context and choose the best communication services.



EC Step 3 overview



EC Step 3 overview



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Enterprise COllaboration & INteroperability

COIN Platform Demonstration

COIN Summer School
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