COIN Workshop: Collaboration and Interoperability Services in the COIN system: a scientific approach

The COIN Generic Service Platforms Federation for Enterprise Interoperability / Collaboration service provision

Aachen, June 21st 2010
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TXT e-solutions SPA, COIN Technical Coordinator
**COIN VISION:** “By 2020 enterprise collaboration and interoperability services will become an invisible, pervasive and self-adaptive knowledge and business utility at disposal of the European networked enterprises from any industrial sector and domain in order to rapidly set-up, efficiently manage and effectively operate different forms of business collaborations, from the most traditional supply chains to the most advanced and dynamic business ecosystems.”

**COIN MOTTO:** “Enterprise Interoperability and Enterprise Collaboration are the two sides of the same COIN”
The COIN Integrated Project

Project No: 216256

Project Full Name: Collaboration & Interoperability for Networked Enterprises

Duration: 48 months

Start date: January 1st 2008

Partnership: 27 partners, 16 countries

Strategic Objectives: FP7 ICT-2007.1.3 - ICT in support of the networked enterprise
FP7 ICT 2009.9.5 Supplements to strengthen cooperation in ICT R&D in an enlarged European Union

Total Eligible Cost: 16M EURO

EC Contribution: 11M EURO
The COIN Consortium & Funnel Model

Industrial Partners
- TXT e-solutions
- IC FOCUS
- Atos Origin
- ESoNET
- SIEMENS

Academic & Research Partners
- WISE Switzerland
- VTT
- BIBA
- SINTEF
- DFK
- TU Vienna
- ESI European Software Institute
- tecnalia
- Jožef Stefan Institute, Ljubljana, Slovenia

User Partners
- IND
- PÖYRY
- ISOIN
- VEN
- Filas
- ACS

EEU Partners
- wirelessinfo
- favit
- LODE
- Politecnica
- LOU
The COIN Metaphore

COIN MOTTO:
“Enterprise Interoperability and Enterprise Collaboration are the two sides of the same COIN”

• The SIDE A of the COIN: Enterprise Interoperability
• The SIDE B of the COIN: Enterprise Collaboration
• The Substrate of the COIN: Service Platform
• The Value of the COIN: Software as a Service-Utility SaaS-U
• The Market of the COIN: Enterprise Networks (mainly SMEs)
COIN related Research Issues:

- ICT Commoditization: from Applications to Platforms, from Platforms to Infrastructure
- EI & EC services/platforms Value Added & Utility Services/Platforms (SaaS-U BModel)
- Platforms federations: IaaS & SaaS are already here, what about PaaS? In the FI?
- Service Delivery / Development Platforms / Platforms Interoperability
COIN and Service Web IoS

COIN related Research Issues:
- More powerful/expressive Service Description languages
- Semantic crawling & search engines for providers
- Need for easy-to-use development platforms (beyond delivery): Front-End, pro-sumers
- Long-lasting Service Level Agreements for Enterprises and Business Processes

Static
- WWW
  - Syntax
    - URI, HTML, HTTP

Dynamic
- Web Services
  - UDDI, WSDL, SOAP
  - Syntax

Intelligent Web Services
- Semantic Web
  - RDF, RDF(S), OWL
  - Semantics

Protocol Usage by APIs
- REST (67%)
- SOAP (20%)
- JavaScript (7%)
- XML-RPC (2%)
- Atom (2%)

WWW
- URI, HTML, HTTP
- Static

Dynamic
- Web Services
  - UDDI, WSDL, SOAP
- Intelligent Web Services
  - RDF, RDF(S), OWL
- Semantics

28,000
10,000,000
10000
20000

Tuesday 15 September 2009
PM welcomes Sir Tim Berners-Lee to Downing Street

The Prime Minister welcomed the creator of the World Wide Web, Sir Tim Berners-Lee, and Professor of Artificial Intelligence at the University of Southampton, Nigel Shadbolt, to Downing Street this morning.

Mr Berners-Lee and Mr Shadbolt presented an update to Cabinet on their work advising the Government on how to make data more accessible to the public.

Gordon Brown has already spoken publicly about his aim of making the UK a world leader in opening up government information on the internet, an important element of Building Britain’s Future.
The GSP Federation

COIN Project
- COIN GSP1 EI
- COIN GSP2 EC
- COIN GSP3 Open-to-All
- COIN GSP4 Seekda!

COIN Evolution
- Other GSPs Odette
- Other GSPs SAP IBM
- Other GSPs SOA4ALL

Other GSPs
- Odette
- SAP IBM
- SOA4ALL

COIN Project
- 12 COIN Pilots
- COIN Gen. CP BPO
- COIN GENESIS DR

COIN Evolution
- Non COIN CP Sironta
- Non COIN CP ITA CDCP
- Non COIN CP Ecospa

The CP Federation

Individual & IT Users

Industrial Users
COIN Upper Cloud

• Core Topics
  ➢ Provide the mechanisms to populate and make the federation evolve
  ➢ Broadcast of a service request and merging of the answers
  ➢ A model of the nodes for intelligent forwarding, goal decomposition
  ➢ Including federation and composition issues in the GSP Cube

• Nodes Typology
  ➢ COIN Nodes (COIN Platform & COIN Services)
  ➢ GSP Nodes (COIN Platform): Service Providers + Platform Providers
  ➢ EI/EC Nodes: service request & service orchestration interoperability

• Further Collaborations
  ➢ EI/EC Service Discovery in the Open Internet (EI/EC Crawler)
  ➢ Bundling EI/EC with FinES Value-Added services
  ➢ Bundling EI/EC with Public Services (e.g. ISA), COM(2010) 744 final, Towards interoperability for European public services
  ➢ Bundling EI/EC with FI PPP Core Platform & Unit D3 R&D (CC LOS)
COIN Lower Cloud

• Core Topics
  ➢ A more loosely coupled cloud of Collaboration Platforms
  ➢ A first set of 6 CPs + additional 6 CPs from Enlarged EU Countries
  ➢ 8 of them using the COIN CP, 4 of them using their own platform
  ➢ Three COIN collaboration forms extended with Living Labs (BG CZ)
  ➢ COIN EEU provide additional EI/EC services to COIN GSP federation
  ➢ CPs provide a BPM (BPO) functionality, diverse integration degrees

• Nodes Typology
  ➢ COIN nodes (COIN CP): social, knowledge and business services
  ➢ CP nodes: nodes created by networked enterprises (or IT providers)
  ➢ Non-CP nodes: using their own CP with KSB models and IT services

• Further Collaborations
  ➢ Manufacturing FoF PPP, obj. 7.3 Virtual Factories and Enterprises
  ➢ FI PPP Use Cases (objective 1.8) of ther FI Core Platform
COIN Front End

• **Core Topics**
  - Web Interfaces for human users accessing the COIN System
  - APIs to interoperate upper and lower cloud (in GSP and CP)

• **Front End Typology**
  - **Web Interfaces** for 4 categories of human users
    - Generic Users (registered or not) with browsing, search, try me
    - IT Users (registered) service and/or GSP platform providers
    - Business Users (registered) CP platform providers, businessmen
    - System Admin managing the COIN system and nodes evolution
  - **APIs Interfaces for 3 levels of interoperability (step-1,2,3)**
    - Manual: implemented by the above Business Users interface
    - Semi-automatic: generated by the BPM facility inside the CP
    - Automatic: intelligent reasoning embedded in CP BPM & GSP

• **Further Collaborations**
  - Web Interfaces: the EI/EC Google
  - API: COIN BPO service with embedded EI/EC functions
## GSP Evolution Scenarios

<table>
<thead>
<tr>
<th><strong>“Emergent” scenario</strong></th>
<th><strong>“Planned” scenario</strong></th>
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<tbody>
<tr>
<td><strong>Different authorities</strong></td>
<td><strong>Single authority</strong></td>
</tr>
<tr>
<td>Different GSP instances established <em>independently</em>, then federated</td>
<td>Different GSP instances deployed as a distributed architecture</td>
</tr>
<tr>
<td>Platform instances may be specialised to some extent, but not by design</td>
<td><strong>Specialisation</strong> of instances can be by design</td>
</tr>
<tr>
<td>Federation may not be transparent to users</td>
<td>Distributed architecture is transparent to users (logically a single entity)</td>
</tr>
</tbody>
</table>
The “emergent” and “planned” scenarios can be complementary, but are different both from a technical and a business perspective.

- We mostly focus on the “emergent” scenario.

We chose a “local knowledge” approach:

- Each GSP instance is independent.
- Each GSP instance has its own repository:
  - Ontologies, service descriptions, policies, etc.
- Knowledge can be accessed through GSP services.
- Some knowledge is shared across the federation (to describe instances).
GSP Evolution Hypercube

- Incremental scenarios

- Three dimensions:
  - service composition
  - federation
  - NFP-based ranking

GSP Evolution “cube”
GSP – Primary Scenarios

• Single instance with service composition (B)
  – A match composed of *multiple services* can be identified
  – Decomposition of goals and service composition

• Federation (C)
  – A match given by a service registered at a *different GSP instance* can be identified
  – GSP instances can forward goals and matches to other instances

• Federation with service composition (D)
  – A match composed of *multiple services* registered at *different GSP instances* can be identified
  – Composition of scenarios B and C
GSP Further Scenarios

- Federation with NFP ranking (E)
  - NFP-based ranking of results coming from different GSP instances
  - Trust with respect to GSP instances can influence ranking

- Single instance with composition and NFP ranking (F)
  - NFP-based ranking of composed services
  - NFP composition

- Federation with composition and NFP ranking (G)
  - NFP-based ranking of composed services coming from different GSP instances
  - Composition of scenarios E and F, with additional issues because composition can happen at different instances
Basic GSP Federation

- We are now targeting scenario “C” (simple federation)
- Basic support for federation has been designed and implemented
  - GSP nodes can forward goals and responses among them
  - With federated discovery all nodes receive the request
  - The new “Federation Adapter” component of the GSP takes care of inter-node communication
    - It may be used to integrate in the federation any WSMO-based discovery engine, not just WSMX
Conclusions & Future Work

• Achievements
  - A federation of EI/EC service delivery platforms implemented
  - Prototype in the EI/EC domain of a Global Service Delivery Platform
  - Instantiation of the FIA Federated Open Trusted Platforms concept
  - Open architecture to future service- and platform- providers
  - Platforms completely available in Open Source

• Future Challenges
  - Integration with service-oriented Development / Mash-up Platforms
  - GSPs deployment onto a Cloud Computing architecture
  - Full EI/EC GSPs virtualization and plug & play facility
  - Self-management and P2P governance of the federation
  - Federated Business Models and Policies Management
  - Integration with the Future Internet (and FI PPP Core Platform)
Enterprise COllaboration & INteroperability

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