Enterprise COllaboration & INteroperability

IERC AC4 Semantic Interoperability Workshop

The COIN Project and Semantic Interoperability

Venezia, June 19th 2012
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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 Consortium & Funnel Model

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

Academic & Research Partners
- VTT
- SINTEF
- ESI
- TU Vienna
- ESI
tecnalia
- Jožef Stefan Institute, Ljubljana, Slovenia

User Partners
- IND
- PÖYRY
- ISOIN

EEU Partners
- Wireless INFO
- favit
- LODER
- Politecnica
COIN Vision on Interoperability

Innovation

- Fixed costs
  - Dedicated resources
  - Product oriented

- Variable costs
  - Shared resources
  - Service oriented

- IT Switch

- Marginal cost "close to" 0.0
  - Value based dynamic pricing
  - Service infrastructure as utility
  - Service federated

- IT Tap

- Ecosystem pricing, relationship led rather than cost based
  - Utility service infrastructure as generative platform
  - Making new needs: co-design, co-creation, co-development, co-consumption

- IT Store
What is it [semantic] Interoperability

- **Semantics in Interoperability**: mutual understanding about the meaning and not just the syntax of the information exchanged
- **Interoperability via Semantics**: achieving interoperability by using semantic technologies (and not just ontologies)
  - Integrated Unified Federated (examples)
COIN Interoperability Services

- Interoperability Spaces Alignment (WP 5.2)
- UBL2GS1/exceptionCriteria (iSurf)
- GS12UBL/exceptionCriteria (iSurf)
- Interoperability Spaces (Federated) (WP 5.2)
- **Semantic** Mapping Discovery service (WP 5.2)
- **Semantic** Reconciliation Rules Generation service (WP 5.2)
- **Semantic** Interoperability Reconciliation Engine (WP 5.2)
- **Social Ontology** Building and Evolution (SOBE) service (WP 5.3)
- Enterprise **Semantic** Profiling service (WP 5.3)
- Enterprise **Semantic** Matchmaking service (WP 5.3)
- Business Interoperability Gap Finding Service (WP 5.4)
COIN Information Interoperability

- **Interoperability Space**
  - Publish/Subscribe
  - Federated Approach
  - Micro-services
  - UBL 1.0 – UBL 2.0
  - DK-TK invoices

- **Payload Negotiation**
  - 1:1, 1:n, n:m
  - ACS negotiation contract (buyer\supplier)

- **Semantic Interoperability**
  - A generic complete suite
  - Unified Approach
  - 21 Rules
  - AIDIMA order exchange (Furniture)
COIN Knowledge Interoperability

- Modeling CN competences asset
  - Social Ontology Building of CS
  - Automatic knowledge extraction from txt docs
  - Social participation of experts community (voting, discussing)
  - Example: IND ICT CS core ontology
  - Enterprise Semantic Profiling
  - Ontology-based filtering of enterprises related docs
  - Semantic profiles as ontology-based feature vectors (OFV)

- Assessing the current and evolving CS asset
  - Based on Information content-driven computation of semantic measures (coverage and similarity) between semantic profiles

\[ \text{CN} = \text{Collaborative Network} \]
\[ \text{CS} = \text{Competences & Skills} \]
COIN Process Interoperability

**Challenges**
- Define the scope of business process interoperability
- Categorize and classify interoperability gaps
- Develop innovative services to ensure business process interoperability
- Provide service primitives to purge the gaps during collaborative process model design-time

**Results**
- Solid concept of business process interoperability
  - Overall scenario
  - Gap categorization and classification
- Prototypical implementation of Business Interoperability Services:
  - Transformation Service (to transform private business processes into view processes applying SBVR Semantics of Business Vocabulary and Rules)
  - CBPip Gap Detection Service (to identify CBPip gaps)

**EXAMPLE**
- Transformation of private processes to public views
- Detection of interoperability gaps

![Diagram showing CBPip-Gaps at Business Level with interface mismatches, deadlocks, loop, multiple source, improper structuring, number of messages, and message types.](attachment:diagram.png)
COIN Contributions to AC4

• Provide a **Methodological Framework** for Interoperability in general and Semantic Interoperability in particular

• Provide a **Reference Architecture** and a **Generic Service Platform** (semantically enabled service architecture SESA) for [semantic] Interoperability

• Provide generic **Environments and Tools** for developing semantic interoperability solutions at design time and a **SOA based BP execution Tool** at runtime

• Ontologies, semantic artefacts, knowledge-rule bases are available, but instantiated for **Enterprise Interoperability** in the **Manufacturing** domain (12 test cases automotive, aeronautics, space, pulp & paper, ICT, construction, railways, logistics, marine shipping, agrofood, healthcare, new media): no specific semantic artefacts for **IoT**
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