Challenges in the Business Digital Ecosystems

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“Towards a network of digital ecosystems: which technology, which research and which instruments?”

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Imagine...

...your offer/service/product to be
- described solely in business terms (What it does, how it does it, location, price, services...)
- discoverable by means of its Business specification and not by its technical specification
- visible to a wide business audience at the same level of titans companies
- competing with other similar offers and be reused, integrated and consumed in an automatic way
- integrated automatically in the customer back-office
- integrated with your back-office with minimum effort
- the IT is not in the critical path from business concept to realization

You imagine a Digital Business Ecosystem
Level of Information Exchange(*)

1) Inside-SME Application

2) Inter-enterprise applications

3) Inter Enterprise Applications

4) InterCommunities

Community A

Community B (DBE instance B)

(*) Concept of Peter Herzum
B2B vs Ecosystem

- **B2B**: static
  - Technologies may vary but are countable and predefined
  - Functional model is predefined
  - Business happens outside the B2B

- **Ecosystems**: dynamic
  - Technologies are not known in advance
  - Functional model is not predefined
  - Business happens inside the Ecosystem

- **B2B**: structured
  - Model based, data driven

- **Ecos**: evolving
  - Meta-model based and model driven

random network vs scale-free network
DBE Software Process

- Business Modelling
- Development
- Exploring/Search
- Service Execution Environment
- Execution
- Evolutionary Environment
- DBE Development Process
- DBE Community Instance
- Service Factory Environment

- Publish Service Manifest
- Register Proxy
- Publish BPEL
“Ecosystem Oriented Architecture”

- Business Service Factory
- Need to address a whole new set of issues
  - Semantically rich service description
  - Business specification
    - Ontology
  - Technical specification
  - Repository of models
  - Interoperability
- Service Discovery
- Web services does not scale up!
Service Factory

Semantic Distributed Registry

- XMI CIM Model (M1)
- XML CIM Data (M0)
- XMI PIM Model (M1)
- Fitness Data

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Ontology

- Publish

Model Repository

- Publish

- SDL

BML

- Organization
  - service
  - product
  - motivation
  - contract...

- input/outputs
- messages
- type
- parameters
- errors...

Integrated PSM Editor

- Java exceptions
- WSDL
- WS
- .Net...

Integrated PIM Editor

- Integrated CIM Editor

SDL

Ontology Register

Publish

Register

P2P Network (FADA)
Execution Environment

Service Consumer
- Front-end
  - Proxy
  - XMI BML Model (M1)
  - XML BML Data (M0)
  - XMI SDL Model (M1)
  - Fitness Data

Service Provider
- Servent
  - End point

Execute Service

Application
- Search SM
- Download SM
- Download Proxy
- Register Proxy

Service Manifest
- XMI BML Model (M1)
- XML BML Data (M0)
- XMI SDL Model (M1)
- Fitness Data

Semantic Distributed Registry

Domain Ontologies
- Ontology

Publish SM

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P2P Network (FADA)
Role of the Functional Reference Model

- Assuming services will share the same model is an unreachable myth
- There is no “singleton” reference model
  - Model adoption can no be enforced

- Anyone can publish and adopt any model
  - Role of the first players, will create consensus
Scale-free network of model adoptions

- If nodes are models and links are adoptions the ecosystem will create a scale-free-network, i.e.
  - Growing
  - Preferred Links
  - Fitness based
- Moving to a different cluster means adopting new business or computing standard
  - It is a barrier
- What about interoperability?

From Barabasi “Link”
Repositories

- Model dependency
- Model versioning
- Business and technical specification
- Bindes to ontology
- Decentralized and pervasive
  - Tuple space Technology
- How to navigate it?
  - It is not hierarchical
- UDDI is useless in Ecosystems
Enable the Competition in the Ecosystem

- Provide means to understand the Business offer
  - Model (e.g. price model)
  - Information (e.g. Actual prices)
- Functional specification
  - Technical interface
- QoS
  - Availability, performance,
Role of MDA™

- Support model representation with Domain Specific Languages (DSL)
  - Ontology, business, computing
- Support interoperability by model transformation
- Support interoperability by model encoding
- Provide a conceptual framework to work with:
  - Computation Independent Model, Platform Independent Model, Platform Specific Model
- Provide a standard API for model repository
Conclusion

- **Architecture**
  - Realizing an ecosystem is a multi-disciplinary effort

- **Implementation**
  - We need more than web service technology

- Meta-modelling is the way to go for abstraction, extension

- Interoperability is an issue