Integration of business and industrial knowledge on services to set trusted business communities of organisations

Context

Service-chain based collaborative model

Industrial service registry organisation

Conclusion

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Context : Economical environment

- Industrial strategy
  - Blue ocean strategy
    - New business opportunities
    - Precede the consumer needs
  - Customer centric
    - Customer perceived value chain
      - ✓Value added activities
    - Mass customization
  - Sustainable production
    - Life cycle integration
    - Logistic constraints
  - Product-service economy
- Internet based economy
  - Web 2.0
  - Virtual services
  - Service oriented enterprise?

Context : Service systems

- Service vs product
  - Intangible
    - Virtual
    - May require physical resources…
  - No stock
    - « Consumed » by the client
- Different typologies
  - Tangible / Intangible components importance
    - Impact on the service selection
    - Value-added activities classification
  - Service production organisation
    - Involvement of the client
    - Production organisation

Context: Product-service organisation

- Product-oriented
  - Product owned by the consumer
  - « Companion » services
    - Delivery
    - Maintenance
- Use oriented
  - Identified physical product
  - Buy the right to use the product
- Result oriented
  - A service is subsituted to the product
  - No clear identification of the physical product

Context: Collaborative business

- Inter-enterprise collaboration
  - Collaboration strategy
    - Value management
    - Outsourcing strategy
  - Common processes
  - Interoperability challenges
    - Conceptual:
      - ✓Business semantics
      - ✓Business rules
    - Organisational
      - ✓Responsibility management
      - ✓Distributed decision framework
    - Technological
      - ✓N-Tiers architecture
      - ✓De facto web-based standard

Requirements

- Collaborative service ecosystems
  - Service or Product-service strategy
    - Customer perceived value chain
    - Life cycle constraints
    - Delivery constraints
  - Partnership management
    - Partner selection
    - Collaboration strategy
- Large scale service ecosystems development
  - Service publication
  - Community management
    - Business area
    - Trust
  - Service chain enactment
    - Composition process
    - Service identification
    - Governance toolset

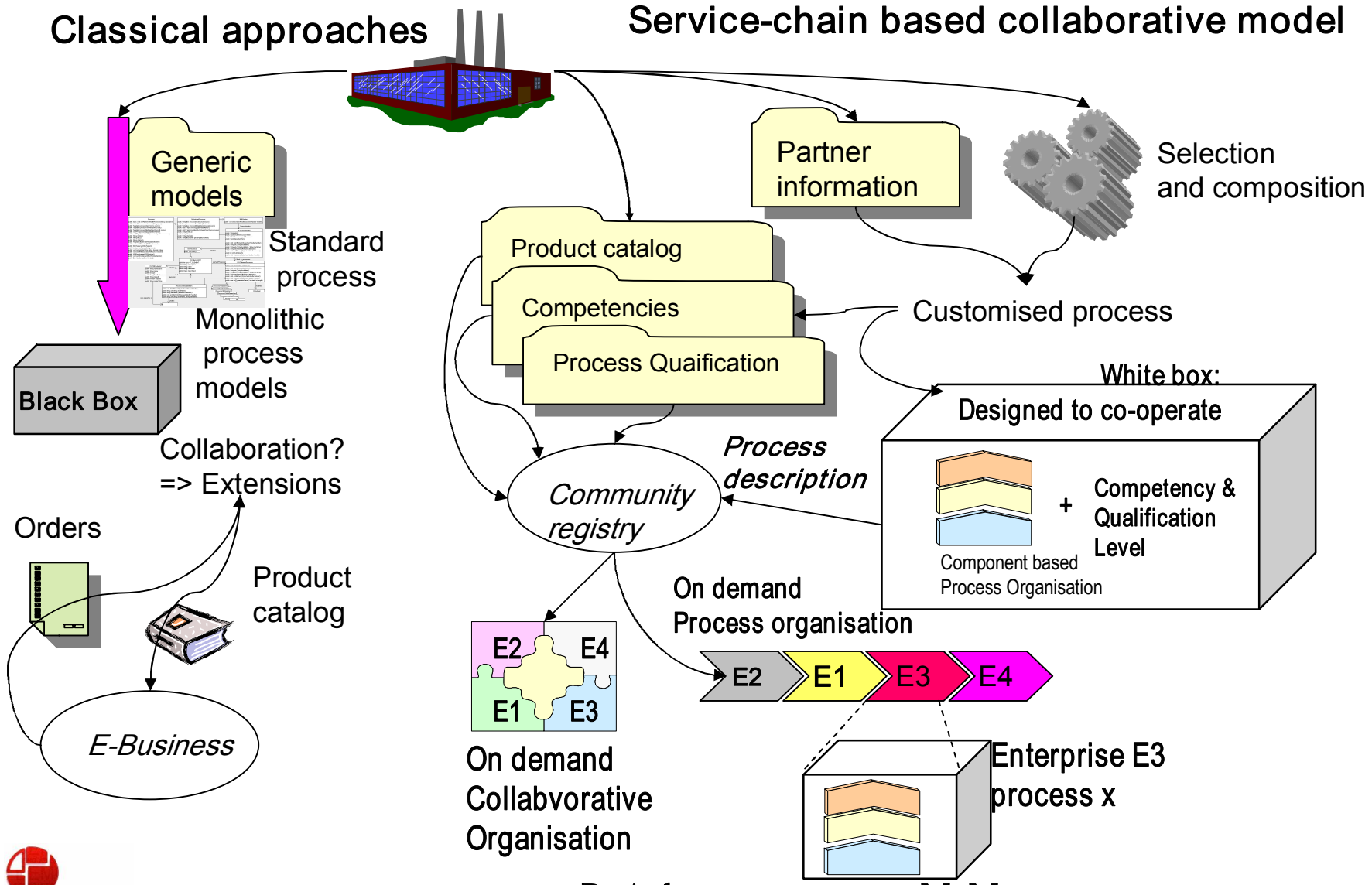
From IT Services to Industrial services

- Industrial service semantics
  - Different business areas ontologies
    - Describe service competencies
    - Used to set inter-area mediation
  - Different business communities
    - Integration of trusted partners
    - Partners expertise
- Industrial service chain composition
  - Based on the consumer needs
  - Integration of business knowledge
    - Trusted communities
  - Integration of industrial knowledge
    - Production strategy
    - Industrial quality

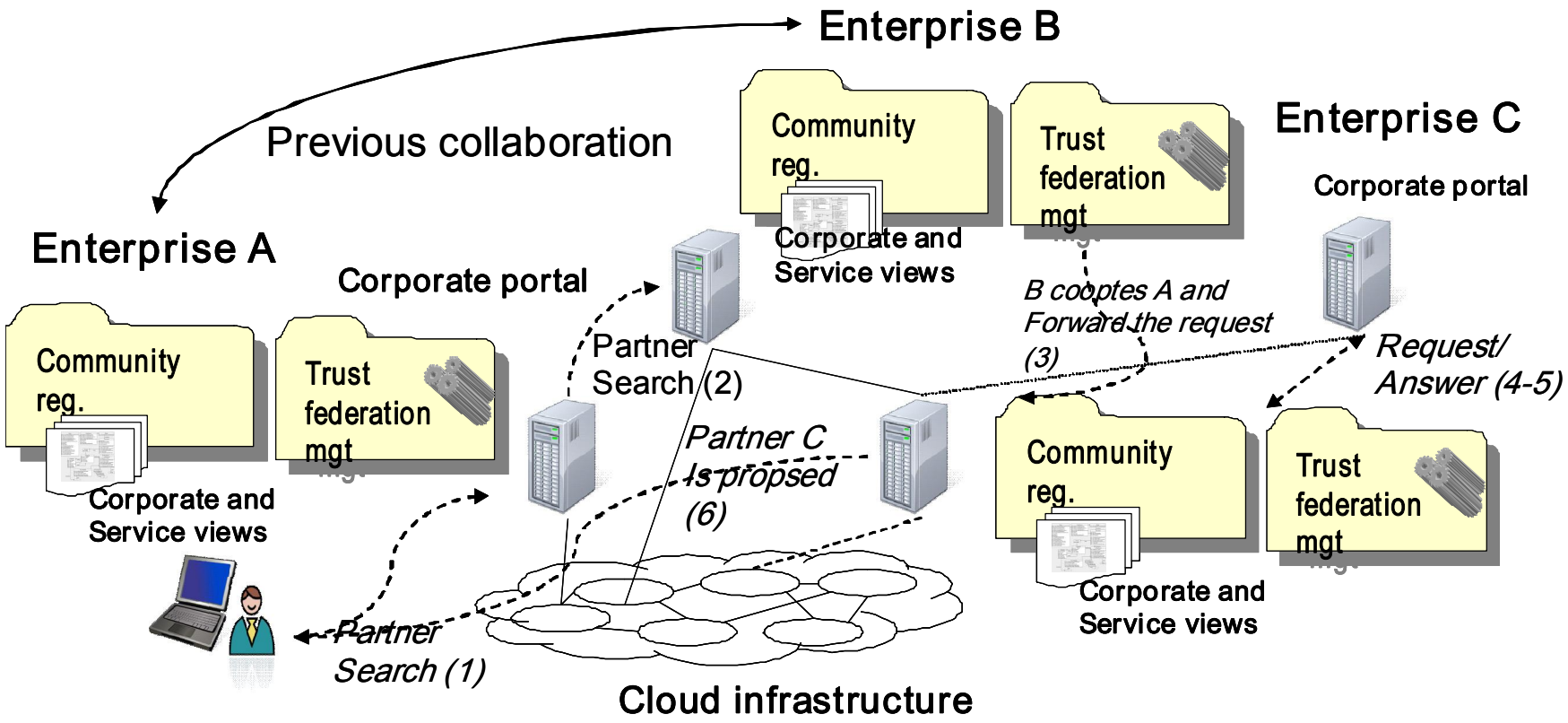
Service-chain composition

- Selection strategy
  - What should be done
    - Business Service "competency" referring to a business area ontology
  - With who
    - Partner identification
    - Partner location
    - Use Trusted communities
  - How
    - Production strategy
    - Non functional properties
      - ✓Maturity
      - ✓Quality

Service-based collaborative ecosystem: enterprise side



Service-based collaborative ecosystem: Collaborative side



Industrial service registry (1)

- 3 dimensions
  - Corporate dimension
    - Administrative information
    - Location
    - Collaboration oriented properties
      - ✓Past collaboration
      - ✓Business communities
  - Functional properties
    - Competencies
    - Production strategies
    - IT support reference (interoperability constraints)
  - Non functional properties
    - Static information
    - Dynamic information

Industrial service registry (2)

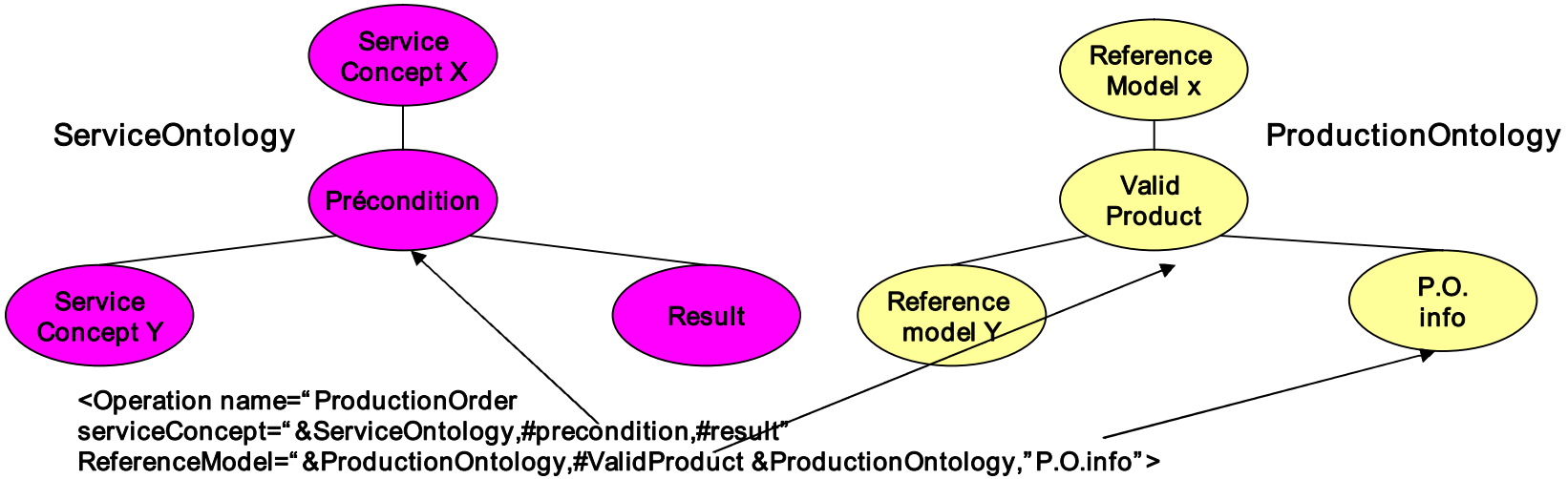
- Non functional properties
  - Security
    - Related to the environmental risks
    - Different security policies
  - Quality of service
    - Environmental interface
    - Process quality
      - ✓Maturity : CMMI classification
      - ✓Global quality (refer to the business area)
    - Production abilities
      - ✓Relaibility
      - ✓Configuration
      - ✓Delay
      - ✓Adaptation
    - Cost / financial information
    - Other performance indicators as sustainable growth parameters…

Service chain composition

- Selection
  - Semantic filtering
    - Equivallence
    - Proximity
  - Integration of the 3 dimensions
    - Community-based
      - ✓« Federation manager »
      - ✓Based on previous collaboration
    - Integration of « static » non functional properties
- Late binding service
  - If necessary
  - Selection depending on the service level agreement
  - Integration of dynamic non functional properties

Multi-dimensional industrial service registry

- Implementation
  - Based on the DRAGON Toolset
  - Extensions based on YASA4WSDL
    - Different business ontologies
    - Functional and non functional properties

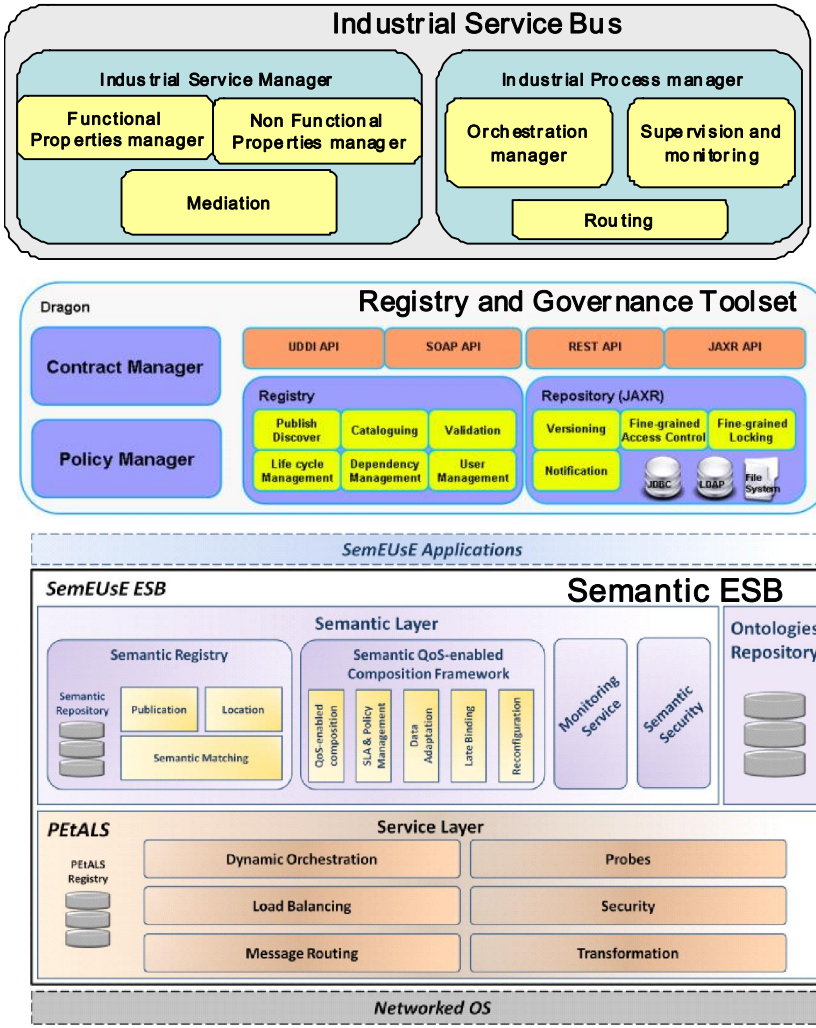


Service chain monitoring

- Non functional properties monitoring
  - Manage the previous experiences
  - Mean – standard deviation
- Communities management
  - Each partner manages its own collaboration
  - Cooptation relationships
  - Exchange Quality of service information
- Further extension
  - Globalised governance toolset
  - Trust computation

Business service bus architecture

- Business service manager
  - Extended registry
  - Semantic annotation
  - Semantic mediation
- Business Process manager
  - Federation manager
  - Selection/composition
  - Routing process
    - Contract-based
    - Routing
  - Governance toolset



Conclusion and further works

- Multi-disciplinary research work
  - Industrial engineering point of view
    - Service Production systems
    - Service chain organisation
  - Computer science point of view
    - Middleware based architecture
    - Software Quality and Quality of Service
- Multi-dimensional service ecosystem model
  - Internal vs external views
  - Global vs stand-alone view
- Current development
  - Open-source based
  - Extension of the SeMeuse Project
- Further works
  - Contextual IT service generation