Model Driven Realization of Business Processes in Care Paths Based on a Service-Oriented Architecture in a Hospital Infrastructure

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Introduction

- The IT-portfolio at Ullevål University Hospital is growing larger and more complex:
  - making it harder to reconciliate systems to business processes.
- Integration of systems are typically done ad-hoc and is lacking structured semantic mappings from business domain to corresponding technical artefacts:
  - Making system integration expensive, rigid and error-prone.
- Manual maintenance of documentation:
  - Not to be trusted – changes demand reverse engineering.
- Need to compose services (service chaining) to composite processes, e.g. patient logistics

Objective

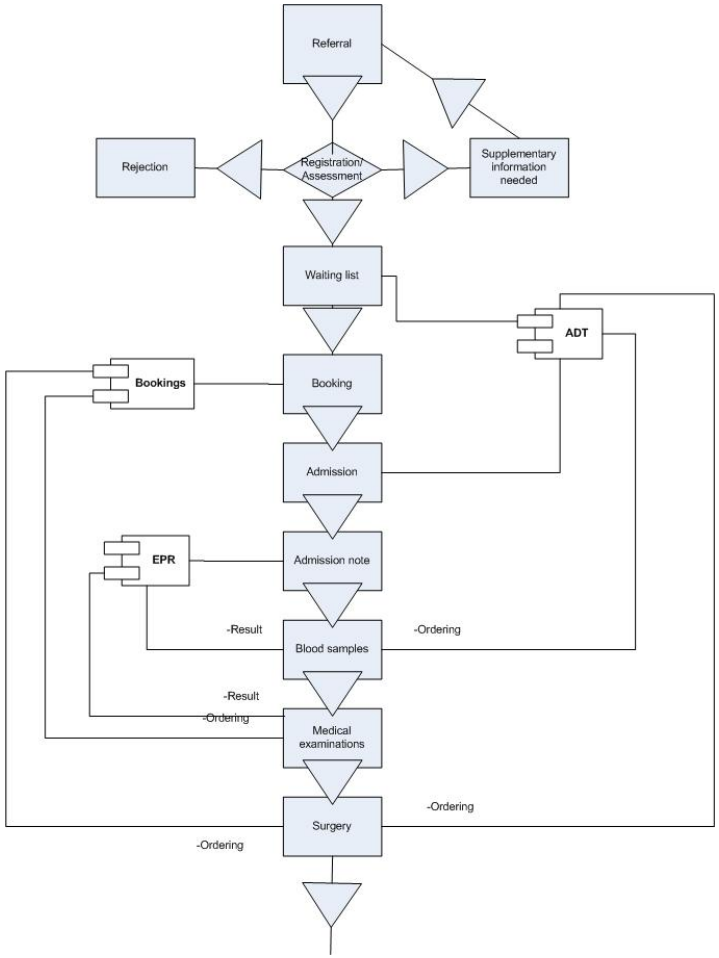
- Improve reconciliation of business processes and IT-portfolio at Ullevål University Hospital by applying MDA /MDD principles.
- Assessment of BPMN and BPEL as technolgies to map business processes (Computational Indepent Model - CIM) to IT-infrastructure (Platform Independent Model /Platform Specific Model – PIM/PSM).
- Assessement of reference ontologies as tools for improving semantic mappings in system integration and in interoperability with external partners.

Methods

- Capture business processes by structured interviews and informal modeling. The methods used and results will not be evaluated or discussed.
- Realizing models for business processes in a BPMN-tool
- Realizing models for service chaining by the use of BPEL metamodel. Map and transform BPMN to BPEL either directly or through a PIM model to constrain implementation to SOA paradigm and further to a PSM model of BPEL.
- Realizing a reference ontology conceptually in a hostpital setting.
- Map MDA CIM and PIM layers to reference ontologies

Methods: Capturing Business Processes

- Structured interviews
- Informal modeling, e.g. simple flow charts
- The accuracy of the captures is not important
- The captures are input to BPMN-models



CIM/PIM Modelling (BPMN /SOA)

- Realizing BPMN models.
- Investigate the need to map BPMN-models to a SOA model in order to achieve a Service Oriented Architecture.

PSM Modelling (BPEL)

- Make a BPEL model that conforms to BPEL metamodel and map it to the CIM model (directly or indirectly)
- Do we need a BPEL model? Is a direct transformation of CIM/PIM model to BPEL the way to do it in real life?

Evaluation of Reference Ontology (RDF and OWL)

- Evaluation of Reference Ontology in the MDA / hospital context
- Evaluation of existing technologies, RDF and OWL, in order to create a reference ontology for integration of health information systems.

Research questions

- Evaluating the BPMN-BPEL-chain:
  - What is lost in transformation from BPMN to BPEL?
  - Is the technologies suited for integration of health information systems?
  - Where does referance ontology fit in the MDA framework and how should it be realized?
  - What are the profits to expect using a reference ontology in semantic mappings of clinical and organizational data in, e.g. EDIFACT and HL7

Research questions: Integration of Health Information Systems

- Does an MDA /MDD approach with BPMN and BPEL:
  - Make integration cheaper,simpler, faster and less error- prone?
  - constitute a platform for configuration and control of the IT-portfolio – making it easier to tailor service chaining and user interfaces for specific needs?
- Pitfalls and criticism?
- Considerations in the health Information systems domain

Discussion and Conclusion

- The master thesis is due August 2008…

References and Contact Details

Supervisor:

Professor Dr. Arne-Jørgen Berre (SINTEF)

- OMG's MDA framework
- OMG's BPMN specification
- OASIS group's BPEL standard
- Athena MDI framework

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