ERP-Control: A REA-based Enterprise Resource Planning Application

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ERP-Control: A REA-based Enterprise Resource Planning Application

- **ERP-Applications**: SAP ERP 6.0, MS Dynamics AX 2013, … transactional recording of business data and resource planning functionalities
- **“REA Ontology”**: REA Accounting Ontology (McCarthy 1982), REA Business Ontology (Geerts/McCarthy 2002), …
- **Enterprise Control System Integration Standard** (ECSI 2008): Focusing on the information flows between
  - enterprise system (mostly exchange processes)
  - production control system (mostly conversion processes)
- **Integration problem**: How can the different concepts be integrated?
- **Demonstration**: REA-semantic data and business process modeling and prototypical implementation
ERP-Control: Prototypical Web-based ERP-Application

ERP-Control: [http://erpcontrol.imw.tuwien.ac.at/ERPControl/home.seam](http://erpcontrol.imw.tuwien.ac.at/ERPControl/home.seam)
Problem Statement

ERP-Control: Financial Reporting and Business Processes

ERP-Control: Semantic Data and Process Models

ERP-Control: Semantic Implementation

Conclusion

Literature
ERP-Control: Implementation of financial reporting processes

- Annual Report: IFRS financial statements (balance sheet, income statement, change of equity, cash flow statement) as an essential by-product
ERP-Control: Financial Reporting and Business Processes

ERP-Control: Sales process execution

[ ERP-Control interface with example of sales process execution ]

- Customer Selection
  - Add new Customer
  - Customer ID Description
    - Customer: No 20001 Select

- Product Selection
  - Product ID Description Actual Stock UoM
    - 1: Grass-Paraffin 500000.00 kg Select
    - 2: Press-Paraffin 500000.00 kg Select

- Quantity Input
  - Available quantity: 500000.0 kg
  - Sales quantity: 1000.0 kg

- Payment Selection
  - Type of Payment: Cash

- Confirmation
  - Customer ID Product ID Quantity Sales Price (excl.) Rate of taxation Payment Type
    - 0 2 1000.0 kg 1.04 EUR 20 % Cash

Sales with value EUR 1248.00 (incl. tax) successfully saved!
**ERP-Control:** Production process execution

- **Selection of Quarterly Plan**
  - Product ID: 9
  - Description: Molded-Candies Produkt Segment 2014 50

- **Selection of Monthly Plan**
  - Product ID: 19
  - Description: Molded-Candies Produkt Segment 2014 50 February

- **Output Production**
  - Planned Input: 833.00 kg
  - Produced Output: 900.0 kg

Material Resource (Molded-Candies Produkt Segment 2014 50 February) has been successfully saved.
“REDA Ontology”: Economic meaning of business processes
Hierarchical data model for the REA elements
- Abstract classes for the Economic Resource, Economic Event, Economic Agent
- Derived classes for material, personnel, equipment and resources
- Flow classes for the material and financial resources
Conversion processes: REA-semantic data model

- Enterprise Control System Integration Standard (ECSI, 2008) defines
  - Conversion processes via process segments
  - Segment Response is linking the input (consumed/used) to the output (produced)
  - Segment Response is related to Segment Requirement (internal commitment)
• ECSI Standard: Hierarchical modeling of the production technology
  • resource-specific Segment Specification => specification of the production function
  • properties of Segment Specifications => linkage to the derived resource classes
REA-semantic data model: The parts fit together
• JBoss Seam Framework: Seamless implementation of object and process oriented ERP systems in Java EE 3-tier architecture (similar to SAP’s Enterprise SOA )
**REA-semantic business process model: Sales model**

- REA-semantic sales process design: Selection of agents, resources, quantity and double-entry bookkeeping
- Business process modeling in the Java Process Definition Language (jPDL)
- jPDL is language which can be executed in the Java Business Process Manager (jBPM) workflow engine
• Business Case: Transactional recording of resource flows and related value flows according to the REA ontology
The REA-semantic data and business process models behind ERP-Control show that

- the “REA ontology” is generic so that it can be concretized e.g. with
  - the production resources specified in the Enterprise Control System Integration Standard (ECSI 2008) and
  - the financial resources defined in the finance literature and
- it can be expected that a REA-semantic design and implementation should
  - reduce engineering costs by reducing the communication problems between users, designers and programmers,
  - enhance the quality of the designed and implemented ERP systems,
  - improve the maintainability and the extensibility by giving all involved parties a common understanding of the ERP system functioning


Woods D./Mattern Th. [WoMa06]: Enterprise SOA – Designing IT for Business Innovation, O’Reily,, 2006
Literature


• Achleitner St. 2010. Web 2.0 based ERP System for Planning and Control of Financial Instruments, Master Thesis, Vienna University of Technology, Vienna, September 2010


