INCOME2010 - a Toolset for Developing Process-Oriented Information Systems Based on Petri Nets

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Agenda

- Motivation
- XML nets
- Requirements
- Architecture
- Implementation
- Features
- Demonstration
- Summary & Outlook
Motivation

Background

- Importance of process-oriented IS
- Increase in the number of tools supporting process-oriented IS
- XML nets with advantages in:
  - Description of process objects in XML
  - Exchange of standardized structured data

There were no software tools available which support XML nets.

Data source: Petri Nets Tools Database (http://www.informatik.uni-hamburg.de/TGI/PetriNets/tools/db.html)
XML nets

- **XML Nets**
  - Variant of high-level Petri Nets
  - *Places*: Containers of XML documents, typified by XML Schemas
  - *Transitions*: Optionally inscribed by predicate logical expressions
  - *Edges*: Inscribed by Filter Schemas for reading or manipulating XML documents

Motivation

XML nets

Requirements

Architecture

Implementation

Features

Demonstration

Summary
Requirements

• Functional requirements
  – Graphical modeling of process flows (control flows)
  – Modeling of data flows
  – Definition and evaluation of (business) rules
  – Modeling of organizational structure
  – Definition and management of process metrics
  – Hierarchy modeling
  – Reusable process fragments
  – Analysis of process models
  – Execution of process models
  – Monitoring of process execution
  – Dynamic process management
  – Incorporation of SOA concepts

• Non-functional requirements
  – *Run-time*: usability, availability, performance, …
  – *Development-time*: extensibility, scalability, composability, reusability, …
Architecture
Implementation

- Project status
  - Type: Open source
  - License: Eclipse Public License
  - Begin: February 2006
  - End (expected): 2010
  - Partner: AIFB, Promatis, FZI
  - Version: 0.2.3

- Technologies used
  - Java 1.6
  - Eclipse Rich Client Platform (RCP)
  - Eclipse Graphical Editing Framework (GEF)
  - PNML, XNML
  - XMLBeans, XQuery
• MVC pattern

• Interfaces for Petri net element models
Features

• **Features implemented:**
  - Graphical modeling
  - Hierarchy modeling
  - Animated token game simulation
  - PNML-compliant file format
  - Structured standard information describing net nodes
  - Role and resource
  - Graphical editing support
  - Graphical export of diagram
  - Categorized project structure
  - BPEL converter
  - …
Summary and Outlook

• **Summary**
  – An open source software toolset facilitating the development of process-oriented information systems using high-level Petri net variants and SOA concepts.
  – Open platform, including but not limited to supporting XML nets.

• **Outlook**
  – Implementation of other functional plug-ins and features, e.g.
    - Automated simulation with detailed report
    - Element library for reusable net components
    - Editors for Filter Schema, transition inscription and organigram
    - Structural analyzer
    - Workflow engine
    - Monitor
  – Integration of other Petri net variants or tools
  – 3D visualization of process flow
  – Web edition based on Web 2.0 technologies, e.g. Eclipse Rich Ajax Platform (RAP)
Further Information

Please visit our website http://www.aifb.uni-karlsruhe.de/Forschungsgruppen/BIK/income2010/ for more information.