Empowering the Knowledge Worker
End-User Software Engineering in Knowledge Management

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Agenda

• Setting the scene – the need
• Key technologies
• The OfficeObjects® project
• OfficeObjects® architecture overview
• End-user design & implementation methodology
• Conclusions
The need

• Virtual organizations in R&D activities
• Knowledge workers – a dominant class
• The knowledge worker productivity challenge
• The end-user software engineering (EUSE) phenomenon (55 m. power-users vs. 3 m. professional programmers)
• The EUSE key issues
  – Application of sound software engineering principles
  – End-user friendly design and development tools
Anatomy of a Research & Development Project

Communication Infrastructure
- Paper documents
- Fax
- Electronic mail
- Intranet Portal
- Document Management System

R&D Project
- Project Team
- Project Co-ordinator
- Project Participants (A)
- Project Participants (B)
- Project Participants (C)

IT Support for Knowledge Workers
- Knowledge Management
- Group work (documents)
- Groupwork (teleconferences)
- Project Management

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The Key Technologies

• Open architectures of the knowledge management software platforms
• Java Specification Request (JSR) portal frameworks
• End-user software engineering tools and methodologies
• Semantic knowledge content modelling
• Human computer interaction techniques and tools
• Workflow management models
• Adaptive case management
The OfficeObjects® Project

- Research base (FP5, FP6)
  - ICONS – Intelligent Content management System
  - eGovBus – Advanced eGovernment Information Service Bus
  - ASG, Component+, Infomix, Vide, OneStopGov
- Information management applications
  - Over 50 reference sites (document & workflow management)
- Knowledge management applications
  - Federation of 20 RTOs – over 2000 scientific staff
  - Over 10 corporate knowledge management systems
  - A project management platform for FP research projects
The OfficeObjects® Architecture

- JSR portal framework
- Knowledge management repository
- Knowledge Maps
- Business Intelligence Analytics
- Workflow management
OfficeObjects® Repository
Information Resources

- Information Object metadata
- Information Object contents
OfficeObjects® Repository
Referential Structure

- Automatic mode
- Full text retrieval
- Categorization tree
- Metadata search
- Register
- Manual mode
- Case file
- Folder
- Knowledge map mode
- Topic
- Topic relationship
The OfficeObjects® Knowledge Maps

Real world objects

The Knowledge Map

Relationships
Knowledge Map Design & Implementation

Knowledge Map Schema

Knowledge Map Graph

generate

modify

Topic Maps Navigator
OfficeObjects® Workflow Paradigms

• BPMN workflow processes
  – BPMN process topology model
  – BPQL process rules
  – XPDL process specification export/import
  – Dynamic Process Modification

• Goal-oriented workflow processes
  – Activity Precedence Graph
  – BPQL rules
    • Work Participant Assignment
    • Pre-conditions
    • Post-conditions
  – Implemented in Topic Maps Navigator
BPMN Workflow Process Model

Workflow Process Topology

Rule Engine
- Routing rules
- WPA rules
- Action rules
- Pre-conditions
- Post-conditions

Control
- Operate on

Data
- Operate on

Workflow Management Specific
- Process Application Semantics Specific

Control Data

Semantic Assets
- Classifiers
- Role Models
- Organization Models
- Document Models
- Contr. Vocabularies

Process Ontology

Classifiers
- Role Models
- Organization Models
- Document Models
- Contr. Vocabularies

XML

SQL

HTML

Param

<T1=x, T2=y, .., Tn=z>
OfficeObjects® Process Rules
(Business Process Query Language [BPQL])

• Operators
  – Arithmetic
  – Relational
  – Set theoretic
  – Boolean

• Statements
  – Assignment
  – Conditional expressions (IF THEN ELSE)
  – Loop (FOR, WHILE)

• Built-in functions
  – Work participant assignment
  – Set manipulation
  – XML manipulation
  – Text manipulation
Goal-oriented Process Model

Activity Precedence Graph

Rule Engine

WPA rules
Pre-conditions
Post-conditions

Control Data

Operate on

Role Models
Organization Models
Documents

Semantic Assets

Process Ontology

Topic Maps Ontology Models

Definition
States
Statistics
Work Participant Assignment (WPA) Expression

```plaintext
IF (IsNull($osoba_dekretujaca_w_poprzednim_procesie) <> 'NULL' AND
$osoba_dekretujaca_w_poprzednim_procesie <> 'brak') THEN
  IF (GetOUIdFromUser($osoba_dekretujaca_w_poprzednim_procesie) = $id_jednostki) THEN
    UsersFromList($osoba_dekretujaca_w_poprzednim_procesie);
  ELSE
    IF ((NOT (IsNull($osoba_klasyfikujaca) = 'NULL' OR $osoba_klasyfikujaca = 'brak')) AND
$typ_korespondencji = 'na_urzad') THEN
      UsersFromList($osoba_klasyfikujaca);
    ELSE
      IF (isEmpty(ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki))) THEN
        ExpertsFromOU('ADMIN_PROCESOW', $id_jednostki);
      ELSE
        ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki);
      ELSE
        IF ((NOT (IsNull($osoba_klasyfikujaca) = 'NULL' OR $osoba_klasyfikujaca = 'brak')) AND
$typ_korespondencji = 'na_urzad') THEN
          UsersFromList($osoba_klasyfikujaca);
        ELSE
          IF (isEmpty(ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki))) THEN
            ExpertsFromOU('ADMIN_PROCESOW', $id_jednostki);
          ELSE
            ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki);
          ELSE
            IF (IsNull($osoba_klasyfikujaca) = 'NULL') THEN
              ExpertsFromOU('ADMIN_PROCESOW', $id_jednostki);
            ELSE
              ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki);
            ELSE
              ExpertsFromOU('KLASYFIKOWANIE', $id_jednostki);
          END IF;
        END IF;
      END IF;
    END IF;
  END IF;
END IF;
```

Generic OfficeObjects® Process Interfaces
The OfficeObjects® Toolbox

- BPMN process design tool
- Goal-oriented process design tool
- Form Editor
- Ontology Navigator
- Knowledge Map Modeller
The OfficeObjects® Design Methodology

• Repository design decision tree
  – Semantic modelling
  – Knowledge map modelling
  – Access authorization
• Workflow process design decision trees
  – BPMN process modelling
  – Goal-oriented process modelling
• Management of design defaults
• System security and administration
• User support and documentation
Conclusions

• Presented tool and methodology have been verified within large-scale application projects
• Application developers were non-programming IT staff
• Active involvement of end-users in development process has been achieved
• Medium level of application complexity is achievable by the motivated power-users
• Native support for mobile devices
• More effort is required to provide the end-user friendly technical documentation and eLearning courses
• High quality on-line support is the critical success factor
Thank you

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