Modeling Human Aspects of Business Processes - A View-Based, Model-Driven Approach

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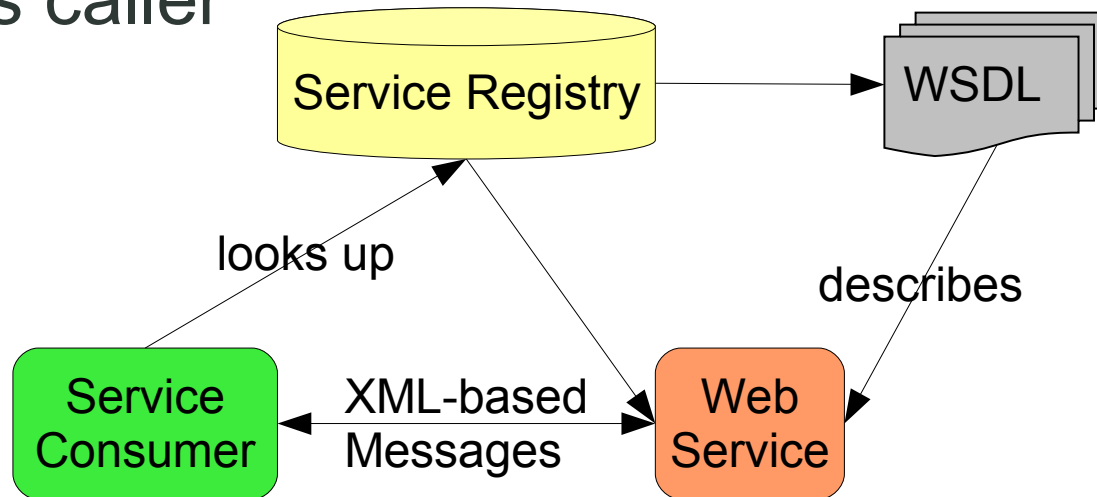
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Outline

▶ **Motivation & Overview**

  ▪ Introduction to WS, BPEL(4People) & WS-HT

▪ A View-Based, Model-Driven Approach

  ▪ Views for representing Human Aspects

▪ Summary & Further Work

Introduction

- Process Modeling needs to address

  - Human <u>participation</u> in business processes and process activities

  - Human – process <u>correlation</u> (e.g. for stakeholders)

- BPEL4People & WS-HumanTask

  - technology specific extensions to the BPEL workflow language

Web Services

- standard for distributed applications
- maximum interoperability
- open & flexible architecture
- complexity & implementation can be hidden towards caller

Business Process Execution Language (BPEL)

- layered on top of Web services

- standard for Web service orchestration
  - external activities correspond to Web services

- BPEL processes are invokable as Web services

```xml
<process name="ExampleProcess"
         targetNamespace="http://example.bpel.vitalab.tuwien.ac.at/process/"
         xmlns="http://docs.oasis-open.org/wsbpel/2.0/process/executable/">

  <partnerLinks>
     ...
  </partnerLinks>

  <variables>
     ...
  </variables>

  <sequence>
     ...
  </sequence>
   ...
</process>
```

5

Business Process Execution Language (BPEL)

Workflow-language

- evolved out of XLANG & WSFL

Activities

Basic	Structured
invoke	sequence
receive	if
reply	while
assign	repeatUntil
throw	pick
wait	flow
empty	forEach
exit	
rethrow	

Exception Handling

scope
compensationHandler
faultHandlers
terminationHandlers
eventHandlers

BPEL & Human Interaction

coffee cleaning BPEL process

receive coffee cleaning command

Invoke official Euro2008 results Web Service

If Austria won against Germany

If Austria won against Germany

Sequence

Invoke Cleaning Task to be performed by Uwe

notify caller of cleaned coffee machine

Exit

Throw coffee machine not cleaned

Web Service
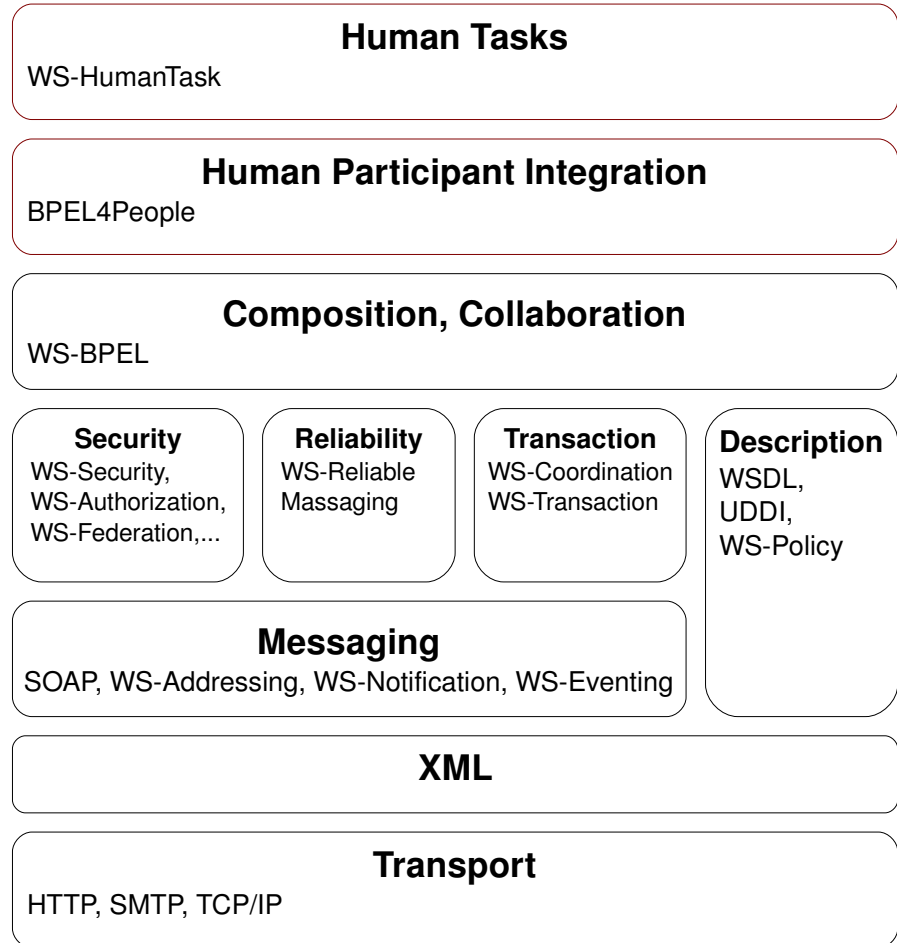
Human Task

Generic Human Roles

- BPEL4People defines
  - process stakeholders
  - process initiators
  - business administrators
- WS-Human Task defines
  - task initiator
  - task stakeholders
  - potential owners, actual owner, excluded owners
  - business administrators
  - notification recipients

A Web Service Stack

with

- BPEL4People
- WS-HumanTask

=> addressing integration of human aspects via BPEL extensions

Human Tasks
WS-HumanTask

Human Participant Integration
BPEL4People

Composition, Collaboration
WS-BPEL

Security WS-Security, WS-Authorization, WS-Federation,...	**Reliability** WS-Reliable Massaging	**Transaction** WS-Coordination WS-Transaction	**Description** WSDL, UDDI, WS-Policy

Messaging
SOAP, WS-Addressing, WS-Notification, WS-Eventing

XML

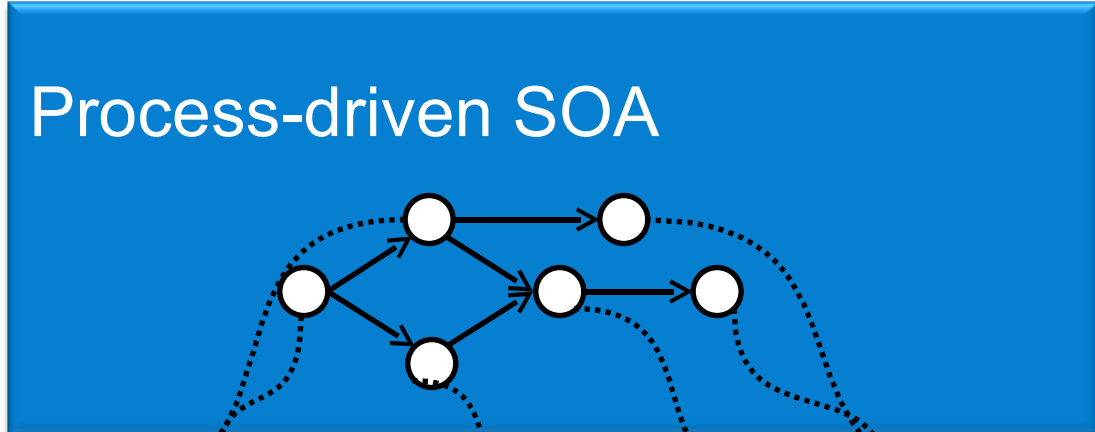| Transport |
|---|
| HTTP, SMTP, TCP/IP |

Problems

- Maintainance of processes

    - expensive; dependence on IT-experts

- Migration of processes

    - to new or similar technologies; expensive

- Understandability of processes

    - Low-level technical standards hard to communicate to domain experts

Separation of Concerns (e.g., *architectural views*) to master the complexity

VbMF

Model-Driven Engineering

Process-driven SOA

SOA

provides an efficient method for integrating business functionality

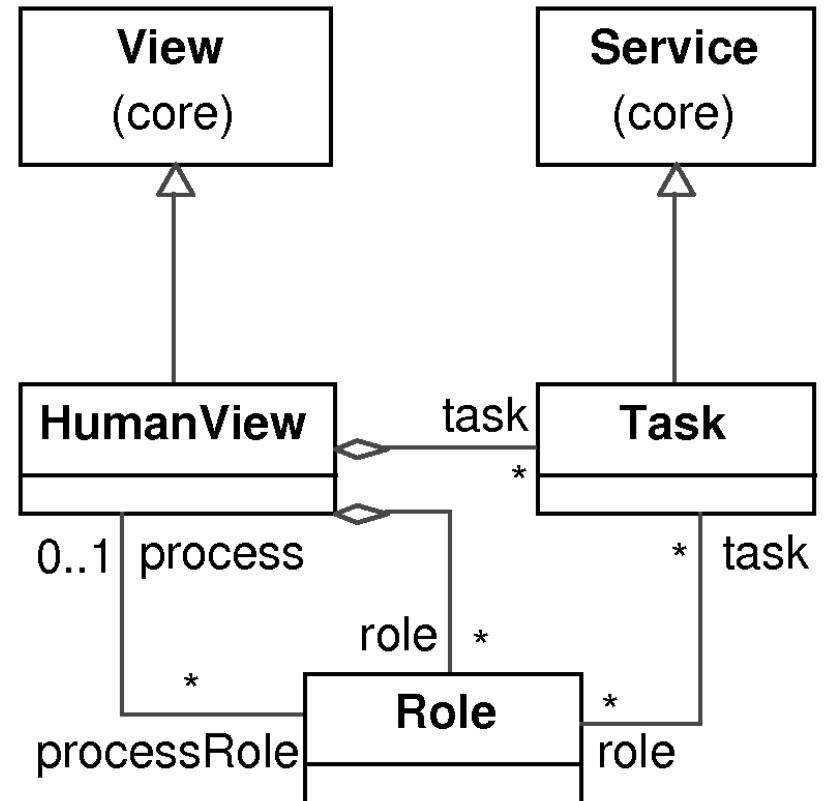reconciles the heterogeneous nature of software systems

Mainframes   Servers   Workstations   Data

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- ▶ **A View-Based, Model-Driven Approach**

    - Views for representing <u>Human Aspects</u>

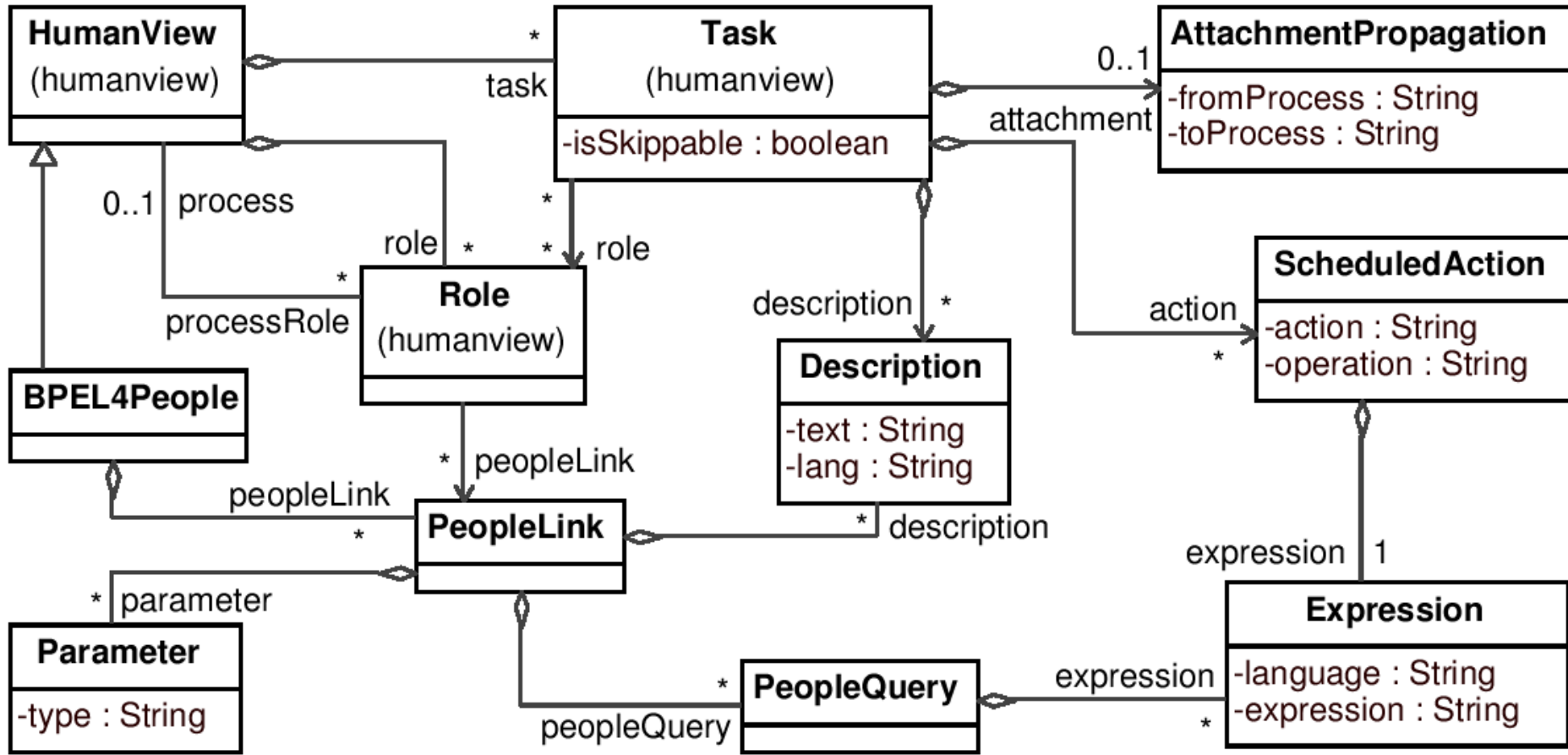- Summary & Further Work

View-Based Modeling Framework

- Different concerns can be viewed seperately

- Models can be viewed at different abstraction levels

  - Developers can work on technical views

  - Domain experts can work on conceptual views

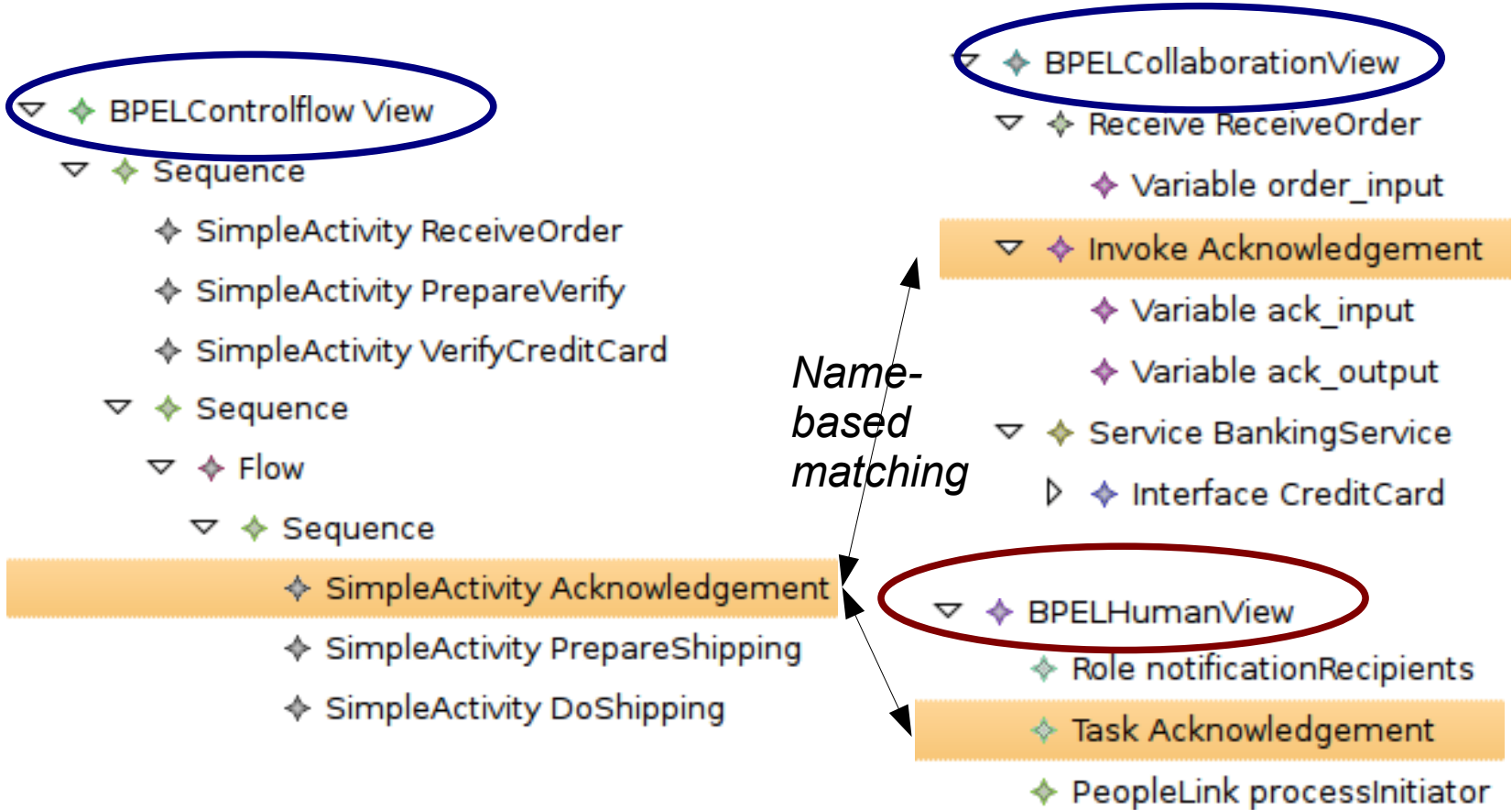# A Conceptual Human-View for Processes

- Defines Correlations of
  - Processes to Roles
  - Process Activities to Roles

- Establishes a
  - Role-Based Abstraction

- Can be used for
  - Access Controls (RBAC)

Refining the Human-View for BPEL4People

Shopping Example:
Controlflow, Collaboration & Human View

Implementation Details

- Eclipse Modeling Framework (EMF)
  - Ecore Meta-Models (M2), Models (M1)

- openArchitectureWare (oAW)
  - Xtend Functions
  - Xpand Templates (M1→M0)
    - BPEL(4People)
    - WSDL

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Summary

- Applied MDD to BPEL4People
- Established an Abstract Conceptual View
  - Human View Meta-Model
  - Role-Based Abstraction
  - Relationships of Stakeholders to Process (Activities)
- Specified a Concrete Technology-Specific View
  - BPEL4People View Meta-Model
- Realized Model→Code Transformation
  - BPEL(4People), WSDL

Further Work

- Monitoring of BPEL(4People) Processes

    - Meta-Models for capturing process execution states

- Studies on the Change-Impact of Models

    - Propagation, Consistency, etc.

- Focus on Collaborative Model-Driven Development

    - Lightweight Collaborative Model-Driven Environment

    - Correlation of Process Stakeholders & MDD Artefacts

Thanks for your attention!

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