From PAIS to PRAIS: caring about resources

Cristina Cabanillas

Vienna University of Economics and Business, Austria

TU/e Eindhoven – May 4th, 2017
About myself

Univ. Extremadura

Univ. Seville

Univ. Trento

Cupenya B.V.

WU Vienna
Research secondments in Amsterdam

Work Packages (WP):
- WP1: Technological Enablers - Social Media
- WP2: Technological Enablers - Smart Devices
- WP3: Technological Enablers - Real-Time Computing
- WP4: Technological Enablers - Big Data Technology
- WP5: Analysis of Social Impact Factors
- WP6: Synthesis of IT Artefacts - BPM Strategy
- WP7: Synthesis of IT Artefacts - BPM Modelling
- WP8: Synthesis of IT Artefacts - BPM Implementation
- WP9: Synthesis of IT Artefacts
- WP10: Project Management
- WP11: Communication and Dissemination Management

http://www.rise-bpm.eu/
PAIS: Process-Aware Information System
PRAIS: Process- and Resource-Aware Information System

Business Process Perspectives

- Functional
- Operational
- Behavioural
- Organisational
- Informational
Framework

**INPUT INFORMATION**
- Organisational Models (Resources, Groups, Relations)
- Business Process (Models)
- Policies, Constraints, Regulations

**OPERATION TYPE**
- Post-execution Resource Analysis
- Resource Assignment
- Process Discovery
- Run-Time Resource Analysis
- Process Monitoring
- Design-Time Resource Analysis
- Process Analysis
- Resource Allocation
- Process Implementation
- Resource Reconfiguration
- Process Redesign

**PROCESS TYPE**
- Resource-aware process model

**ACTIVITY TYPE**
- Process
- Process Implementation
- Process Redesign

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**ACTIVITY TYPE**
- Process Redesign
- Process Implementation
- Process Monitoring
- Process Discovery
- Resource-aware process model
- Process Analysis
- Resource Assignment
- Process Redesign
- Resource Reconfiguration
- Process Implementation

**PROCESS TYPE**
- Organisation Models (Resources, Groups, Relations)
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- Policies, Constraints, Regulations
Framework – Operation types

**Framework – Operation types**

**Imperative process model**

<table>
<thead>
<tr>
<th>Role</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Doc</td>
<td>Request work trip</td>
</tr>
<tr>
<td>Professor</td>
<td>Approve work trip</td>
</tr>
</tbody>
</table>

**Declarative process model**

```plaintext
process WorkTrip {
  task Request work trip
  task Approve work trip
  ensure role(Request work trip, Post-Doc)
  ensure role(Approve work trip, Professor)
  ensure sequence(Request work trip, Approve work trip)
}
```
Framework – Operation types

**Analysis Operations**

- Q1. Who can request a work trip?
- Q2. Is SB involved in this process?

**Operations**

- Process Discovery
- Resource-aware process model
- Run-Time Resource Analysis
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- Resource Reconfiguration
- Process Redesign
- Post-execution Resource Analysis
- Resource Assignment

**Organisational Models**

- Resources, Groups, Relations
- Business Process (Models)
- Policies, Constraints, Regulations

**Research group**

- Professor
- Post-Doc
- PhD Student
- SB
- GH
- ARS
- CDC
- JG
- CC
- AP

**Q1. Who can request a work trip?**

A1. ARS, CDC, JG, CC

**Q2. Is SB involved in this process?**

A2. No
Framework – Operation types

INPUT INFORMATION
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OPERATION TYPE
Post-execution Resource Analysis
Resource Assignment
Process Discovery

Run-Time Resource Analysis
Process Monitoring

Design-Time Resource Analysis
Process Analysis

Resource Allocation
Process Implementation

Resource Reconfiguration
Process Redesign

Shall we change something?
Framework – Operation types

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**Optimization criteria**
Potential performers: ARS, CDC, JG, CC
Actual performer: CDC
Who should perform this instance?
Framework – Operation types

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Optimization criteria
- Potential performers: JM, AP
- Actual performer: AP

Who should perform this instance?
Framework – Operation types

**Execution history**

**Analysis Operations**

Q1. Who can approve a work trip?
Q2. Who can **still** be involved in this process?

A1. ARS, CDC, JG, CC
A2. JM, AP

…
Framework

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ACTIVITY TYPE

PROCESS TYPE

Business Process (Models)
Policies, Constraints, Regulations
Framework – Activity types

Collaborative activities

Individual activities

- Register patient
- Conduct physical examination
- Make documents
- Conduct advanced tests
- Further tests required?
- Perform consultation
- Give brochures and information
- Collaborative activities
- Individual activities
Framework

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**PROCESS TYPE**

**ACTIVITY TYPE**
Framework – Process types

Routine processes

Flexible processes
## Support

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- Creation patterns
- Role mining
- Staff mining
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- Creation patterns
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Project PRAIS

INPUT INFORMATION
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OPERATION TYPE
- Resource Analysis
- Process Monitoring
- Process Implementation
- Process Redesign
- Design-Time Resource Analysis
- Process Analysis
- Resource Assignment
- Post-execution Resource Analysis

PROCESS TYPE
- Resource-aware process model

ACTIVITY TYPE
- Resource Allocation
- Process Design
- Process Monitoring
- Process Redesign
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- Resource Assignment
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Policies, Constraints, Regulations
## Project Objectives

<table>
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<tr>
<th>Objective 1: Resource Assignment</th>
<th>Develop <strong>graphical</strong> resource assignment notations that can be integrated with imperative and declarative process modelling languages</th>
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<td>Objective 2: Resource Allocation</td>
<td>Develop <strong>flexible</strong> mechanisms for resource allocation <strong>integrable</strong> with resource-aware process models as well as with imperative and declarative process execution engines</td>
</tr>
<tr>
<td>Objective 3: Resource Monitoring</td>
<td>Combine <strong>resource mining</strong> techniques with <strong>compliance checking</strong> mechanisms for the redesign of resource-aware process models and develop an approach for <strong>continuous resource (re-)planning</strong></td>
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Objective 1: Resource Assignment

Develop **graphical** resource assignment notations that can be integrated with imperative and declarative process modelling languages.

- Used with BPMN
- Evaluated with experiments: understandability and analysis capabilities
- Re-designed
- Re-evaluated
Develop **flexible** mechanisms for resource allocation **integrable** with resource-aware process models as well as with imperative and declarative process execution engines

- Encoded with Answer Set Programming (ASP)
- Evaluated with an industry scenario (SHAPE project)
- Not connected with any expressive resource assignment language
- Partly integrated into Camunda

Project objectives: starting point

Objetive 3: **Resource Monitoring**

Combine **resource mining** techniques with **compliance checking** mechanisms for the redesign of resource-aware process models and develop an approach for **continuous resource (re-)planning**

- Techniques for mining organisational patterns and team compositions
- Only textual outputs
- Not yet used for compliance checking or process improvement


Project timeline

Project kickoff (01/04/2017)

Allocation integrated with individual assignments (30/11/2017)

Resource assignment techniques validated (31/05/2018)

Resource mining for discovery & improvement supported (31/12/2018)

Individual resource assignment supported (30/06/2017)

Teamwork assignment supported (31/03/2018)

Teamwork allocation supported (31/07/2018)

Continuous (re)planning supported - Project completed (31/03/2019)

http://ai.wu.ac.at/prais-project
11 SEPTEMBER, 2017 - BARCELONA, SPAIN
2ND WORKSHOP ON RESOURCE MANAGEMENT IN BUSINESS PROCESSES
IN CONJUNCTION WITH BPM 2017

TIME LEFT FOR PAPER SUBMISSION:
23 1 47 41
DAYS HOURS MINUTES SECONDS
SUBMIT NOW

Deadline: May 26, 2017
Notification: June 26, 2017
Camera Ready: July 7, 2017
Workshop: September 11, 2017
Conclusions

- Framework for moving from PAIS to PRAIS
- PRAIS project to bridge the gap

---

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- Post-execution Resource Analysis
- Resource Assignment
- Process Discovery
- Resource-aware process model

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