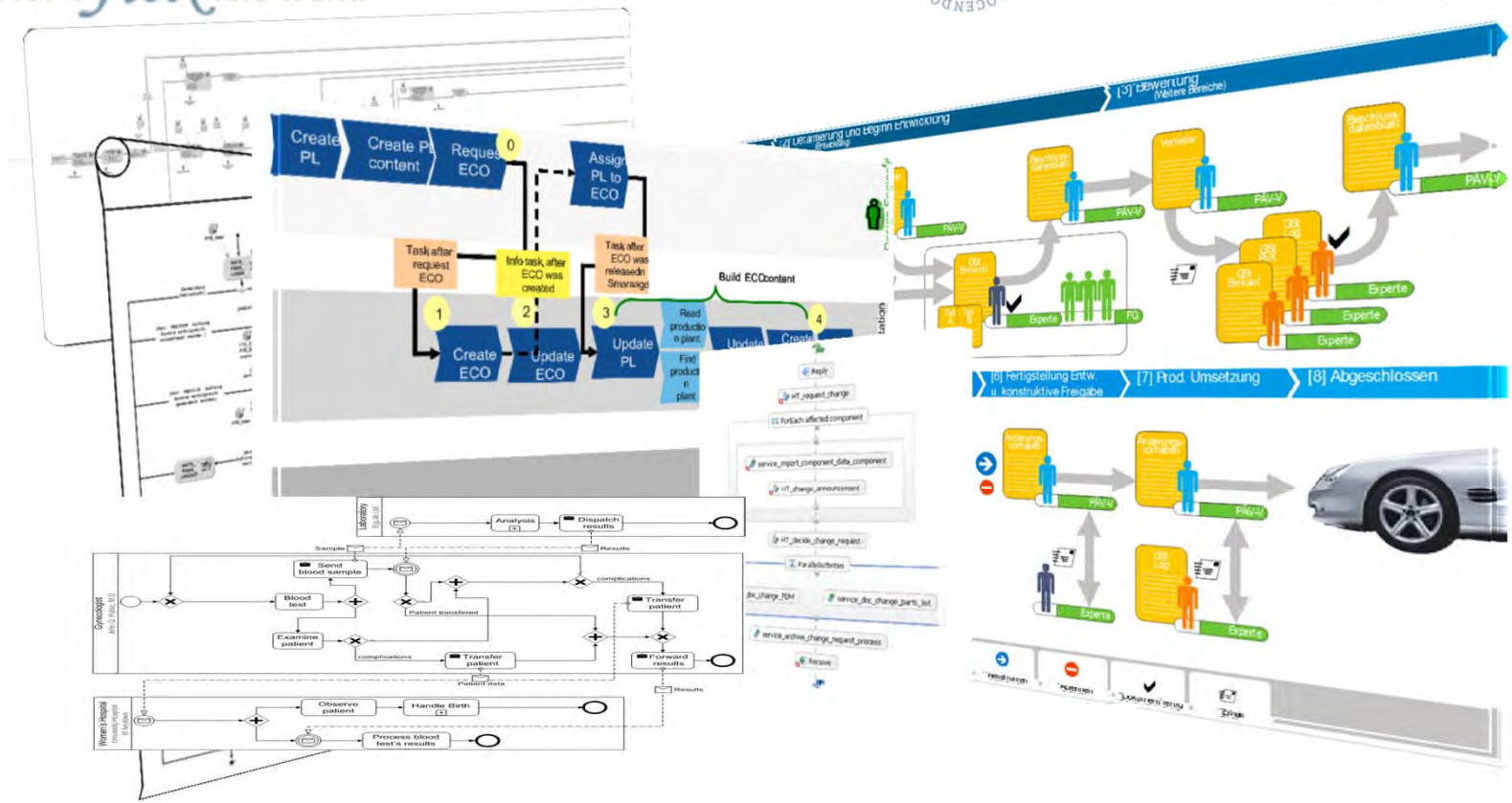
DBIS EXPERIENCE
processes for a flexible world

ulm university universität ulm



A Decade of Research on a Next Generation Process Management Technology

Challenges, Projects, Achievements

Manfred Reichert

Process-Aware Information Systems

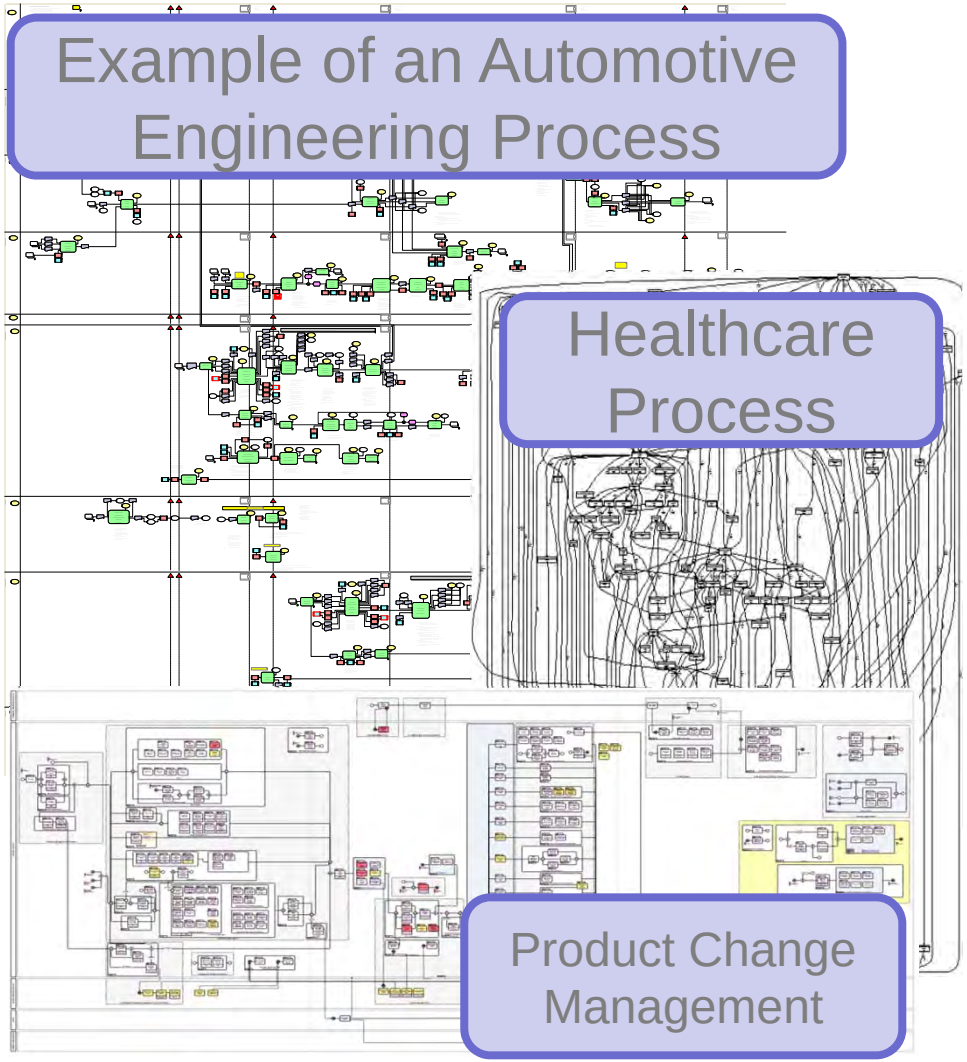
A Decade of Research on Flexible Process-Aware Information Systems and its Achievements

A Decade of Research on Large Processes in the Automotive Industry and Enabling Technologies

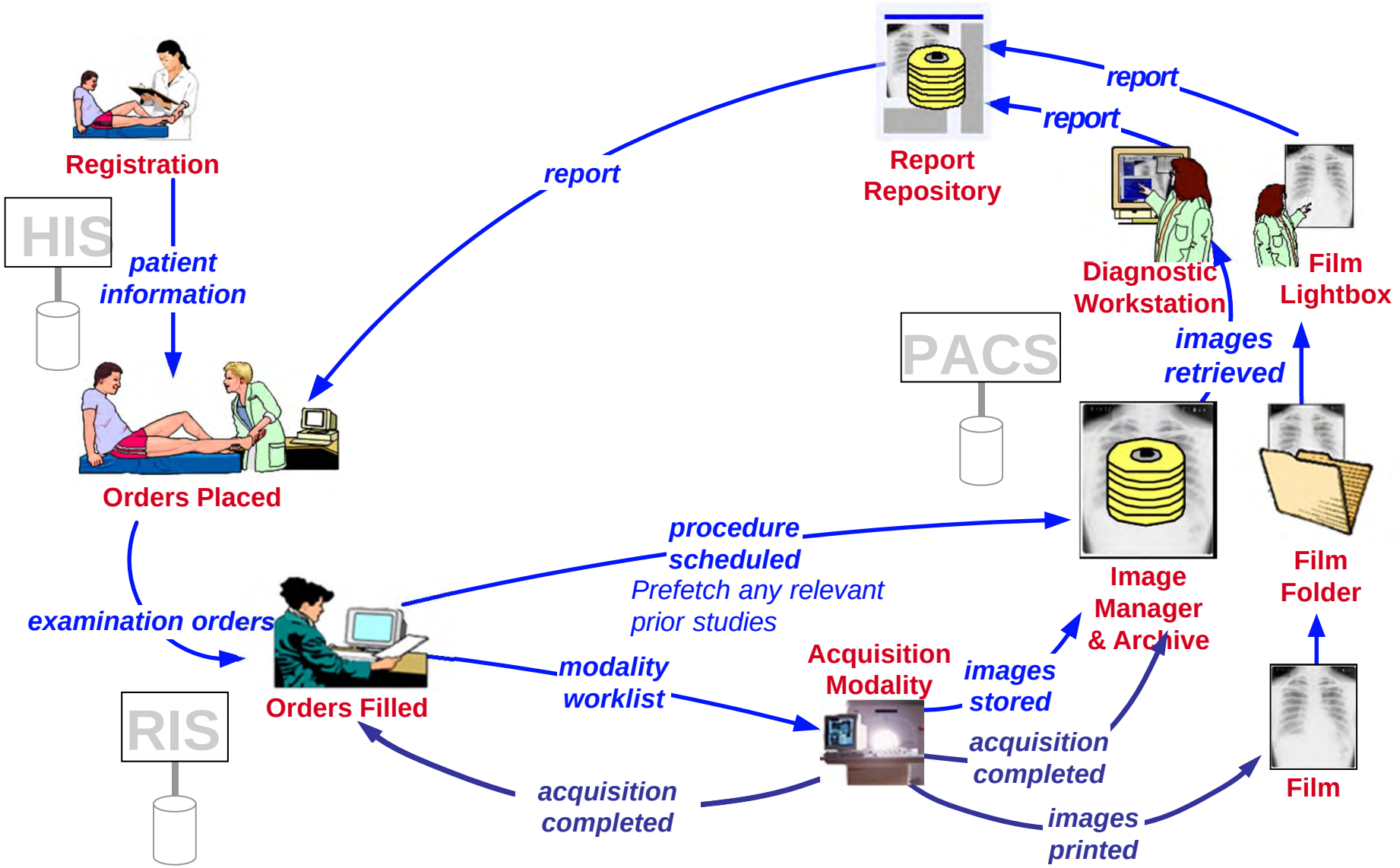
Other Running Projects

Process-Aware Information Systems

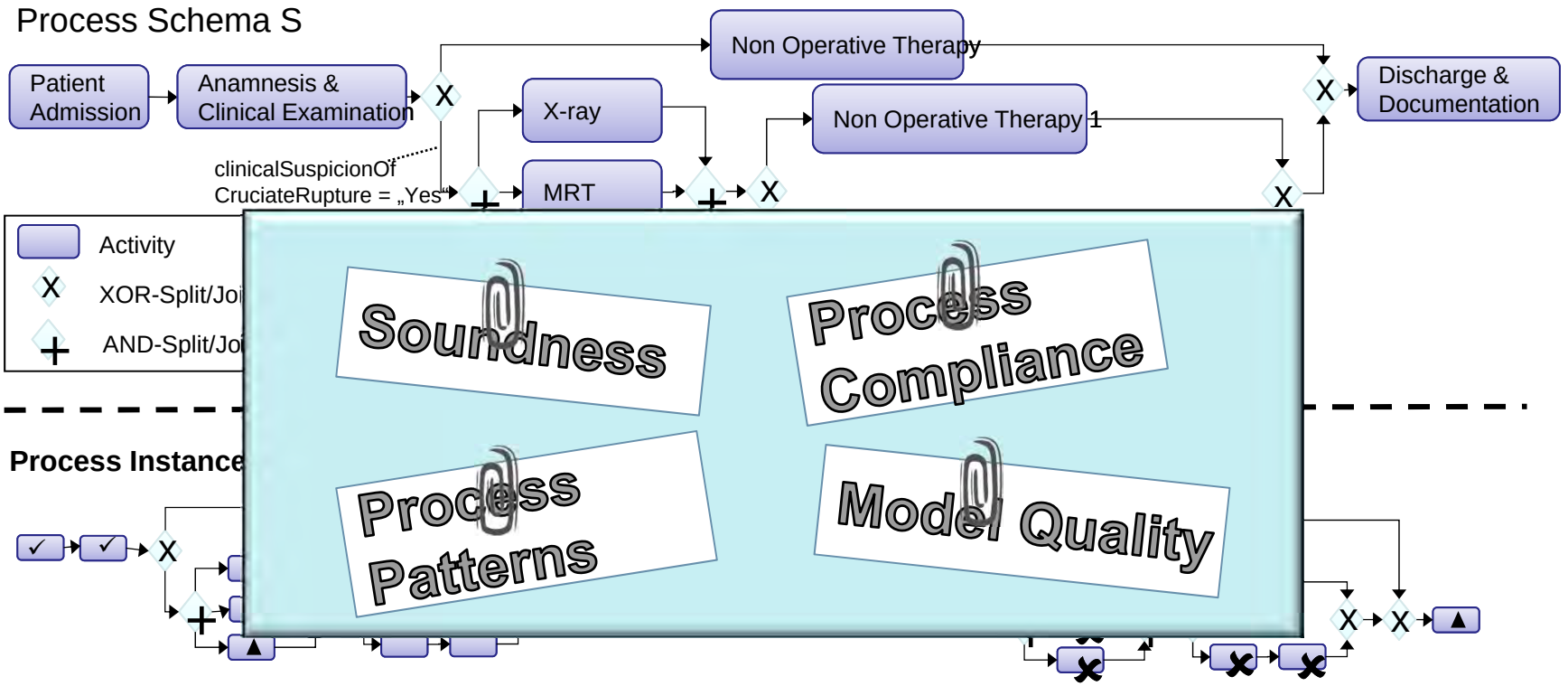
- Processes can become very large and complex
- Thousands of concurrently executed process instances
- High need for flexibility in all phases of the process lifecycle
- Support for application integration is fundamental
- Correctness and robustness are crucial features of any process-aware information systems
- Integrated support of all phases of the process lifecycle required



Process-Aware Information Systems



Process-Aware Information Systems: Buildtime

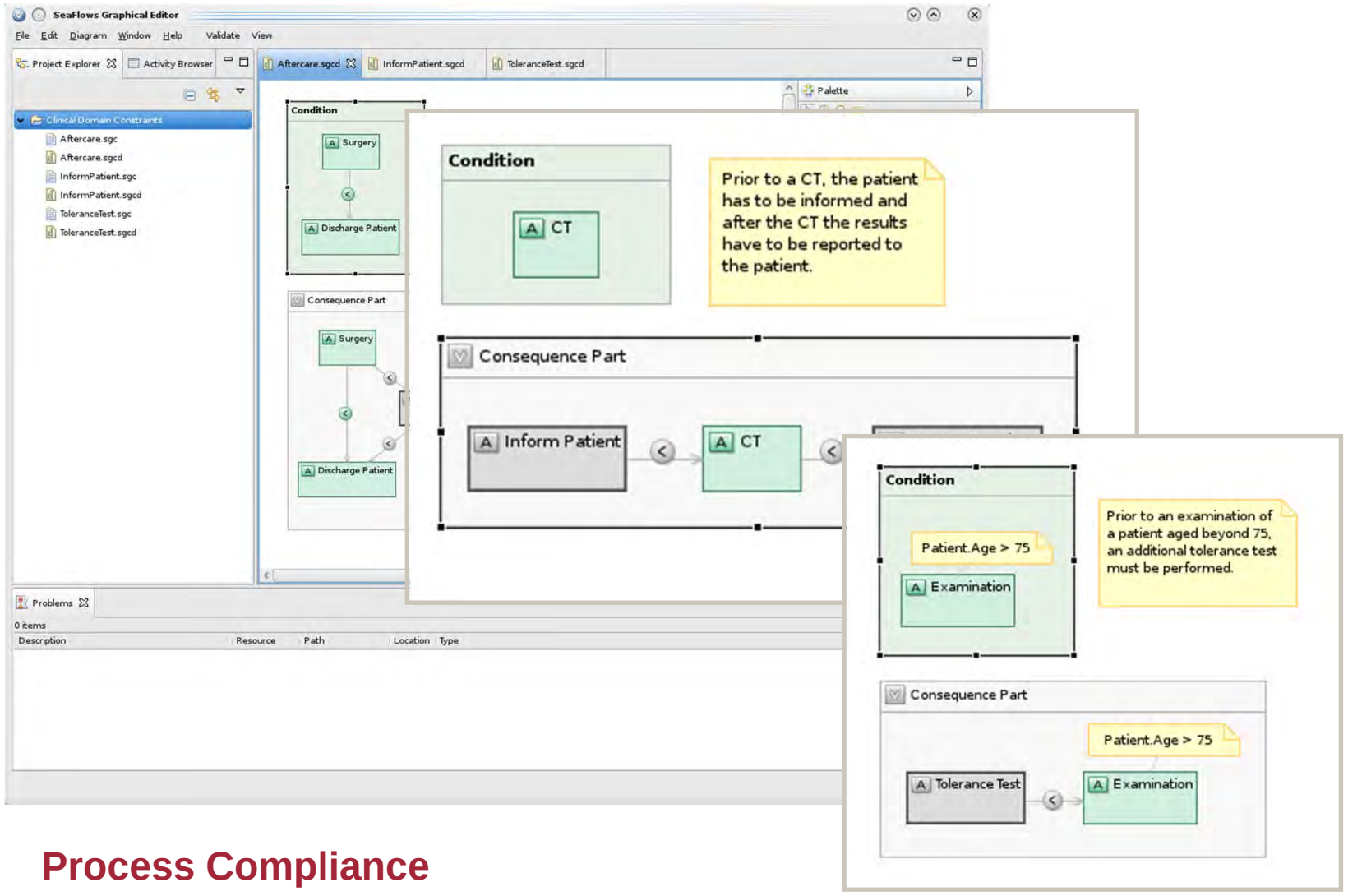


Execution Trace:
σ_1 = < „Patient Admission“, „Anamnesis & Clinical Examination“, „X-ray“>

Execution Trace:
σ_2 = < „Patient Admission“, „Anamnesis & Clinical Examination“, „Non Operative Therapy“>

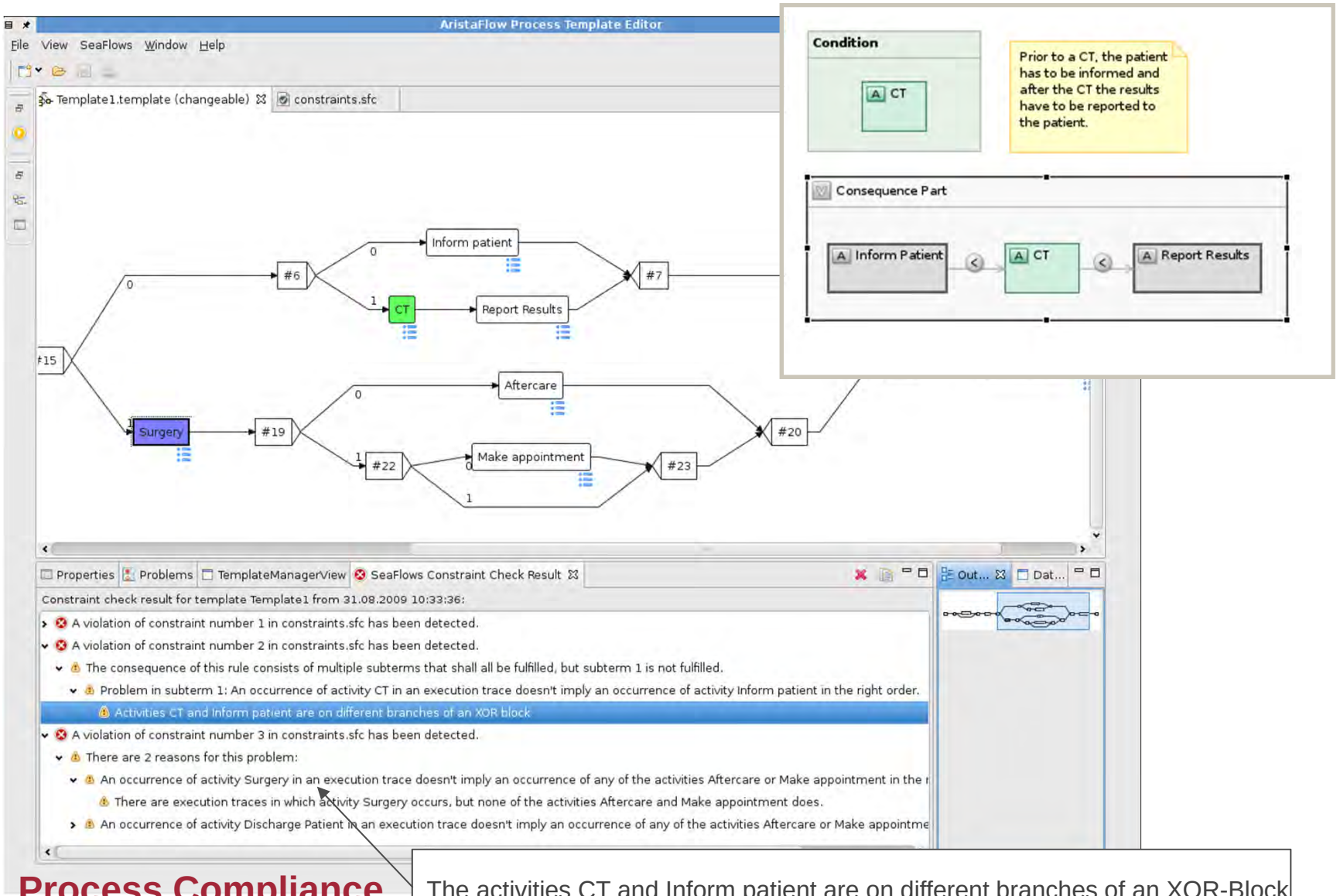
Activity States: ▲ Activated ✓ Completed ✘ Skipped

Process-Aware Information Systems: Buildtime



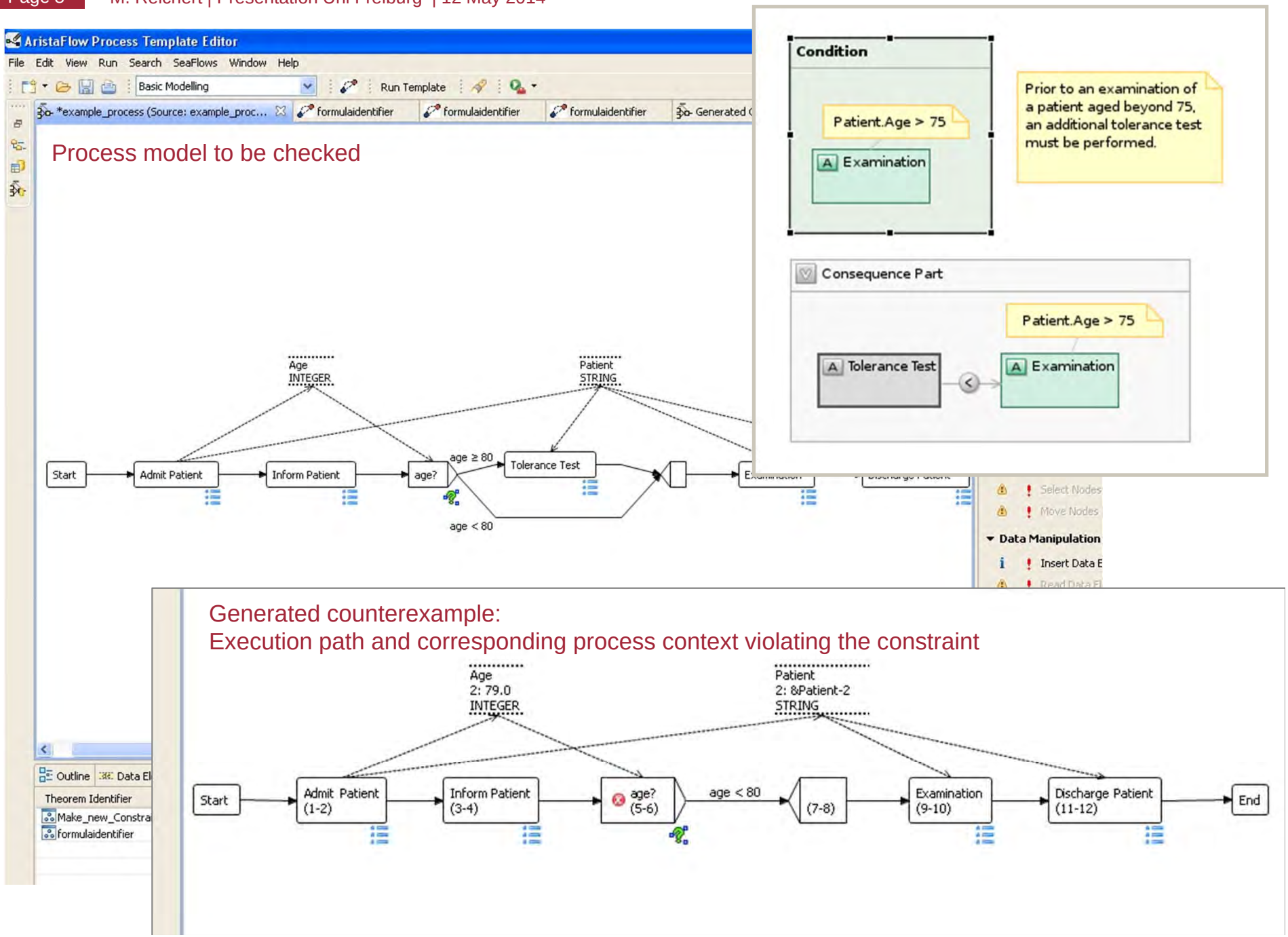
Process Compliance

Process-Aware Information Systems: Buildtime

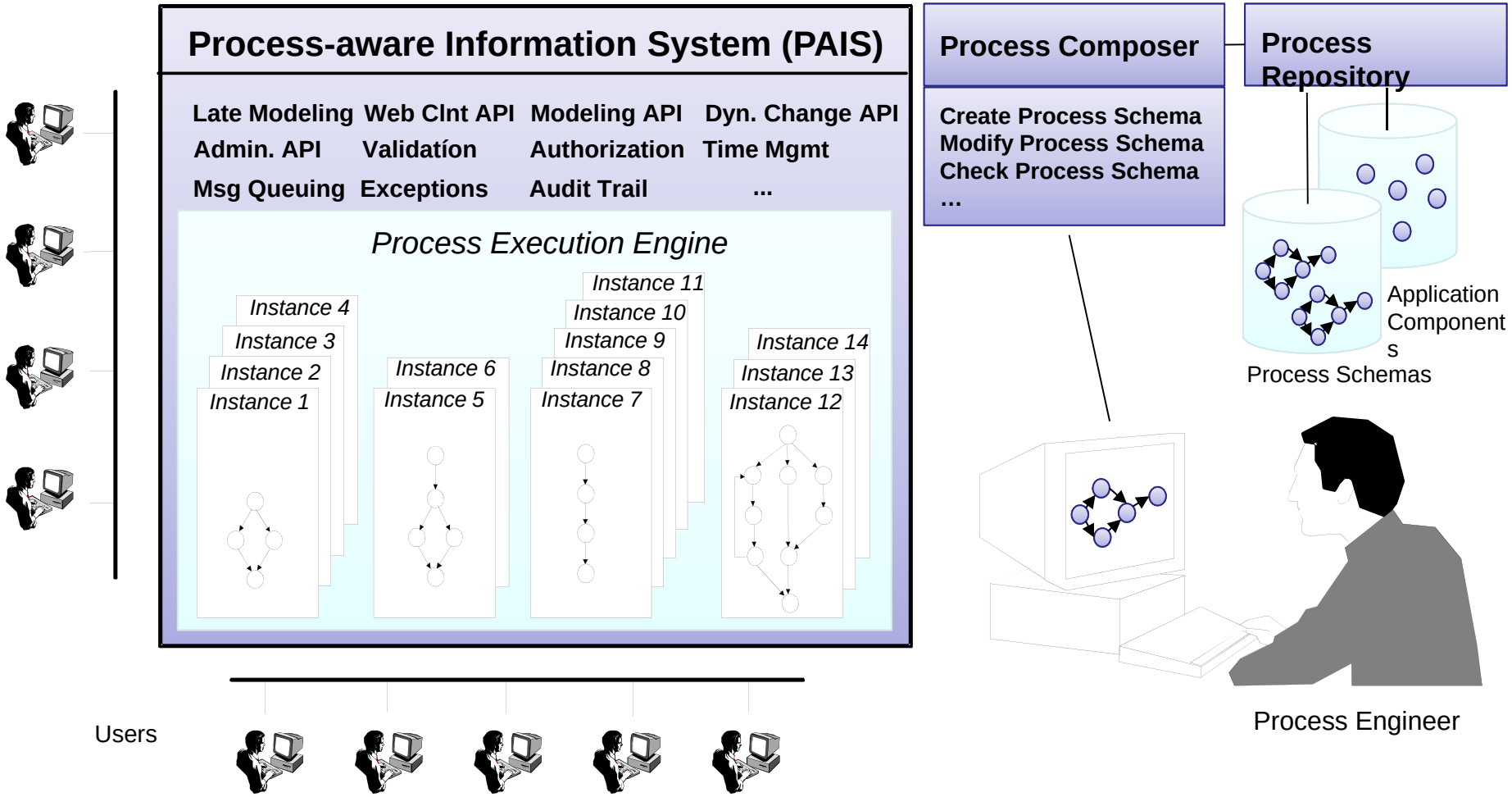


Process Compliance

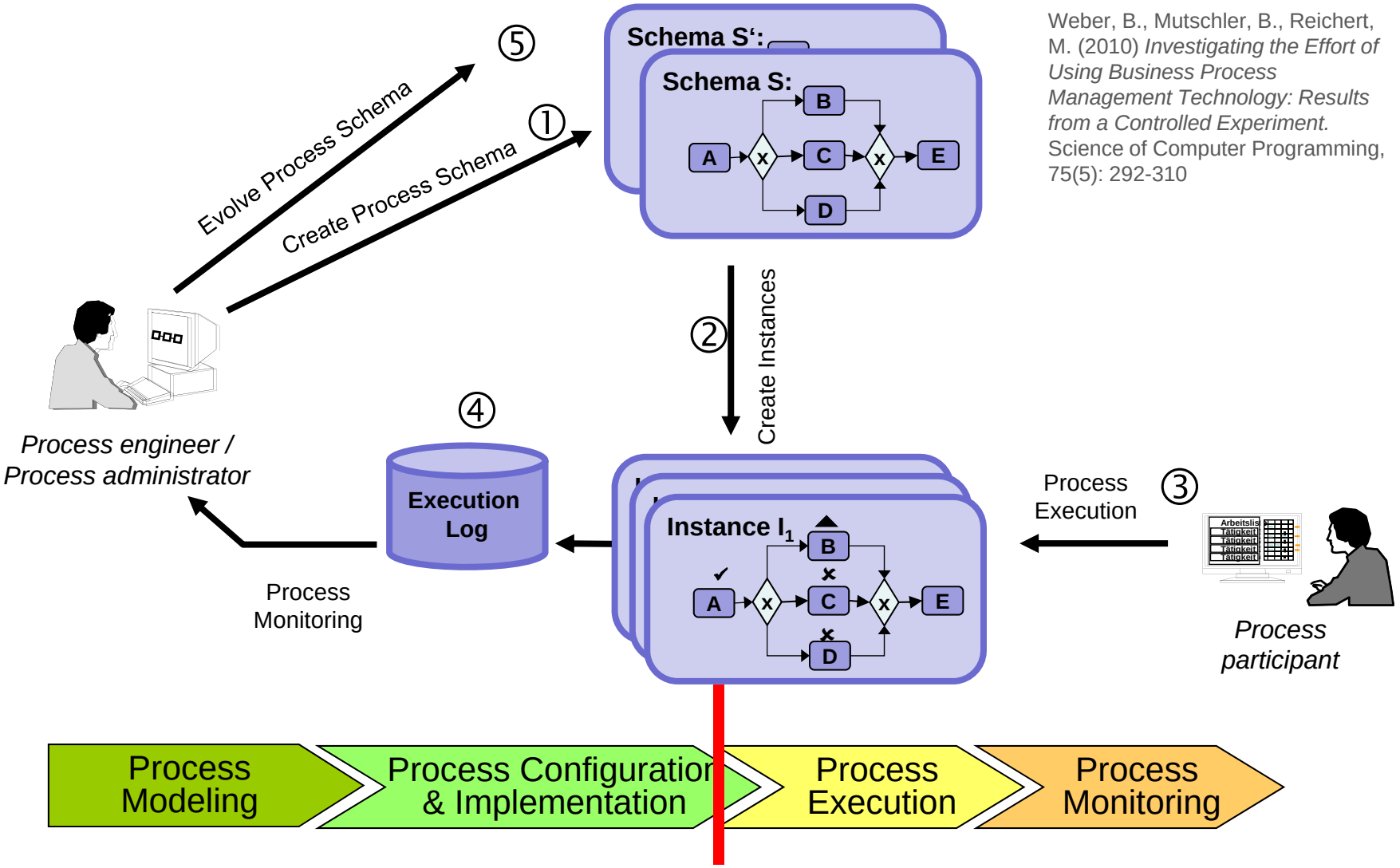
The activities CT and Inform patient are on different branches of an XOR-Block


AristaFlow Process Template Editor
File Edit View Run Search SeaFlows Window Help
Basic Modelling
Run Template
*example_process (Source: example_proc...
formulaidentifier
formulaidentifier
formulaidentifier
Process model to be checked
Condition
Patient.Age > 75
Examination
Prior to an examination of a patient aged beyond 75, an additional tolerance test must be performed.
Consequence Part
Patient.Age > 75
Tolerance Test
Examination
Age
INTEGER
Patient
STRING
Start
Admit Patient
Inform Patient
age?
age ≥ 80
Tolerance Test
age < 80
Select Nodes
Move Nodes
Data Manipulation
Insert Data E
Outline
Data El
Theorem Identifier
Make_new_Constra
formulaidentifier
Generated counterexample:
Execution path and corresponding process context violating the constraint
Age
2: 79.0
INTEGER
Patient
2: &Patient-2
STRING
Start
Admit Patient
(1-2)
Inform Patient
(3-4)
age?
(5-6)
age < 80
(7-8)
Examination
(9-10)
Discharge Patient
(11-12)
End

Process-Aware Information Systems: Runtime



Process-Aware Information Systems:
Traditional Process Lifecycle



Weber, B., Mutschler, B., Reichert, M. (2010) *Investigating the Effort of Using Business Process Management Technology: Results from a Controlled Experiment.* Science of Computer Programming, 75(5): 292-310

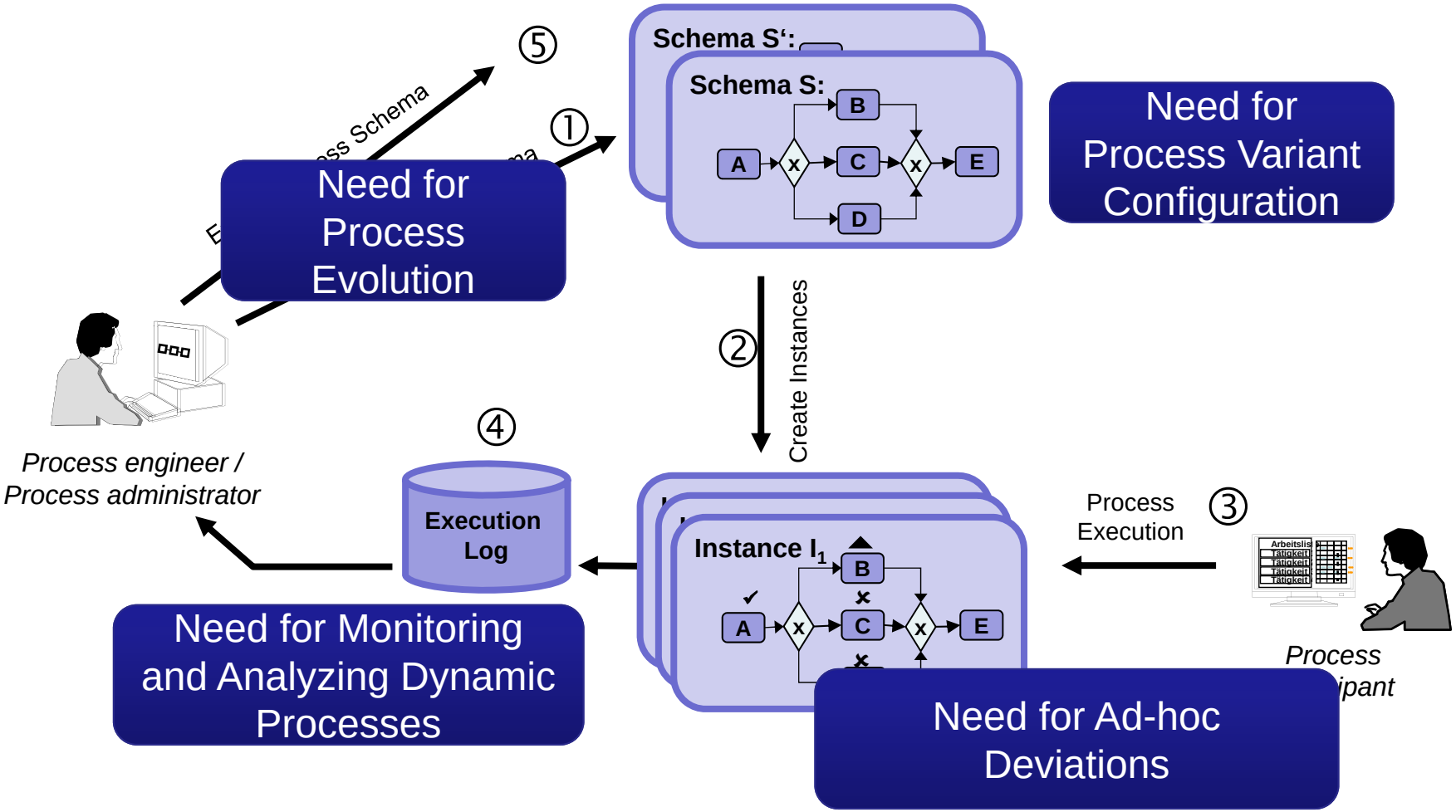
Process-Aware Information Systems

A Decade of Research on Flexible Process-Aware Information Systems and its Achievements

A Decade of Research on Large Processes in the Automotive Industry and Enabling Technologies

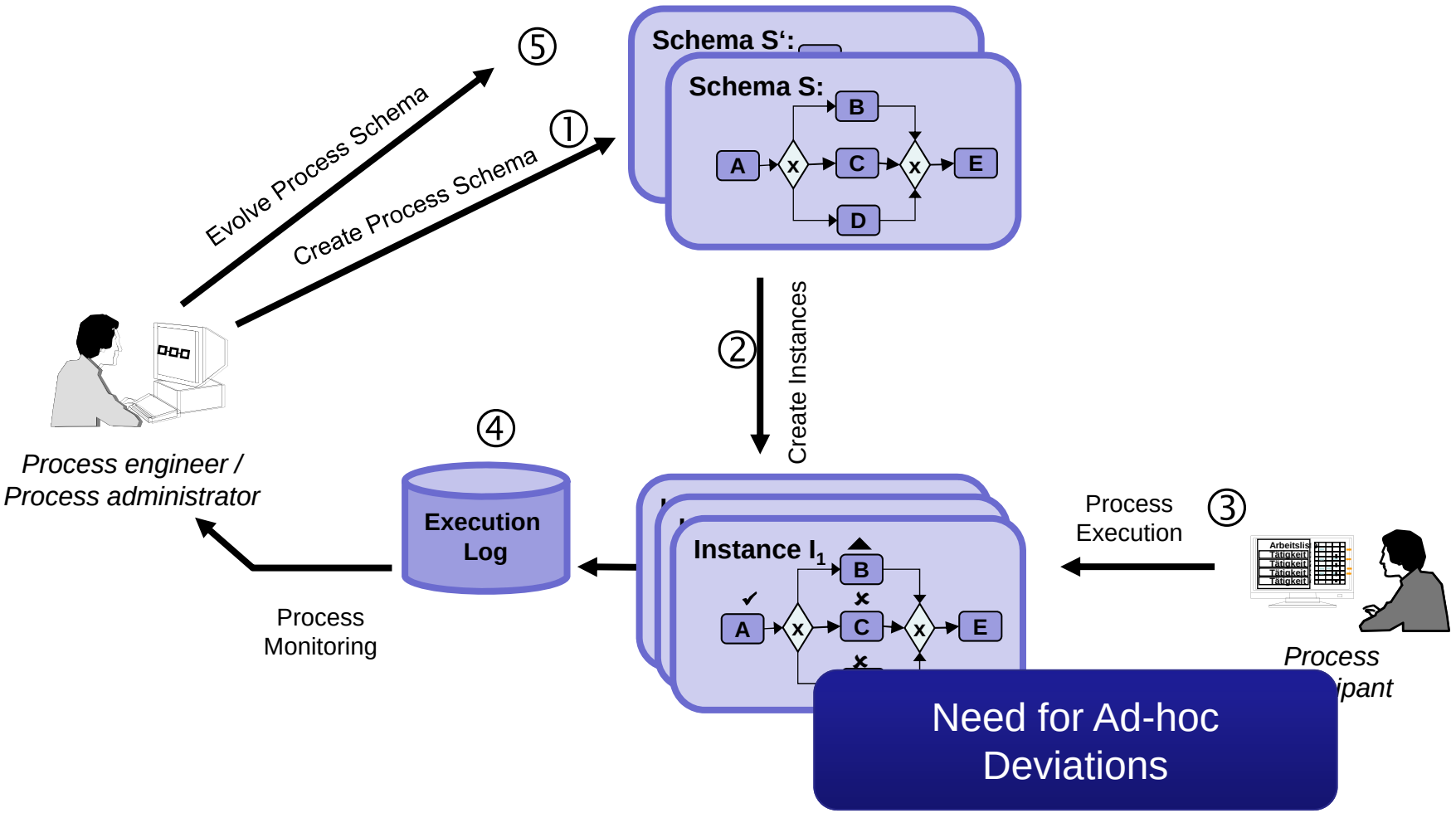
Other Running Projects

Enabling Process Flexibility: Challenges

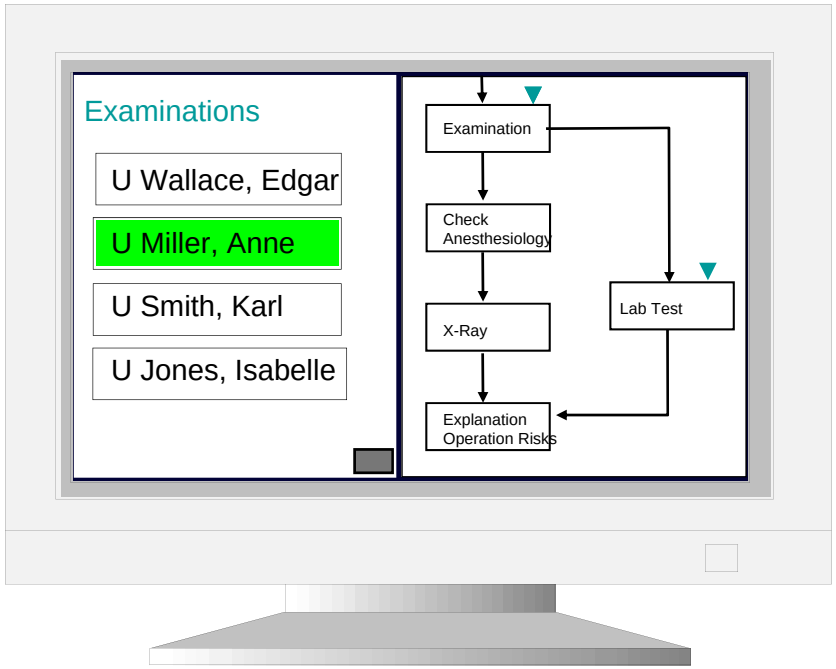


Reichert, M., Rinderle-Ma, S., Dadam, P. (2010) *Flexibility in Process-aware Information Systems.* LNCS Transactions on Petri Nets and Other Models of Concurrency, Vol. 2, pp. 115-135

Enabling Process Flexibility: Challenges



ADEPT: Ad-hoc Changes



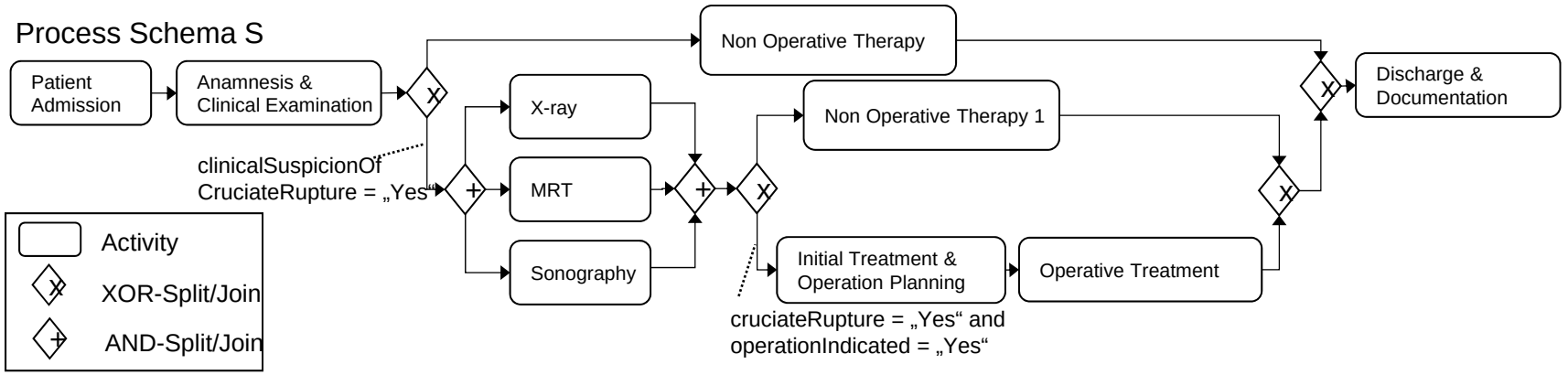
The Users' View

Reichert, Manfred and Dadam, Peter (1998) *ADEPTflex-Supporting Dynamic Changes of Workflows Without Losing Control.* Journal of Intelligent Information Systems, Special Issue on Workflow Management Systems, 10(2): 93-129, Kluwer

ADEPT: Ad-hoc Changes

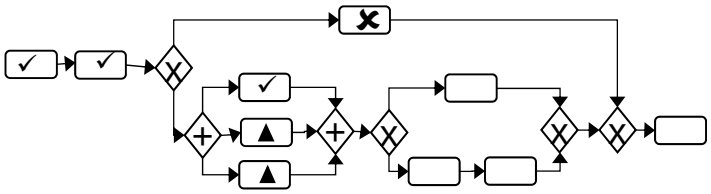
System's View

Process Type Level



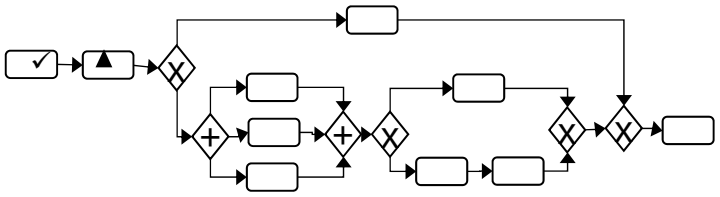
Process Instance Level

Process Instance I1



Execution Trace:
σ_1 = < „Patient Admission“, „Anamnesis & Clinical Examination“, „X-ray“>

Process Instance I2



Execution Trace:
σ_2 = < „Patient Admission“>

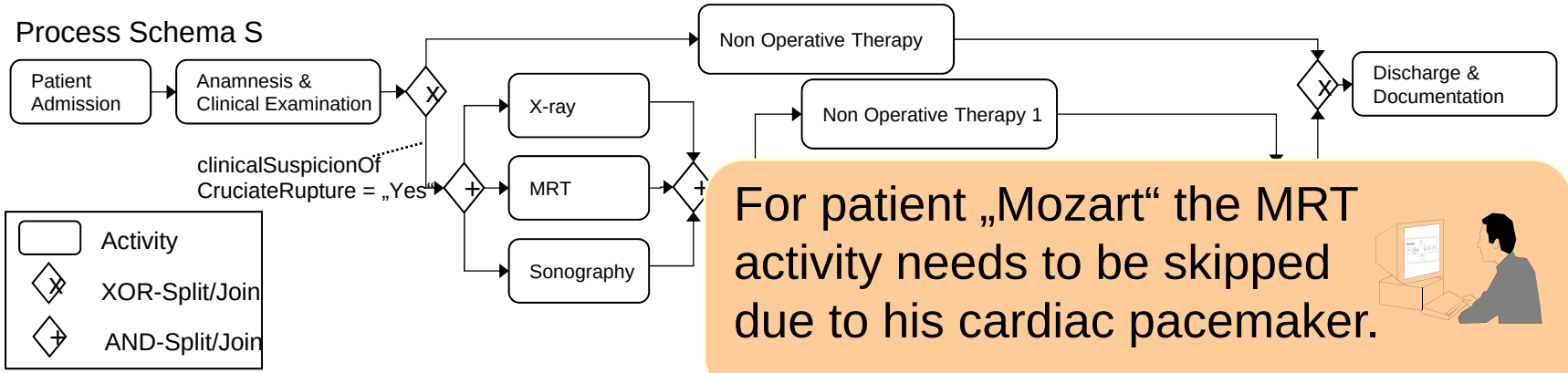
Reichert, Manfred and Dadam, Peter (1998) *ADEPTflex-Supporting Dynamic Changes of Workflows Without Losing Control.* Journal of Intelligent Information Systems, Special Issue on Workflow Management Systems, Vol. 10, No. 2, pp. 93-129

ADEPT: Ad-hoc Changes

System's View

Process Type Level

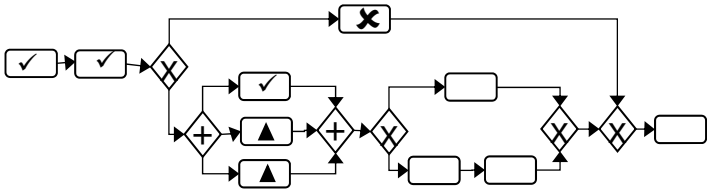
Process Schema S



For patient „Mozart" the MRT activity needs to be skipped due to his cardiac pacemaker.

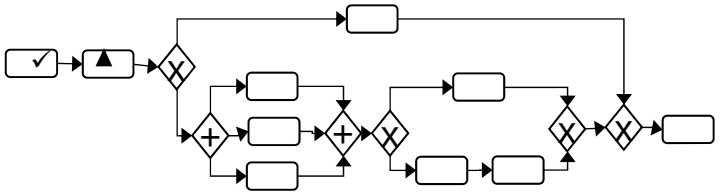
Process Instance Level

Process Instance I1



Execution Trace:
σ_1 = < „Patient Admission", „Anamnesis & Clinical Examination", „X-ray">

Process Instance I2



Execution Trace:
σ_2 = < „Patient Admission">

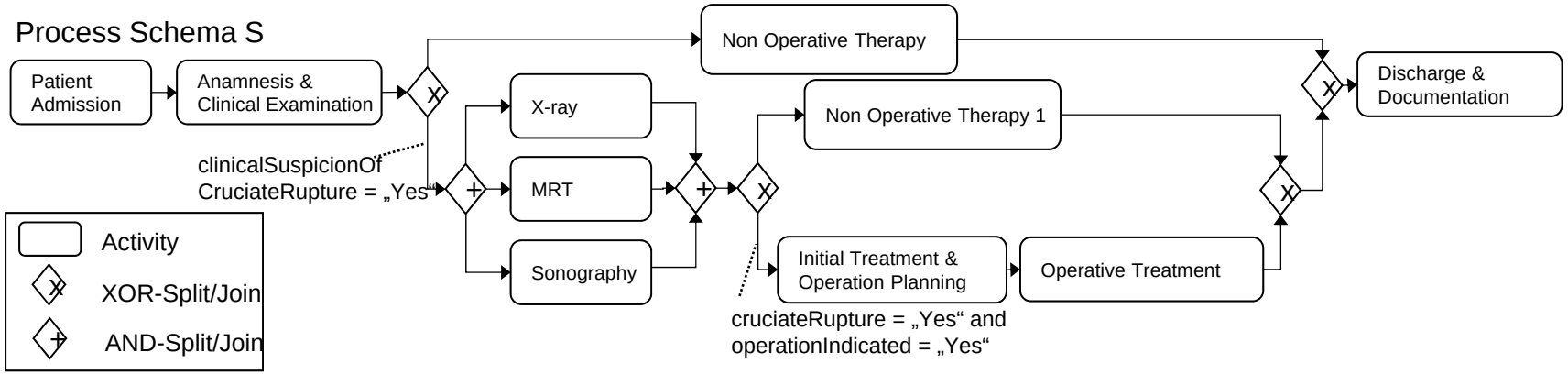
Reichert, Manfred and Dadam, Peter (1998) *ADEPTflex-Supporting Dynamic Changes of Workflows Without Losing Control.* Journal of Intelligent Information Systems, Special Issue on Workflow Management Systems, Vol. 10, No. 2, pp. 93-129

ADEPT: Ad-hoc Changes

System's View

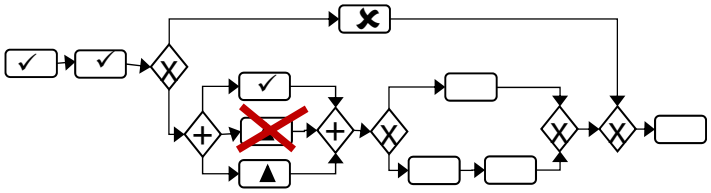
Process Type Level

Process Schema S



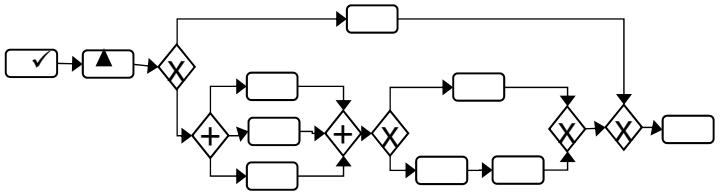
Process Instance Level

Process Instance I1



Execution Trace:
σ_1 = < „Patient Admission“, „Anamnesis & Clinical Examination“, „X-ray“>

Process Instance I2



Execution Trace:
σ_2 = < „Patient Admission“>

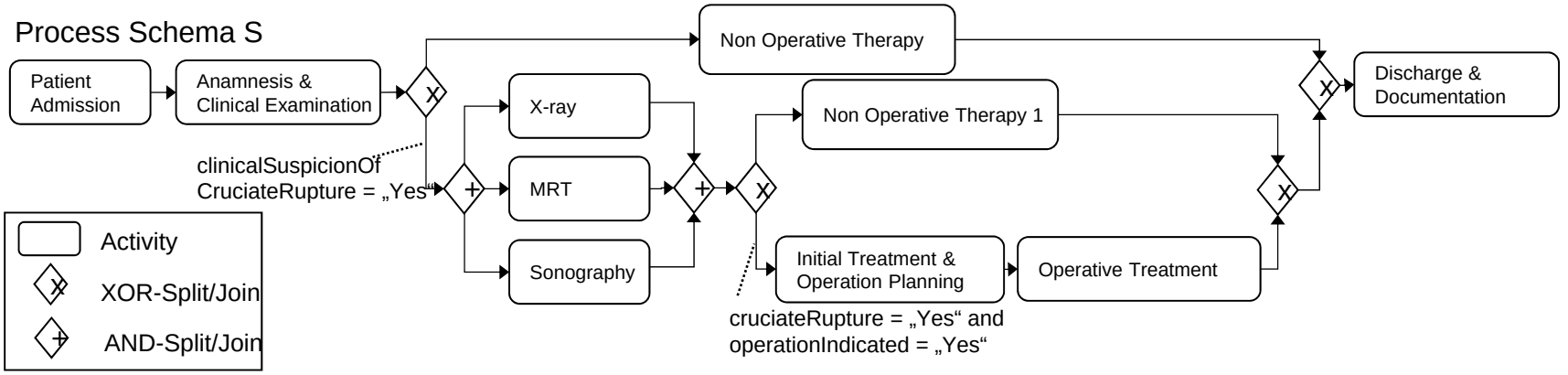
Reichert, Manfred and Dadam, Peter (1998) *ADEPTflex-Supporting Dynamic Changes of Workflows Without Losing Control.* Journal of Intelligent Information Systems, Special Issue on Workflow Management Systems, Vol. 10, No. 2, pp. 93-129

ADEPT: Ad-hoc Changes

Change Correctness

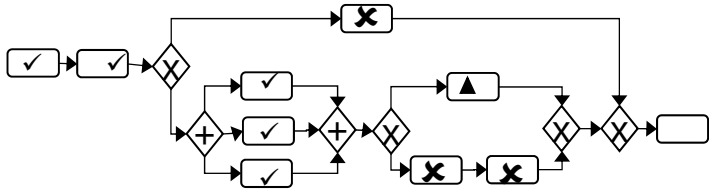
Process Type Level

Process Schema S



Process Instance Level

Process Instance I3

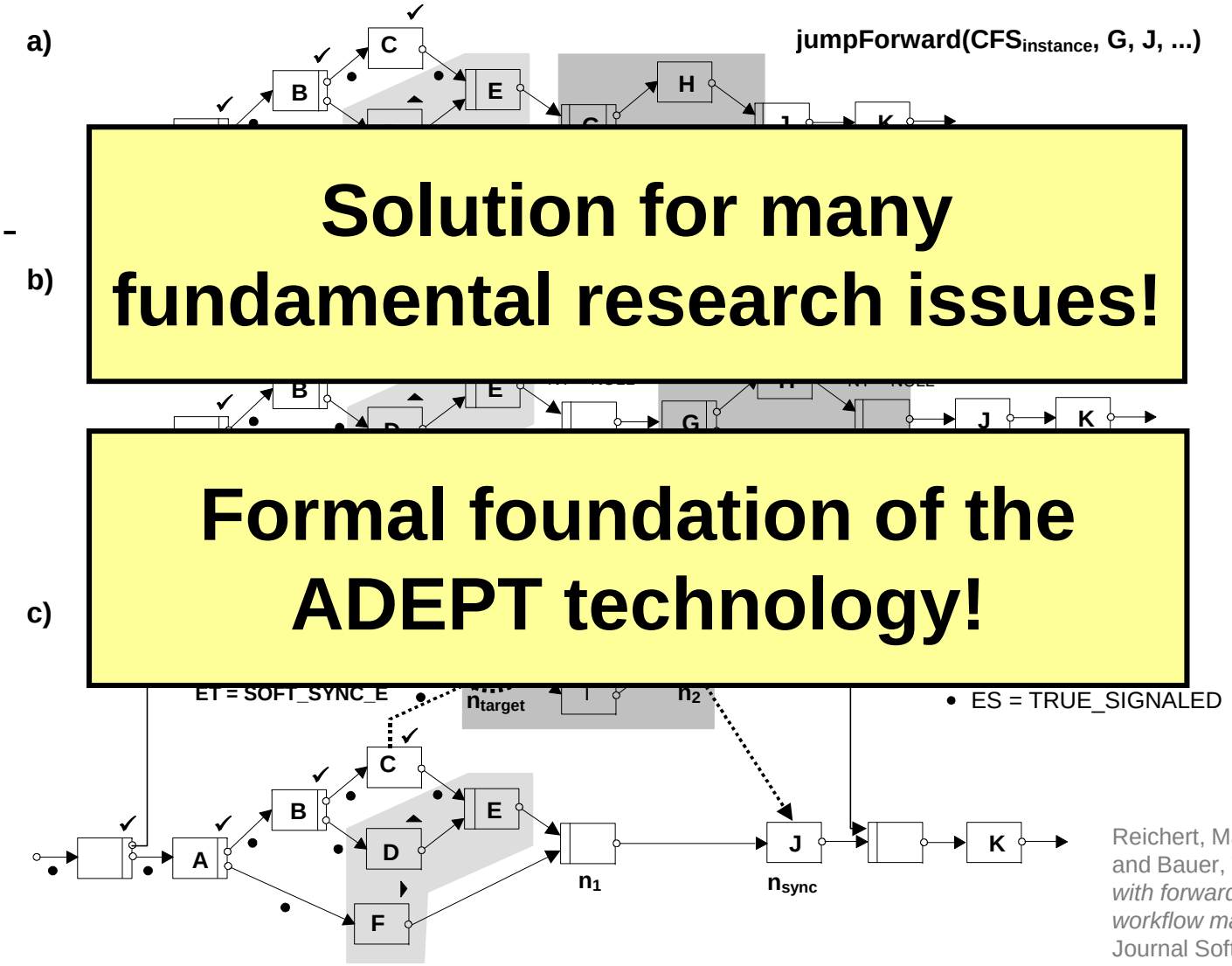


Execution Trace:
σ_3 = < „Patient Admission“, „Anamnesis & Clinical Examination“, „MRT“, „X-ray“, „Sonography“>

I3 is not compliant with change Delete (I3, MRT)

Rinderle, Stefanie and Reichert, Manfred (2004) *Correctness Criteria for Dynamic Changes in Workflow Systems: A Survey.* Data & Knowledge Engineering, Vol. 50, No. 1, pp. 9-34.

ADEPT: Ad-hoc Changes



Solution for many fundamental research issues!

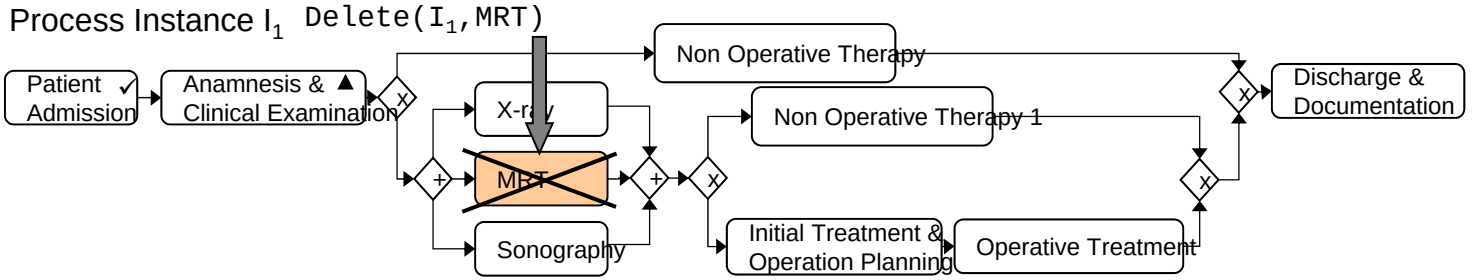
Formal foundation of the ADEPT technology!

Reichert, Manfred and Dadam, Peter and Bauer, Thomas (2003) *Dealing with forward and backward jumps in workflow management systems.* Int'l Journal Software and Systems Modeling (SOSYM), 2(1): 37-58

ADEPT: Ad-hoc Changes

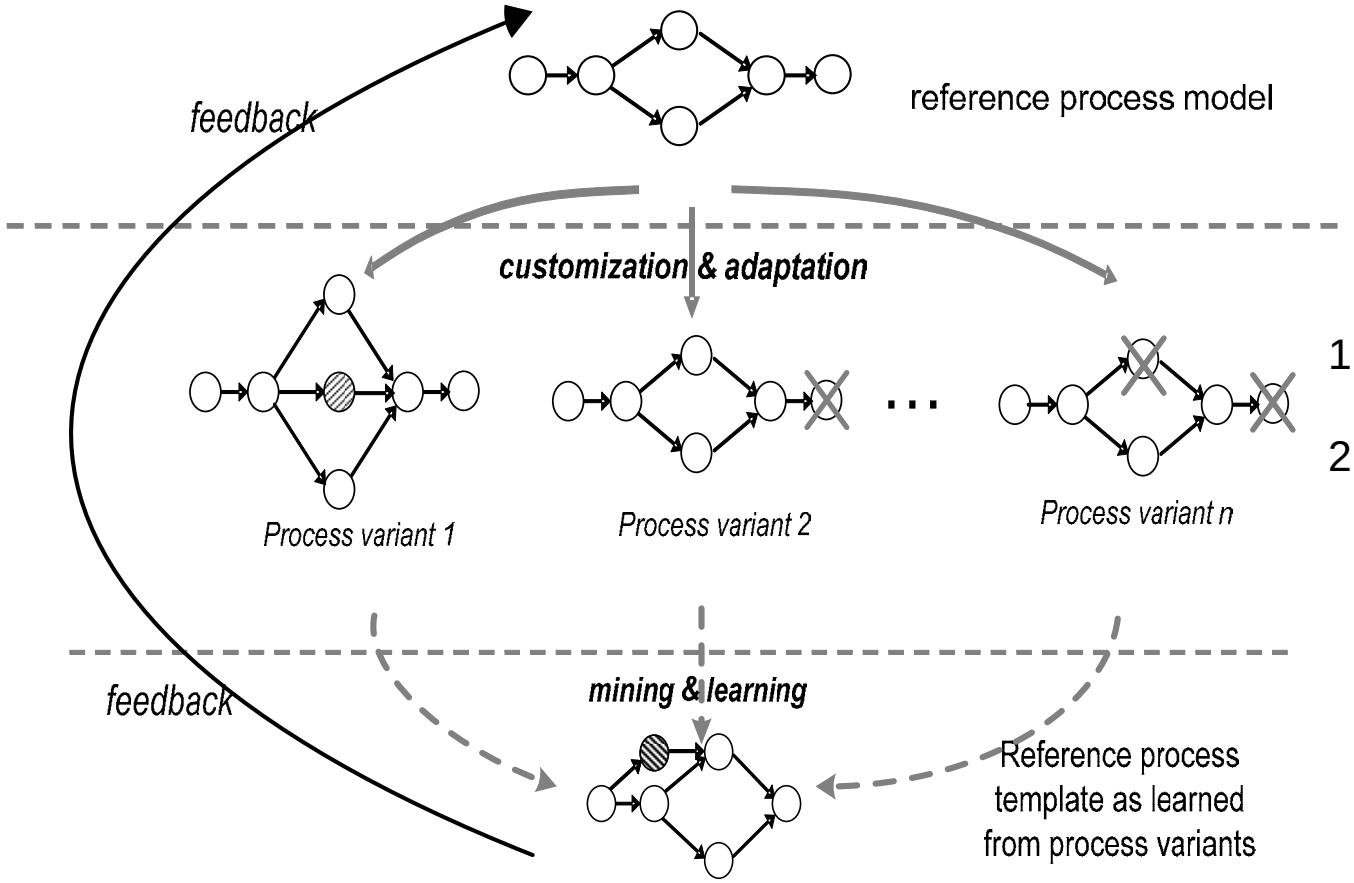
- Annotating changes with information about the reasons for the change
- Retrieval of similar past changes based on context information
- Reuse of changes through PAIS

User Assistance



Weber, Barbara and Reichert, Manfred and Wild, Werner and Rinderle-Ma, Stefanie (2009) *Providing Integrated Life Cycle Support in Process-Aware Information Systems.* Int'l Journal of Cooperative Information Systems, Vol. 18, No. 1, pp. 115-165

ADEPT: Change Mining and Learning

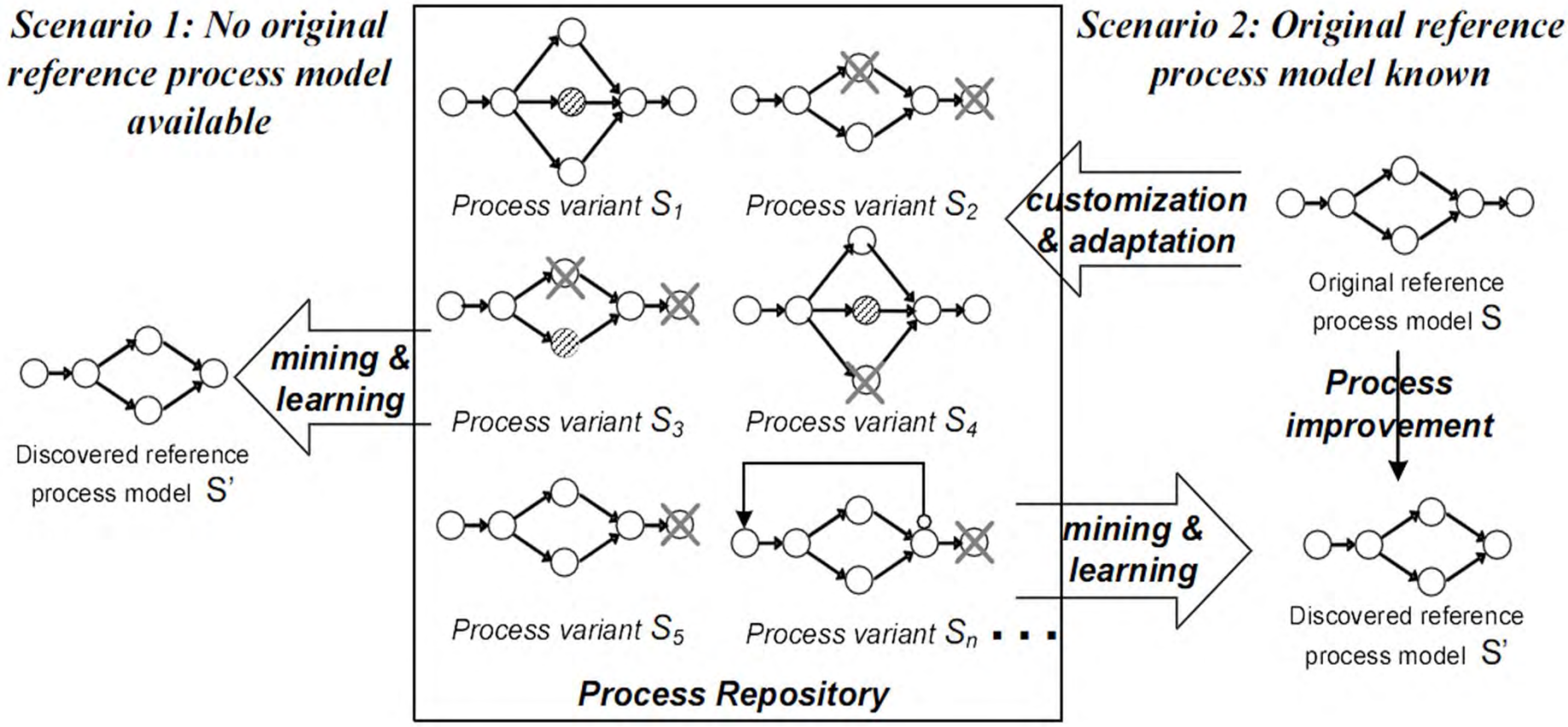


1. Changes are rather costly
2. Variants are difficult to maintain

Derive a new reference process model from the the variants such that:
Less adaptations are needed in future!

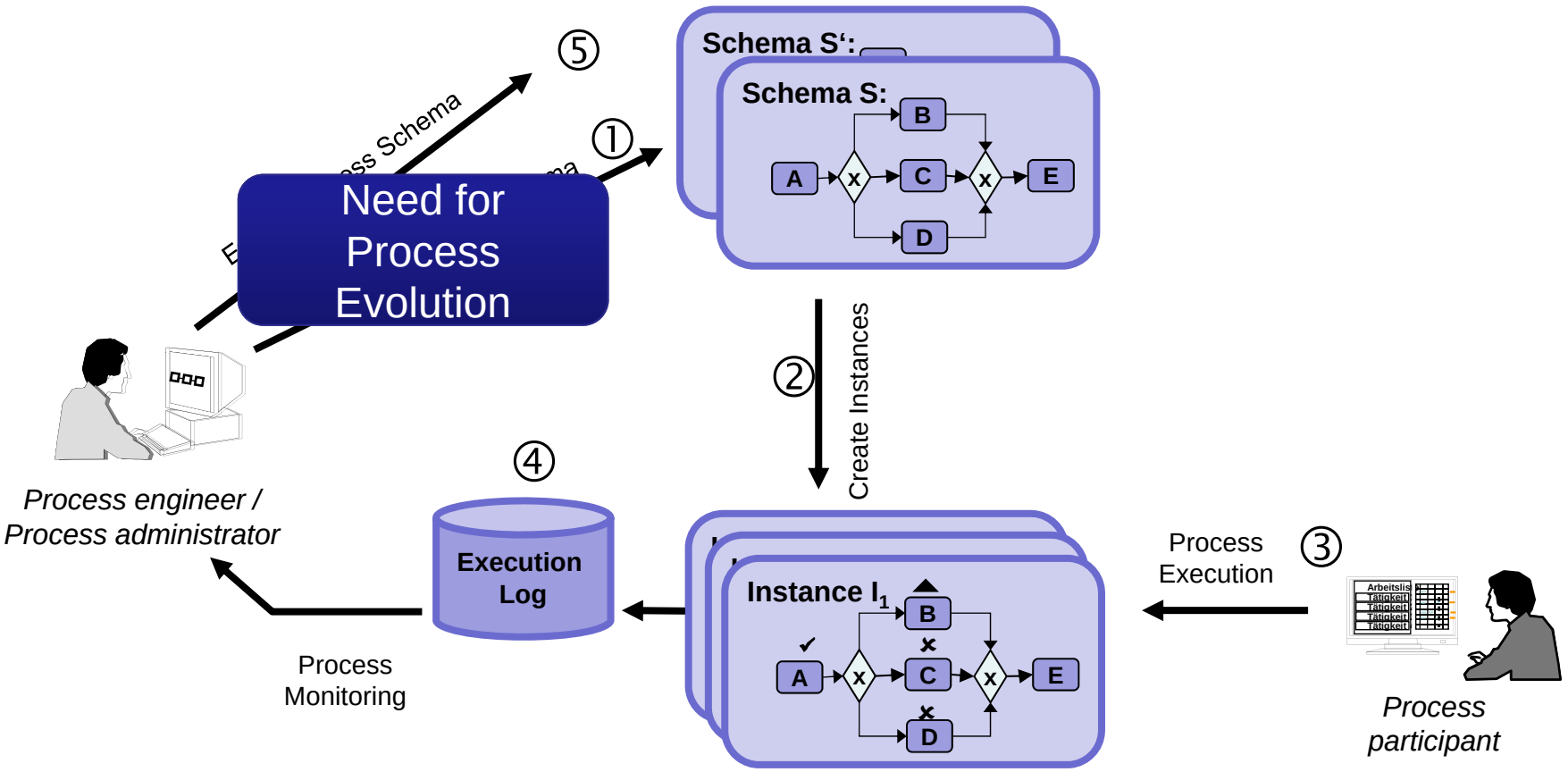
Li, C., Reichert, M., Wombacher, A. (2011) *Mining Business Process Variants: Challenges, Scenarios, Algorithms.* Data & Knowledge Engineering, Vol. 70, No. 5, pp. 409-434,

Process Variants Mining: Supported Scenarios

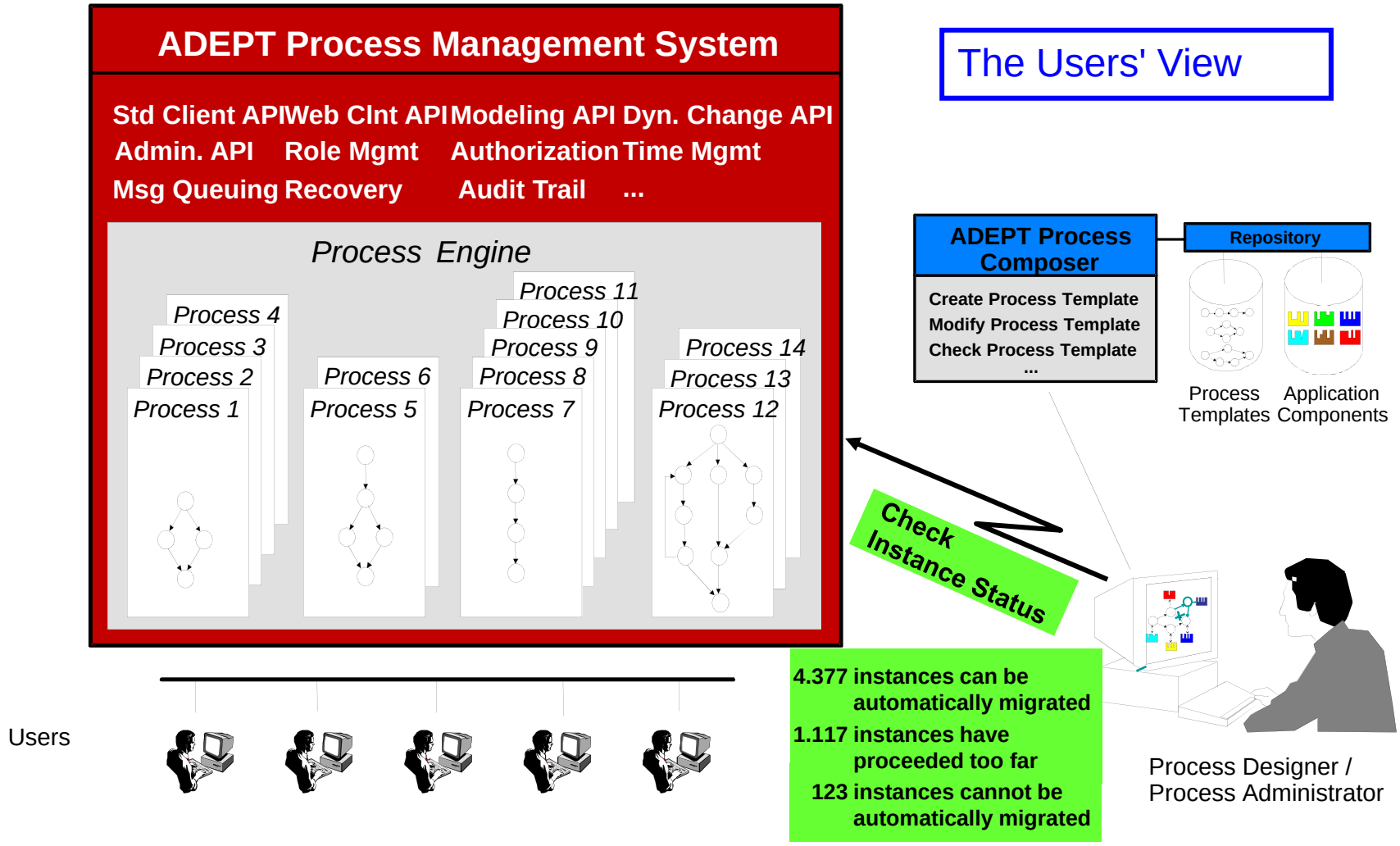


Goal: *Discover a (new) reference process model which requires less configuration efforts*

ADEPT: Process Schema Evolution

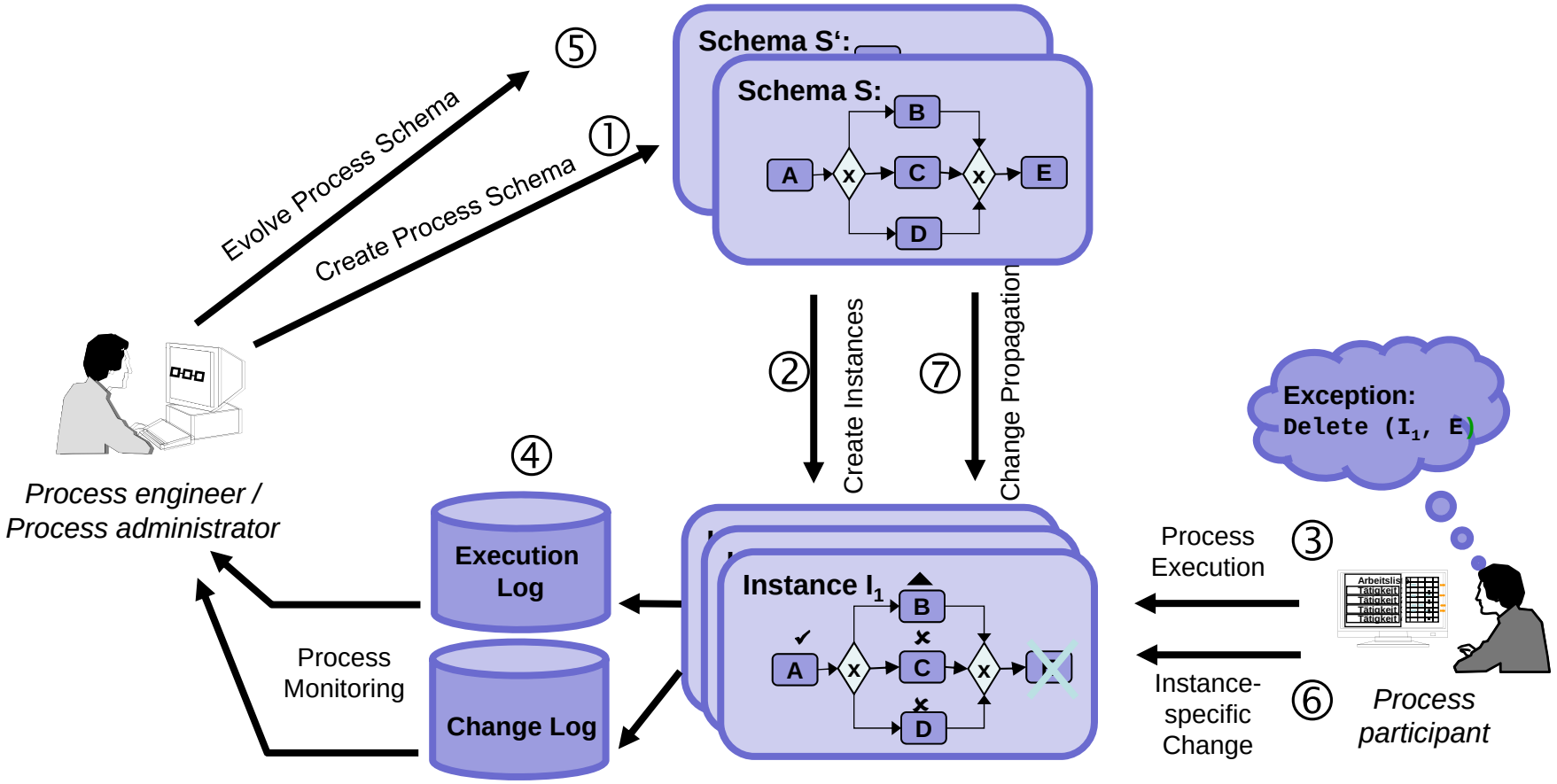


ADEPT: Process Schema Evolution



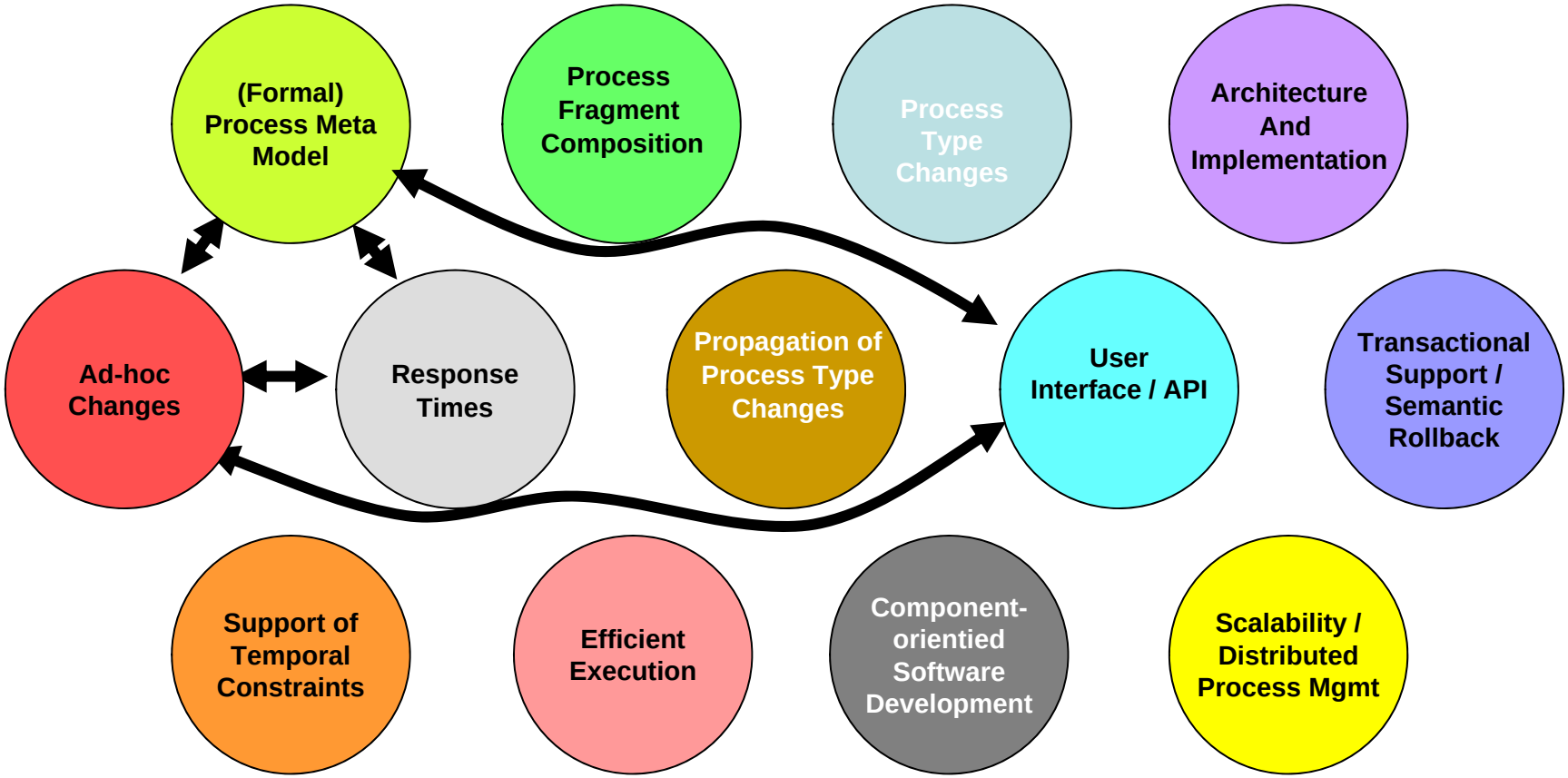
Rinderle, S., Reichert, M., Dadam, Peter (2004) *Flexible Support of Team Processes by Adaptive Workflow Systems.* Distributed and Parallel Databases, 16(1): 91-116

ADEPT: Extended Process Lifecycle Support



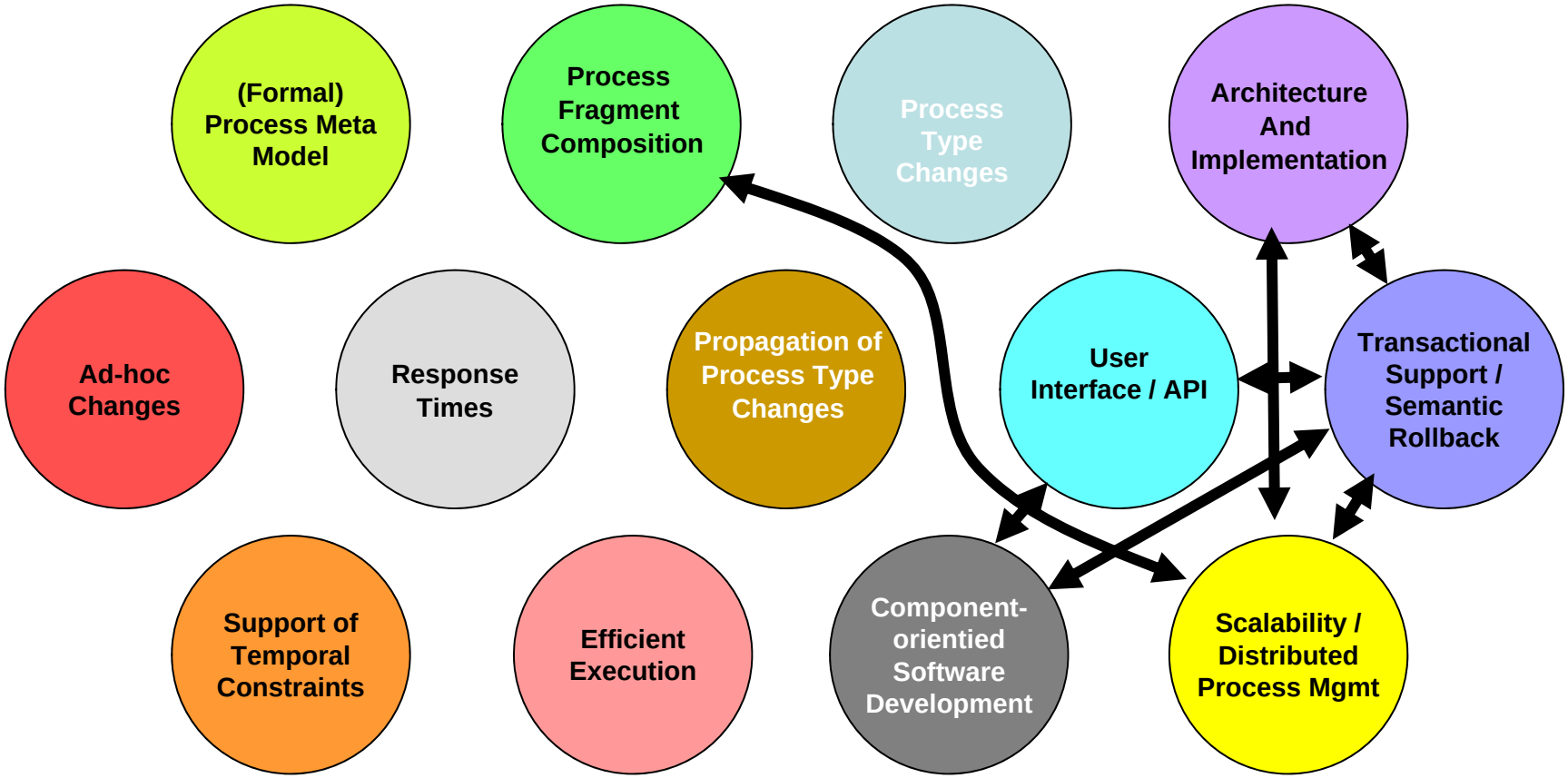
Weber, B., Sadiq, S., Reichert, M. (2009) *Beyond Rigidity - Dynamic Process Lifecycle Support: A Survey on Dynamic Changes in Process-aware Information Systems.* Computer Science - Research and Development, 23(2): 47-65, Springer.

ADEPT: Implementing the Framework



Dadam, Peter and Reichert, Manfred (2009) *The ADEPT Project: A Decade of Research and Development for Robust and Flexible Process Support - Challenges and Achievements.* Computer Science - Research and Development, Vol. 23, No. 2, pp. 81-97.

ADEPT: Implementing the Framework



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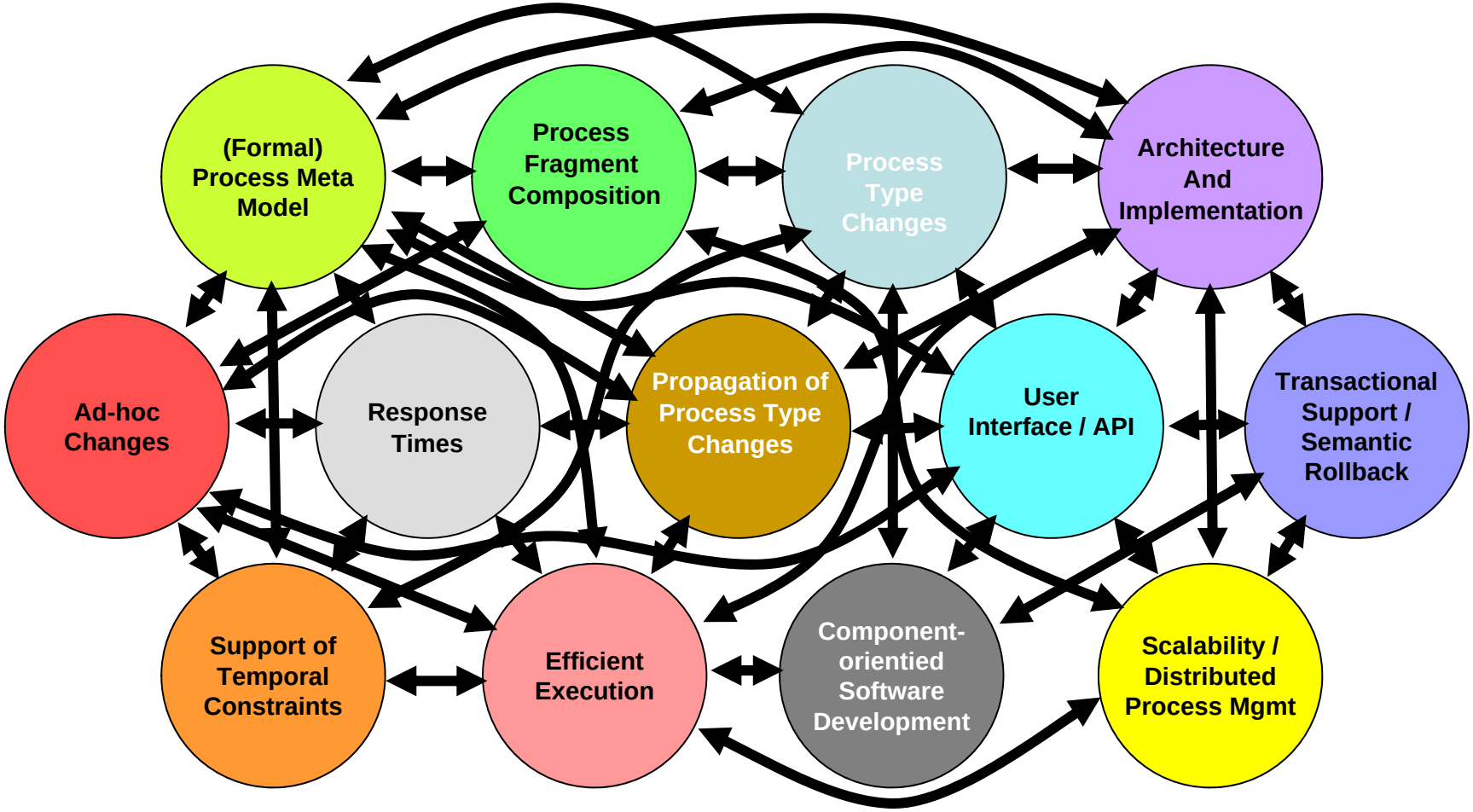
ADEPT: Implementing the Framework



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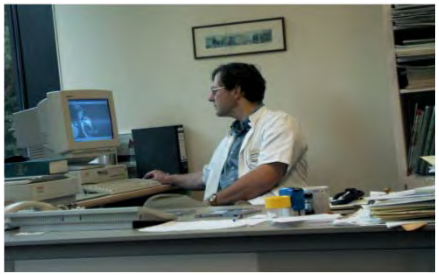
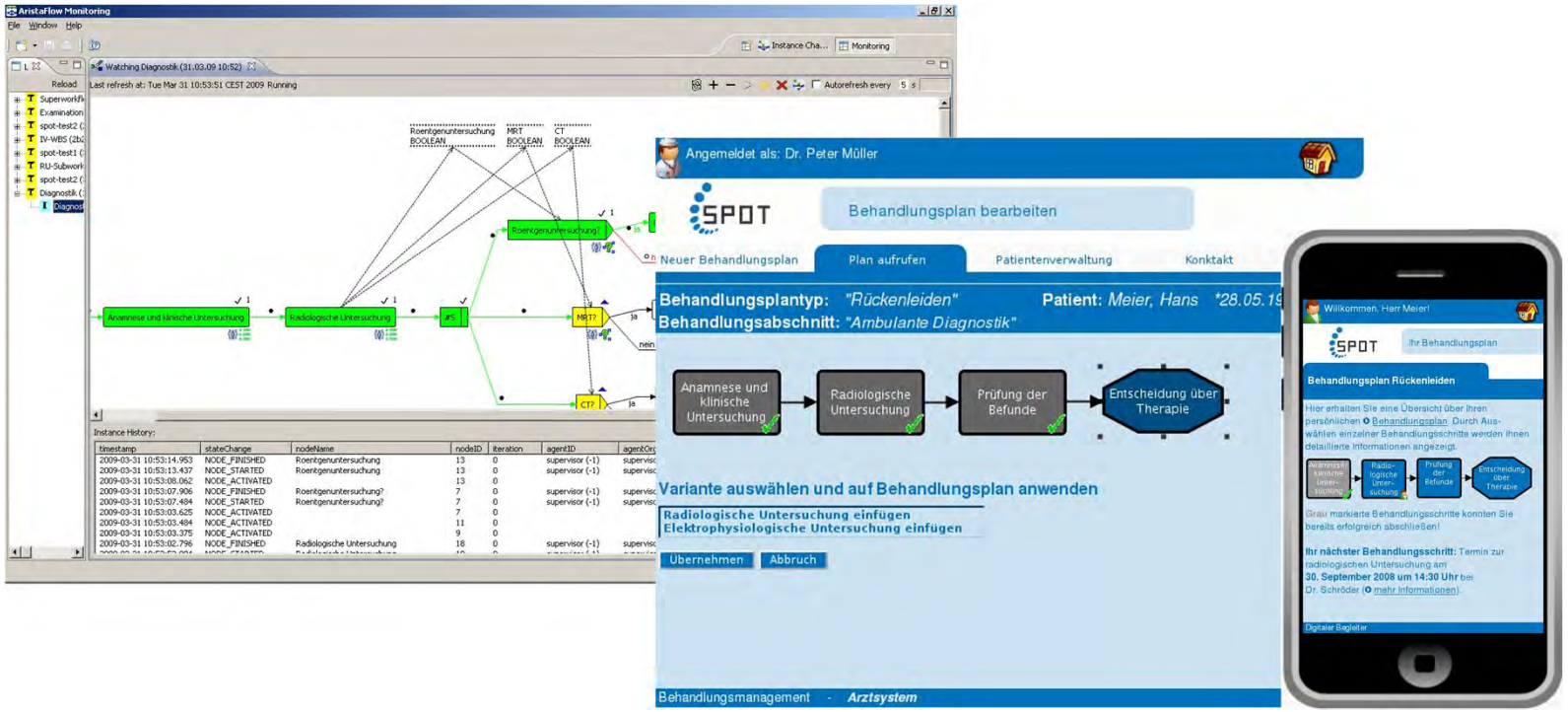
ADEPT: Clinical Pathway Support



Flexible Support of Clinical Pathways with ADEPT

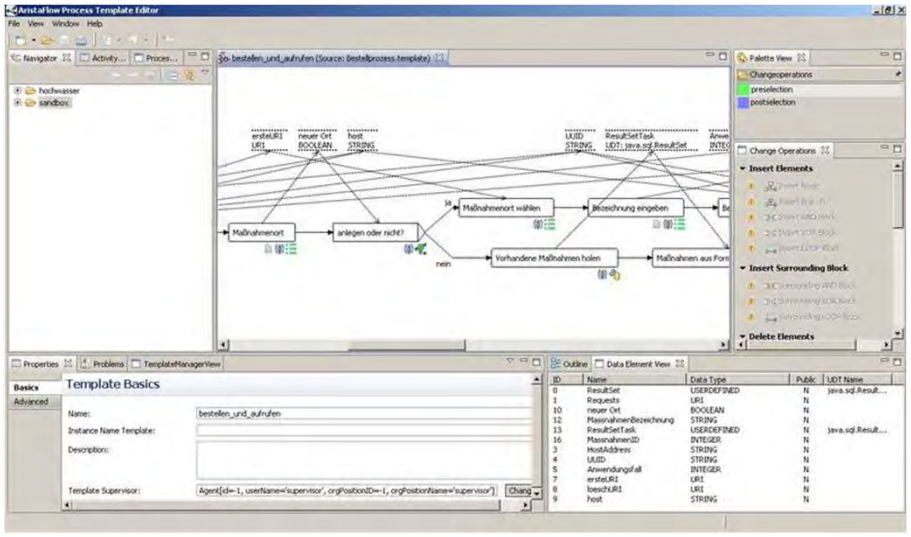
Partners:

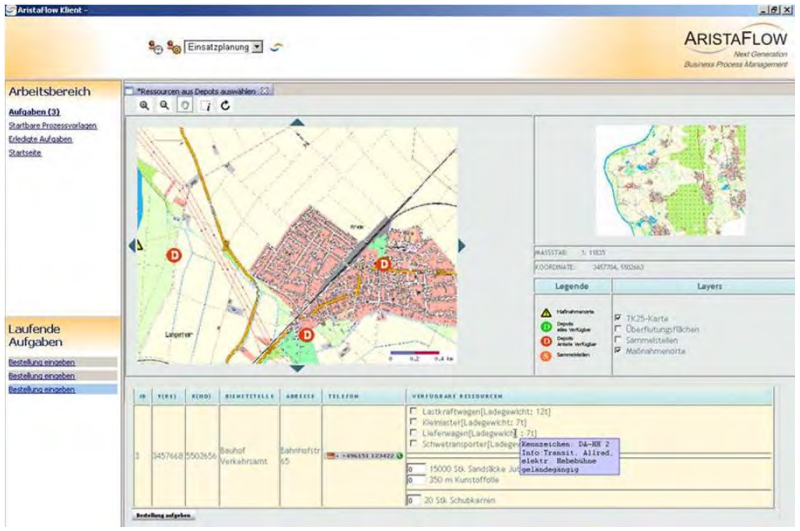
Jan Neuhaus, Claudia Reuter
Fraunhoferinstitut Dortmund



ADEPT: Disaster Management

Process-aware, Cooperative Emergency Management for Water Infrastructures
Partner: TU Darmstadt



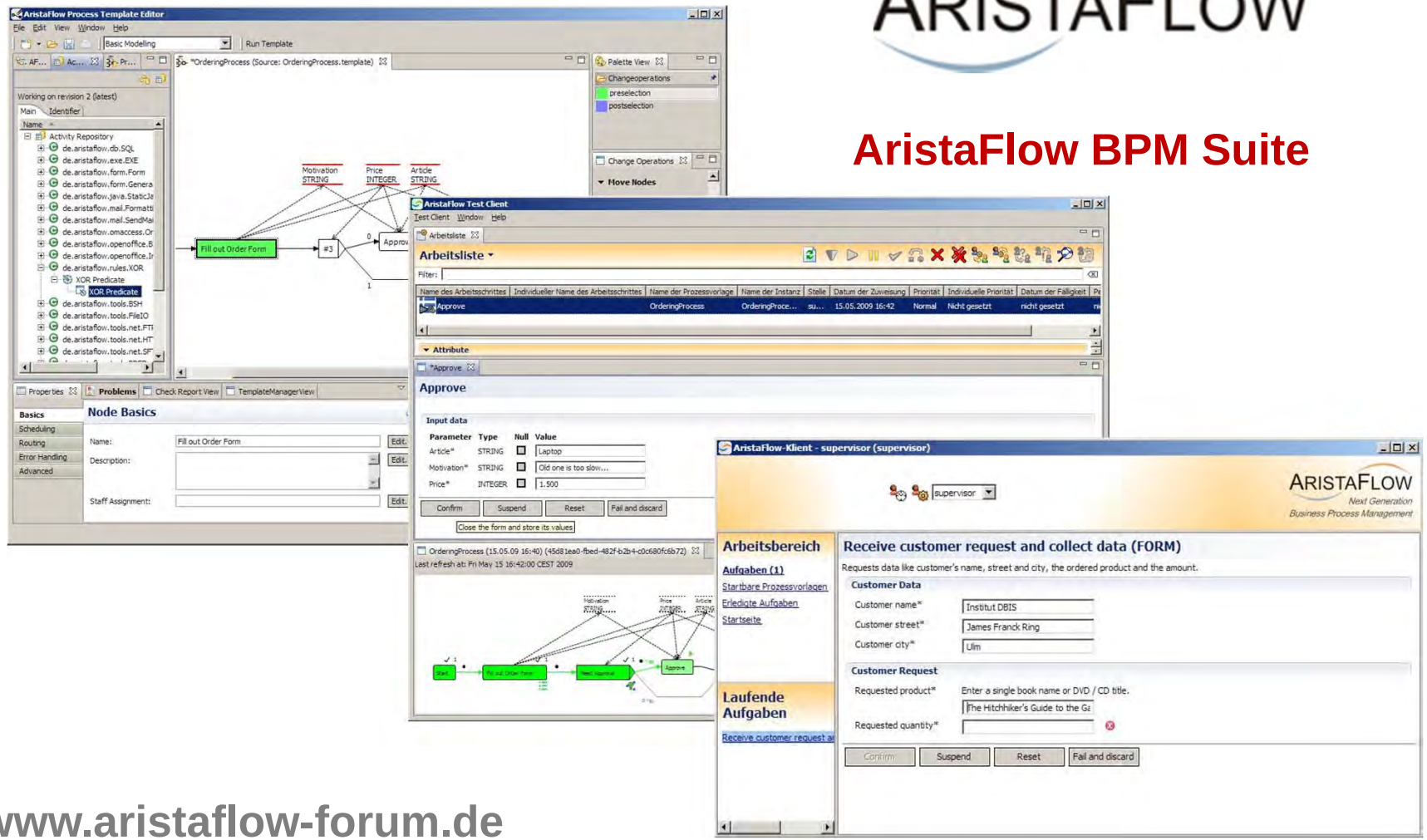


A. Wagenknecht; U. Rüppel: Improving Resource Management In Flood Response With Process Models and Web GIS. In: 16th TIEMS Conf., 2009

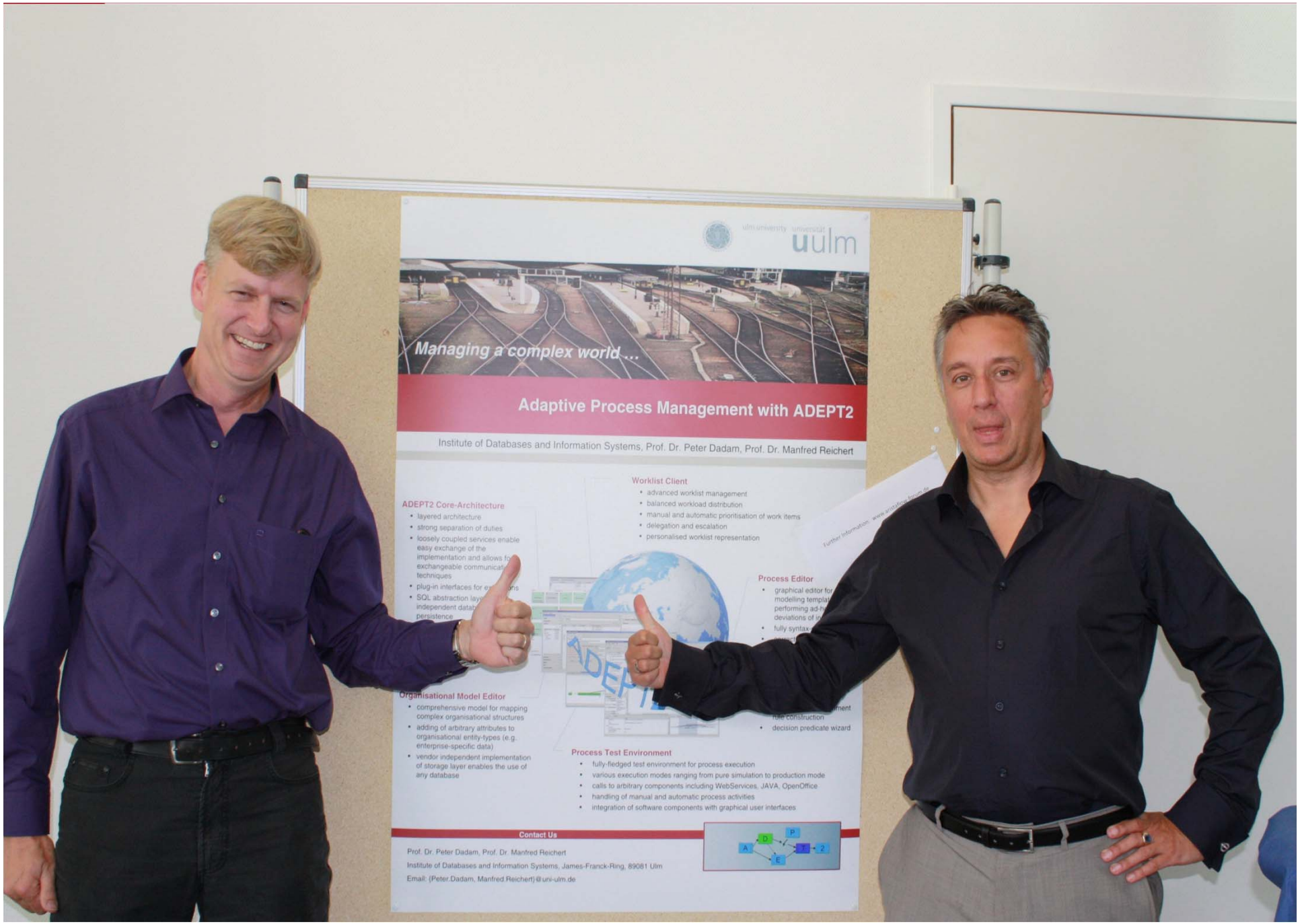
ADEPT: Transfering ADEPT to Practice
The AristaFlow BPM Suite

ARISTAFLOW

AristaFlow BPM Suite



www.aristaflow-forum.de


ulm university universität
uulm
Managing a complex world ...
Adaptive Process Management with ADEPT2
Institute of Databases and Information Systems, Prof. Dr. Peter Dadam, Prof. Dr. Manfred Reichert
ADEPT2 Core-Architecture
layered architecture
strong separation of duties
loosely coupled services enable easy exchange of the implementation and allows for exchangeable communication techniques
plug-in interfaces for extensions
SQL abstraction layer enables DBMS independent database persistence
Worklist Client
advanced worklist management
balanced workload distribution
manual and automatic prioritisation of work items
delegation and escalation
personalised worklist representation
Process Editor
graphical editor for modelling templates, performing ad-hoc deviations of instances
fully syntax
decision predicate wizard
Organisational Model Editor
comprehensive model for mapping complex organisational structures
adding of arbitrary attributes to organisational entity-types (e.g. enterprise-specific data)
vendor independent implementation of storage layer enables the use of any database
Process Test Environment
fully-fledged test environment for process execution
various execution modes ranging from pure simulation to production mode
calls to arbitrary components including WebServices, JAVA, OpenOffice
handling of manual and automatic process activities
integration of software components with graphical user interfaces
Contact Us
Prof. Dr. Peter Dadam, Prof. Dr. Manfred Reichert
Institute of Databases and Information Systems, James-Franck-Ring, 89081 Ulm
Email: {Peter.Dadam, Manfred.Reichert}@uni-ulm.de
P
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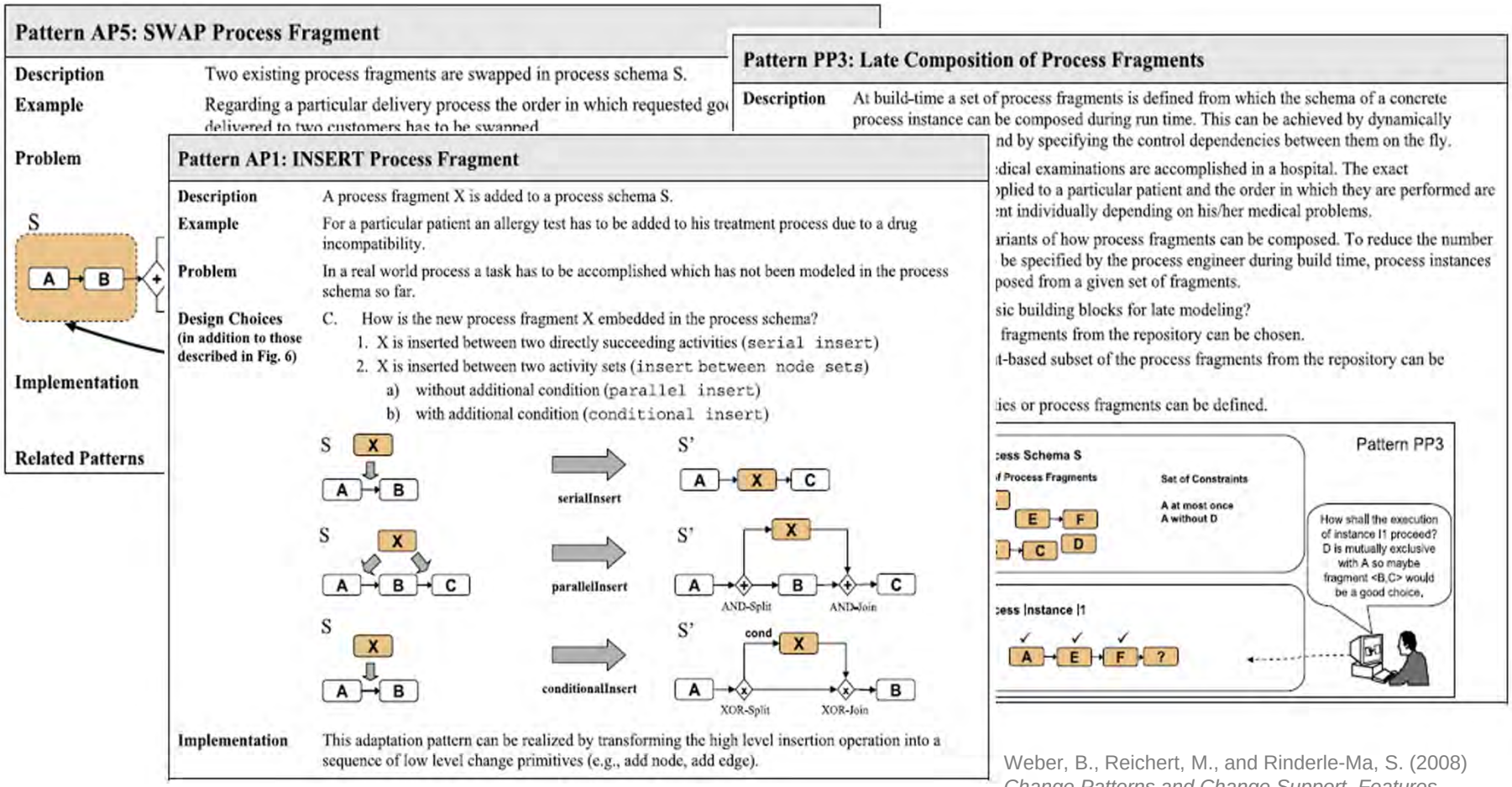
Process Flexibility: A Framework

Change Patterns



Pattern AP5: SWAP Process Fragment

Description Two existing process fragments are swapped in process schema S.

Example Regarding a particular delivery process the order in which requested go
delivered to two customers has to be swapped

Problem

S

A B +

Implementation

Related Patterns

Pattern AP1: INSERT Process Fragment

Description A process fragment X is added to a process schema S.

Example For a particular patient an allergy test has to be added to his treatment process due to a drug incompatibility.

Problem In a real world process a task has to be accomplished which has not been modeled in the process schema so far.

Design Choices (in addition to those described in Fig. 6)

C. How is the new process fragment X embedded in the process schema?

1. X is inserted between two directly succeeding activities (`serial insert`)
2. X is inserted between two activity sets (`insert between node sets`)
   a) without additional condition (`parallel insert`)
   b) with additional condition (`conditional insert`)

S: X, A, B → **serialInsert** → S': A, X, C

S: X, A, B, C → **parallelInsert** → S': X, A, AND-Split, B, AND-Join, C

S: X, A, B → **conditionalInsert** → S': cond, X, A, XOR-Split, B, XOR-Join

Implementation This adaptation pattern can be realized by transforming the high level insertion operation into a sequence of low level change primitives (e.g., add node, add edge).

Pattern PP3: Late Composition of Process Fragments

Description At build-time a set of process fragments is defined from which the schema of a concrete process instance can be composed during run time. This can be achieved by dynamically
nd by specifying the control dependencies between them on the fly.

:dical examinations are accomplished in a hospital. The exact
plied to a particular patient and the order in which they are performed are
nt individually depending on his/her medical problems.

ariants of how process fragments can be composed. To reduce the number
be specified by the process engineer during build time, process instances
posed from a given set of fragments.

sic building blocks for late modeling?
fragments from the repository can be chosen.
t-based subset of the process fragments from the repository can be

ies or process fragments can be defined.

Pattern PP3

ess Schema S
f Process Fragments
Set of Constraints
A at most once
A without D
E F
C D

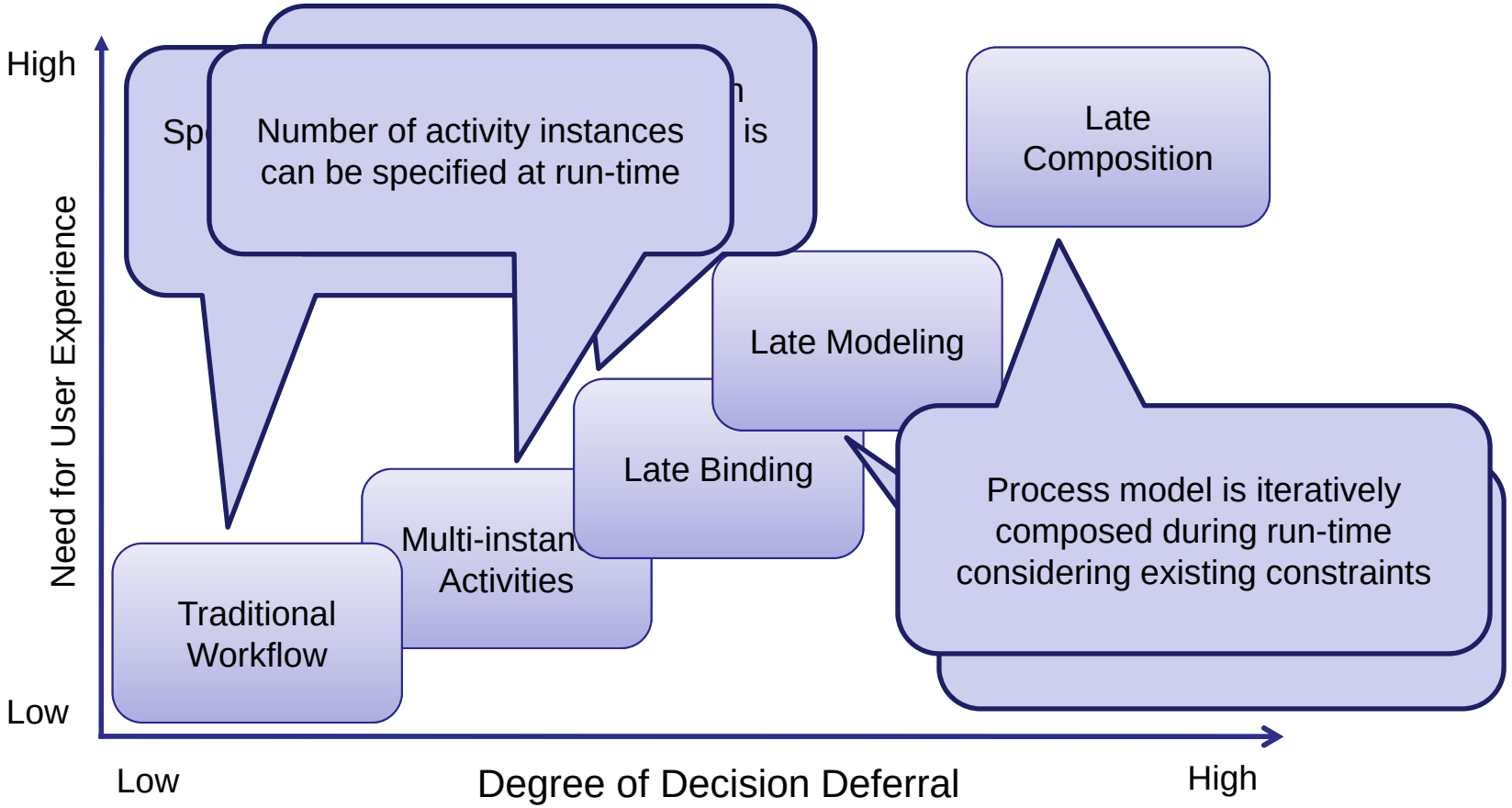
How shall the execution of instance I1 proceed? D is mutually exclusive with A so maybe fragment <B,C> would be a good choice.

ess Instance I1
A E F ?

Weber, B., Reichert, M., and Rinderle-Ma, S. (2008) *Change Patterns and Change Support Features – Enhancing Flexibility in Process-Aware Information Systems.* Data & Knowledge Eng, 66(3): 438-466,

Process Flexibility: A Framework

Patterns for Decision Deferral



Process Flexibility: A Framework

Change Support Features

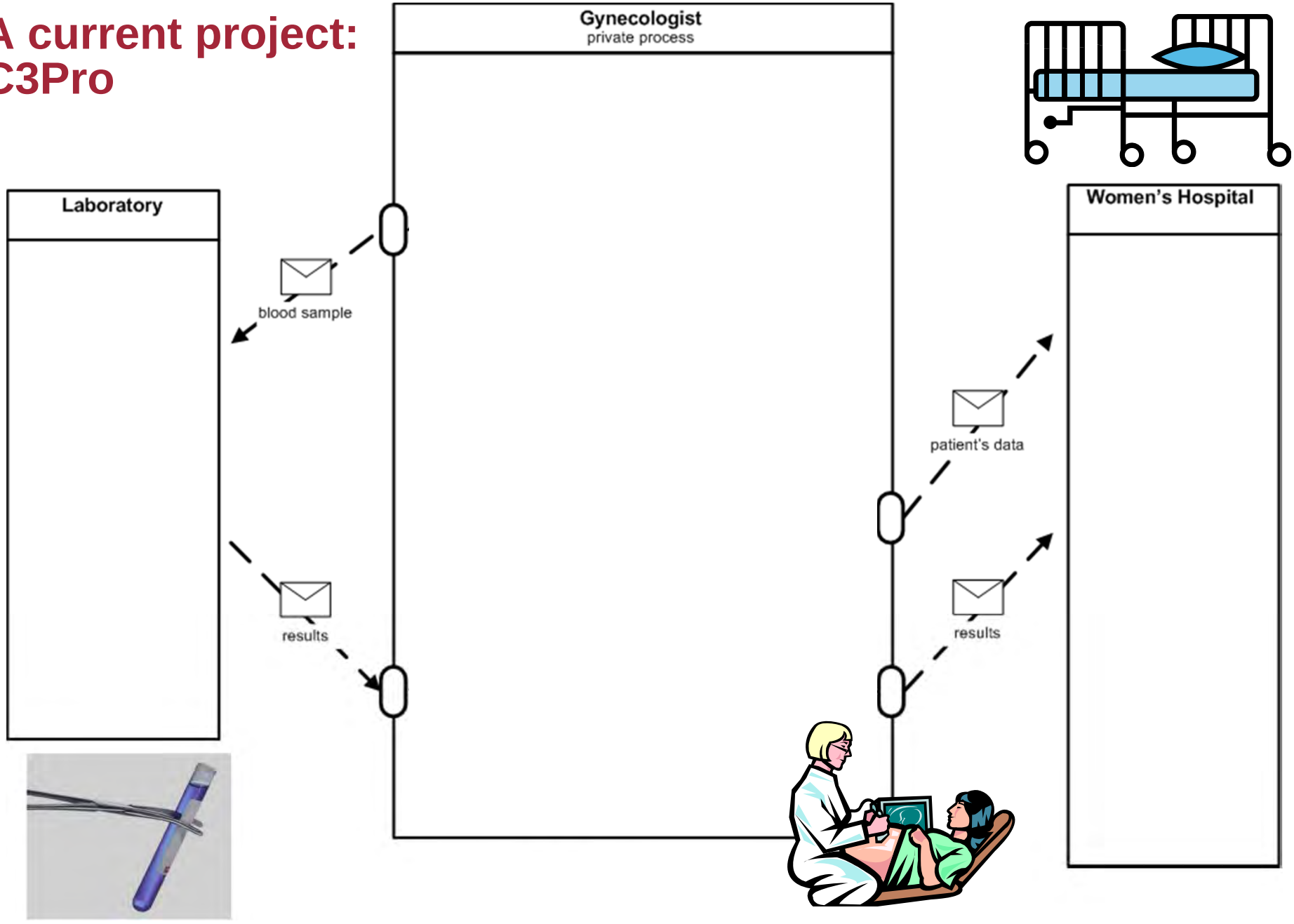
- Schema Evolution, Version Control and Instance Migration
- Support for Instance-Specific Changes
- Correctness of Changes
- Traceability and Analysis of Changes
- Access Control of Changes
- Change Reuse
- Change Concurrency Control
- Refactoring Support for Process Models

Process Flexibility: A Framework

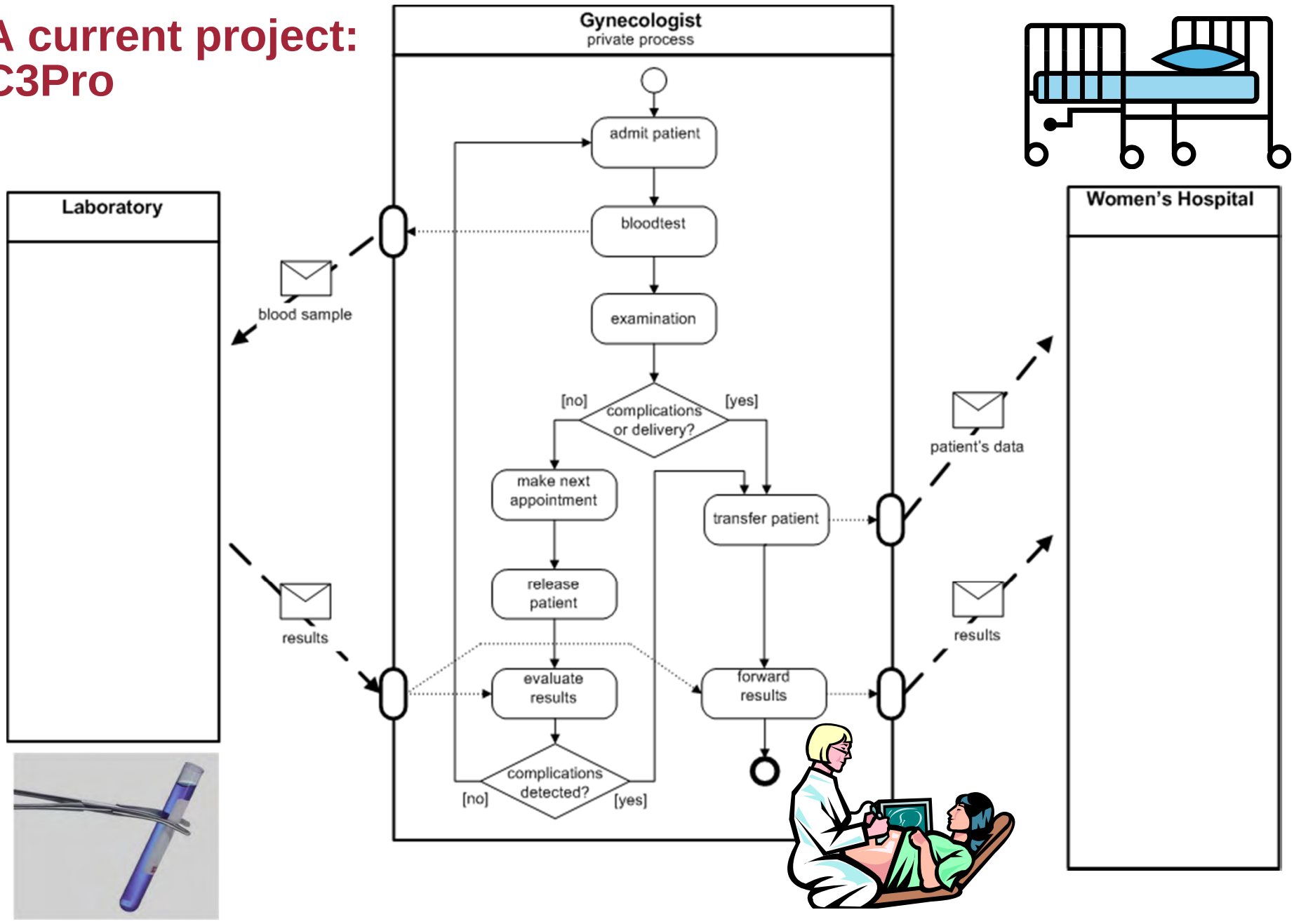
Primitive / Pattern	Academic								Commercial	
	ADEPT2 / CBRFlow	CAKE 2	HOON	MOVE	PoF	WASA2	WIDE	YAWL + Worklets / Exlets	Flower	Staffware
Change Primitives										
PR1 – Add Node	–	+	+	+	+	+	+	+	+	+
PR2 – Remove Node	–	+	+	+	+	+	+	+	+	+
PR3 – Add Edge	–	+	+	+	+	+	+	+	+	+
PR4 – Remove Edge	–	+	+	+	+	+	+	+	+	+
PR5 – Move Edge	–	+	–	–	–	–	–	+	–	–
Adaptation Patterns										
AP1 – Insert Fragment	A[1, 2], B[1,2,3], C [1, 2]	–	–	–	–	–	A[2], B[1], C[1,2]	–	–	–
AP2 – Delete Fragment	A[1, 2], B[1,2,3]	–	–	–	–	–	A[2], B[1]	–	–	–
AP3 - Move Fragment	A[1, 2], B[1,2,3], C[1,2]	–	–	–	–	–	–	–	–	–
AP4 – Replace Fragment	–	–	–	–	–	–	A[2], B[1]	–	–	–
AP5 – Swap Fragment	–	–	–	–	–	–	–	–	–	–
AP6 – Extract Fragment	A[1,2], B[3]	–	–	–	–	–	–	–	–	–
AP7 – Inline Fragment	A[1,2], B[2]	–	–	–	–	–	–	–	–	–
AP8 – Embed Fragment in	A[1,2], B[1,2,3]	–	–	–	–	–	–	–	–	–
AP9 – Parallelize Activities	A[1,2], B[1,2,3]	–	–	–	–	–	–	–	–	–
AP10 - Embed Fragment in Conditional Branch	–	–	–	–	–	–	A[2]	–	–	–
AP11 – Add Control Dependency	A[1,2]	–	–	–	–	–	–	–	–	–
AP12 – Remove Control Dependencies	A[1,2]	–	–	–	–	–	–	–	–	–
AP13 – Update Condition	A[1,2]	–	–	–	–	–	A[2]	–	–	–
AP14 – Copy Fragment	–	–	–	–	–	–	–	–	–	–

Weber, Barbara and Rinderle, Stefanie and Reichert, Manfred (2007) *Change Patterns and Change Support Features in Process-Aware Information Systems.* In: CAiSE'07, Trondheim, Norway, LNCS 4495, pp. 574-588.

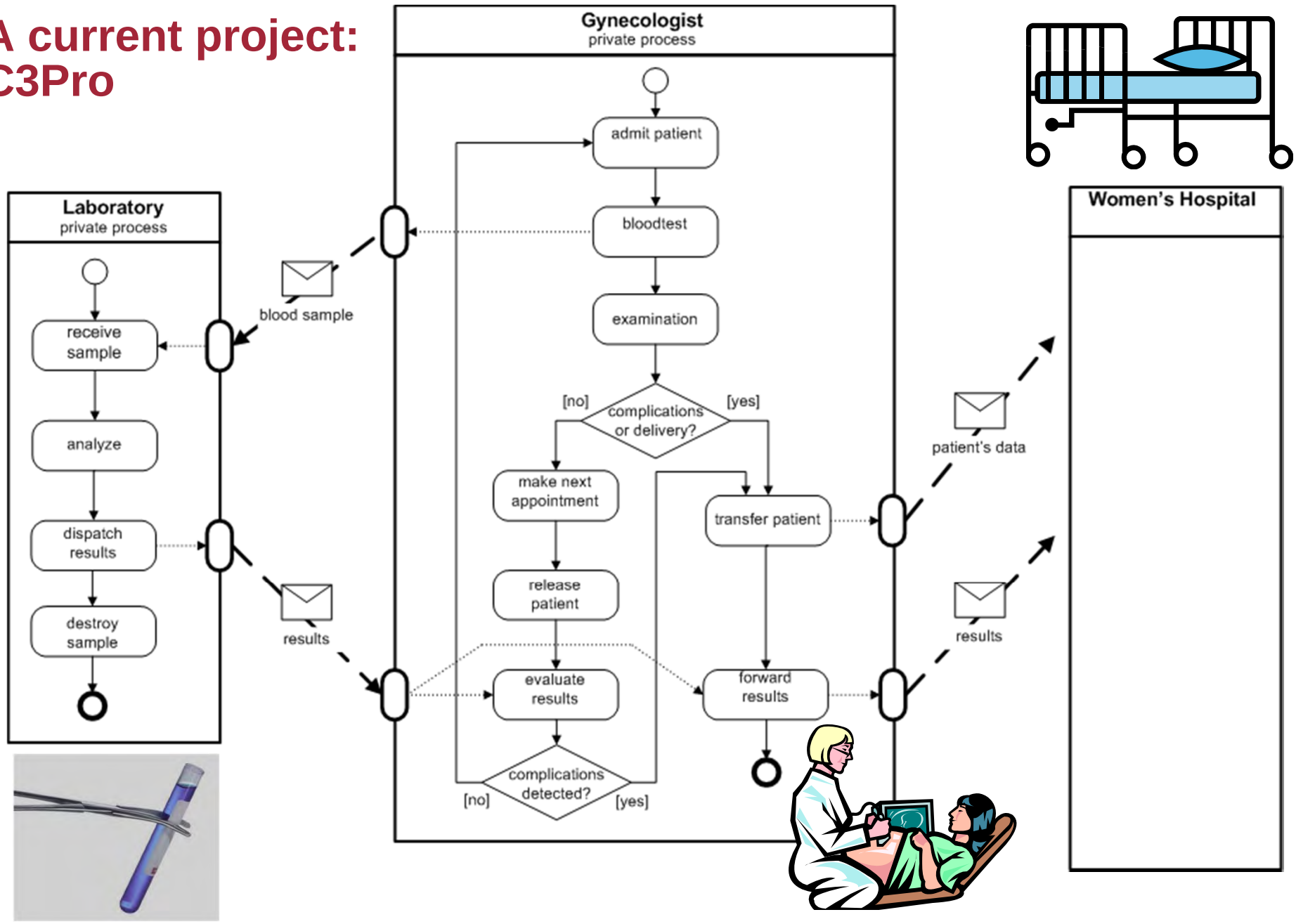
A current project: C3Pro



A current project: C3Pro



A current project: C3Pro



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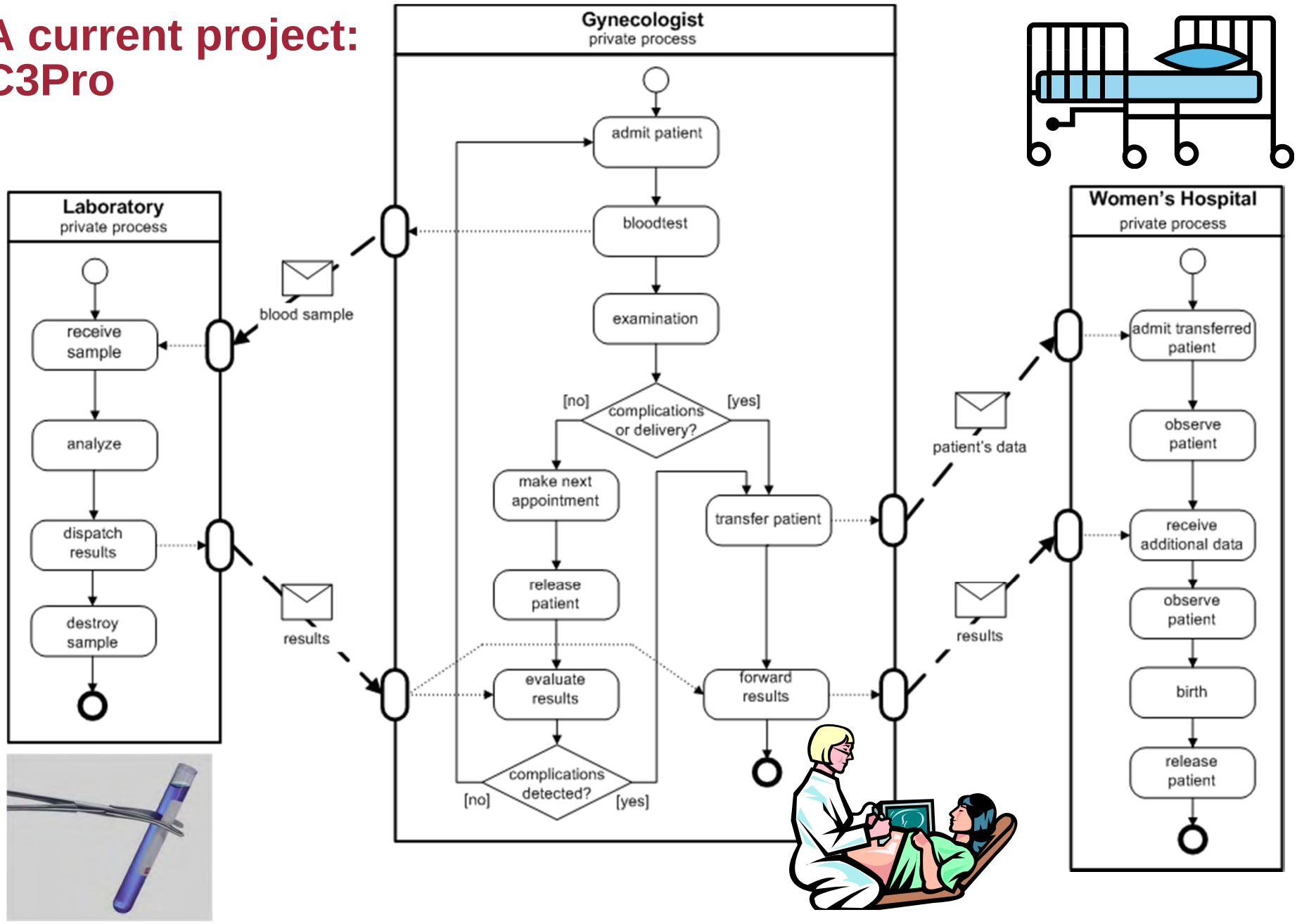
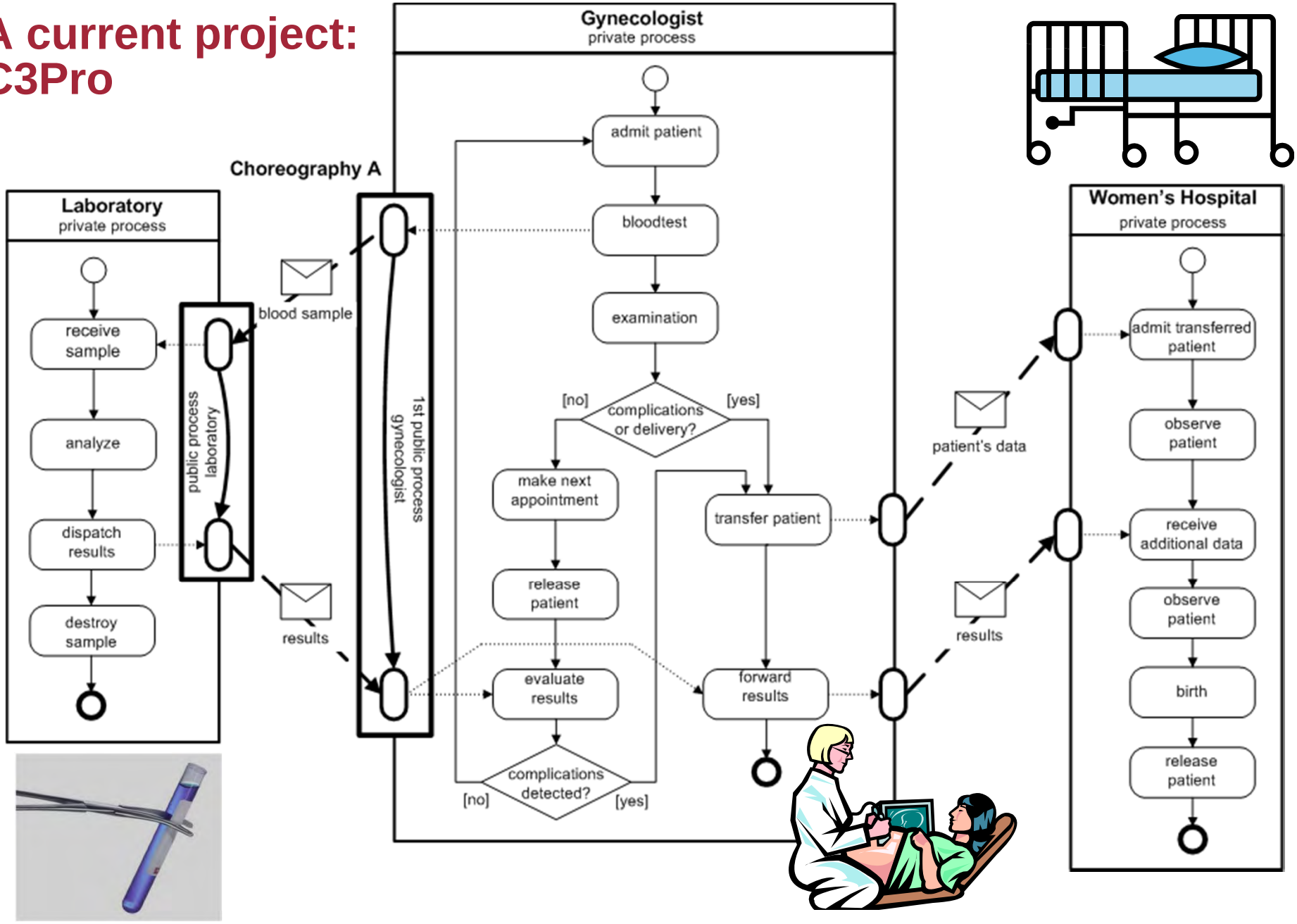
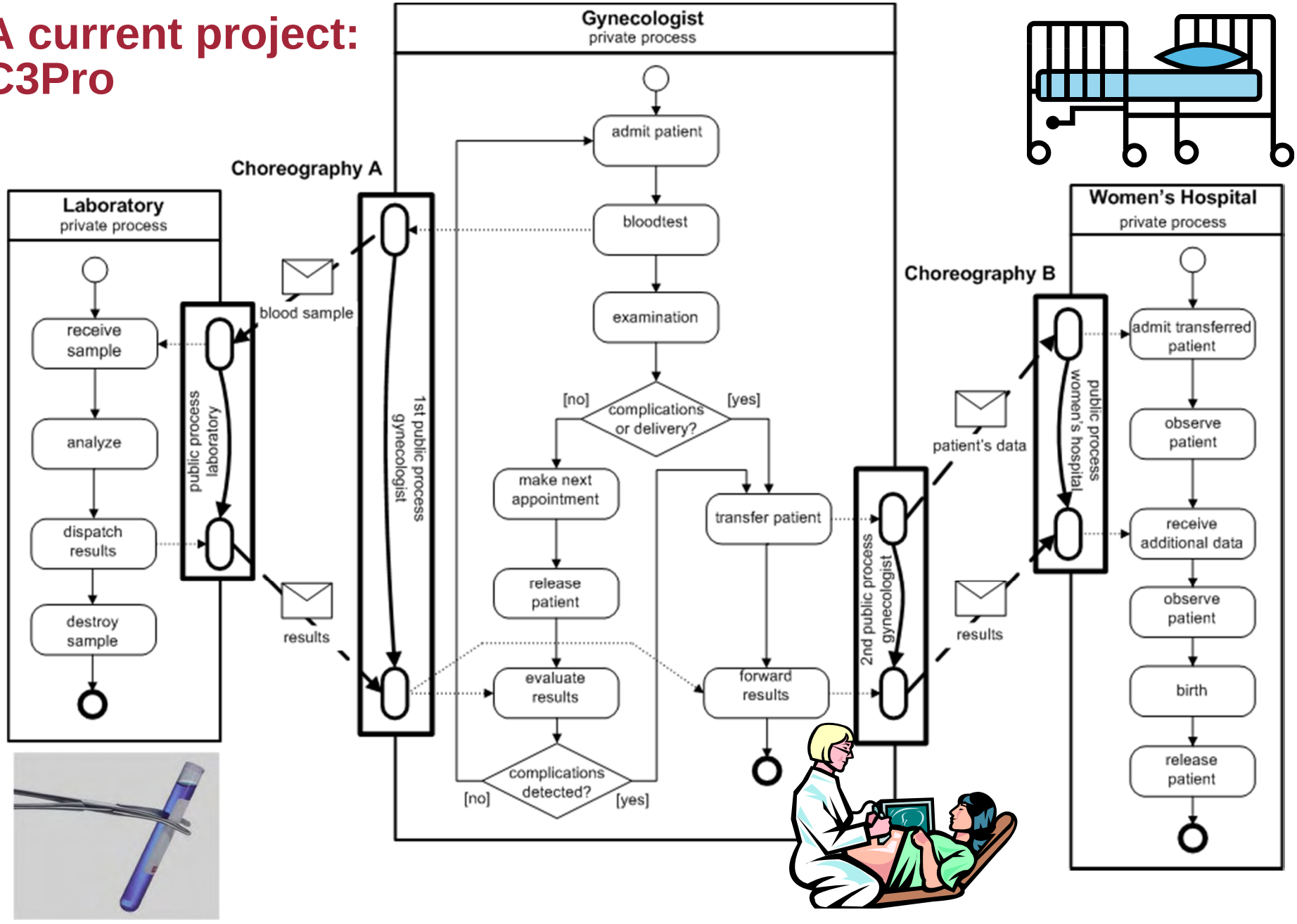


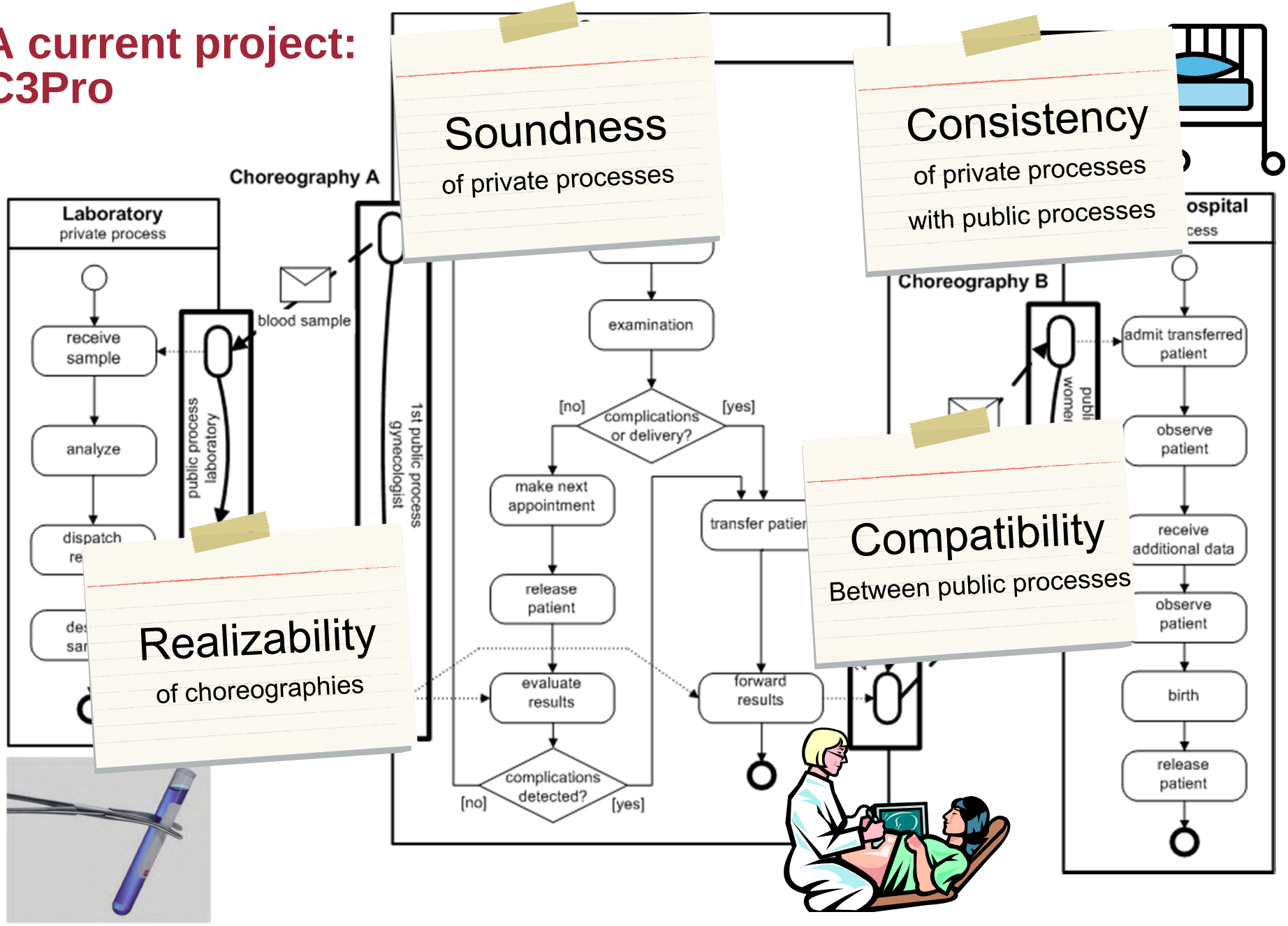
A current project: C3Pro



A current project: C3Pro



A current project: C3Pro



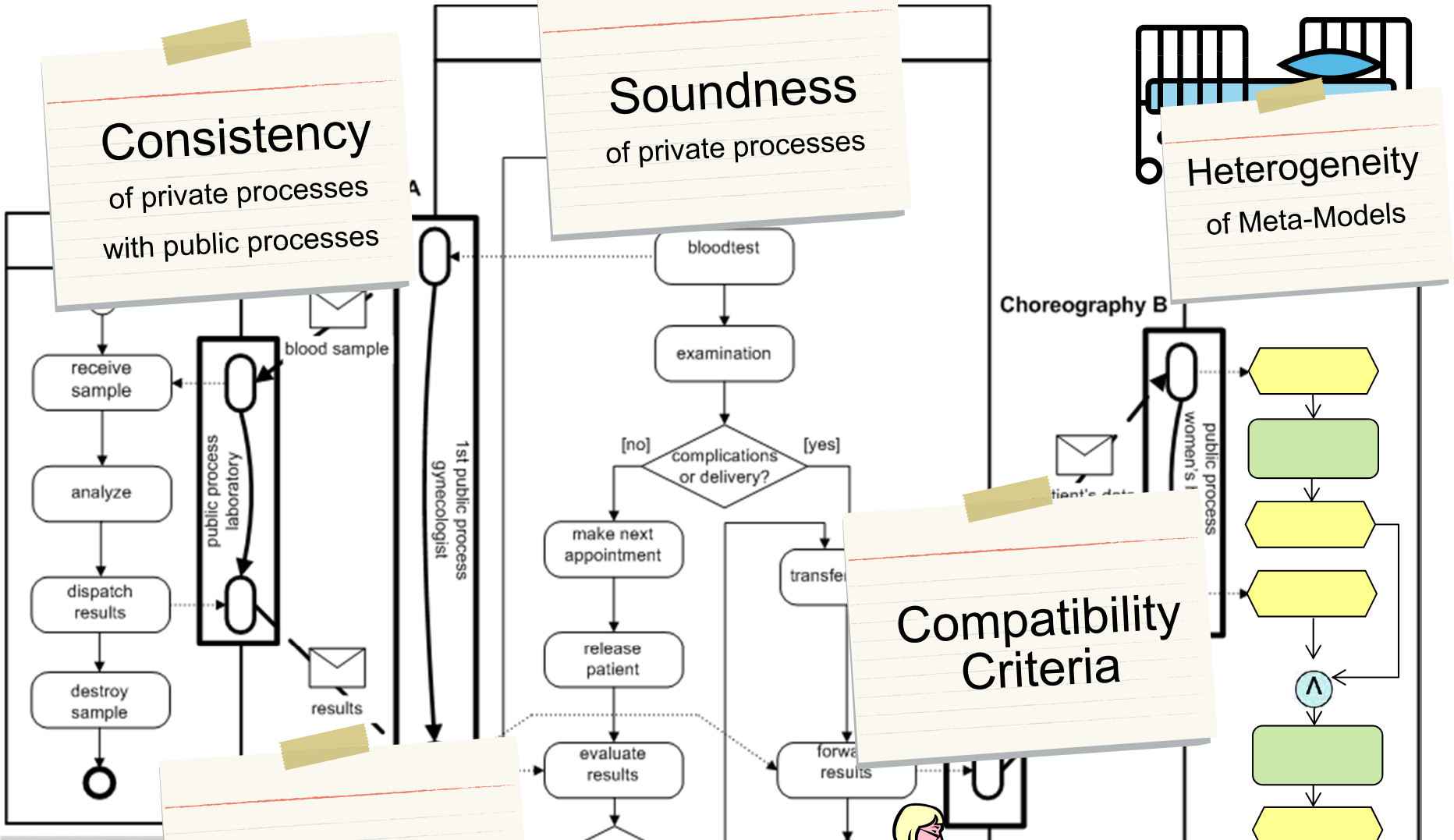
Consistency
of private processes
with public processes

Soundness
of private processes

Heterogeneity
of Meta-Models

Compatibility Criteria

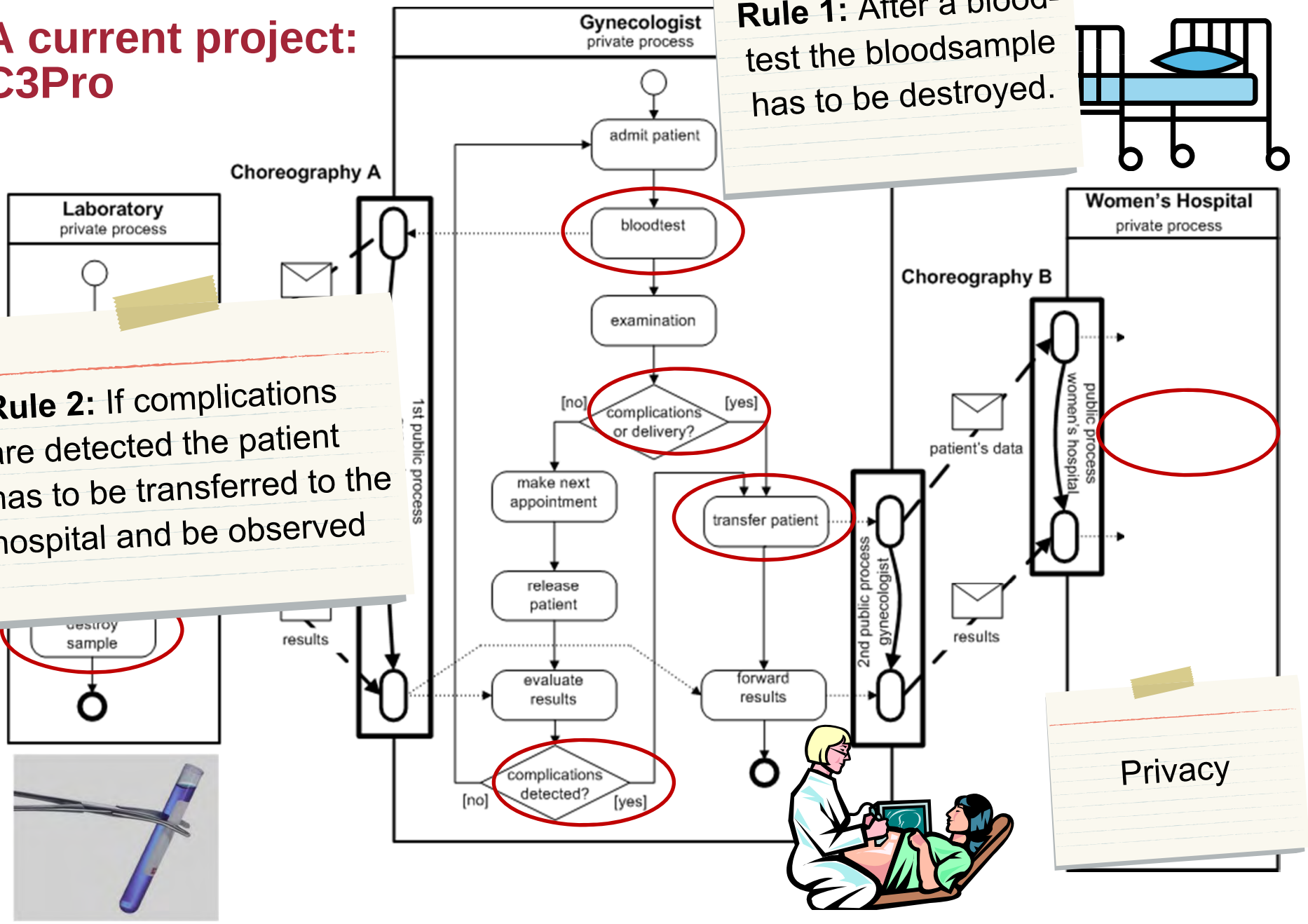
Realizability
of choreographies

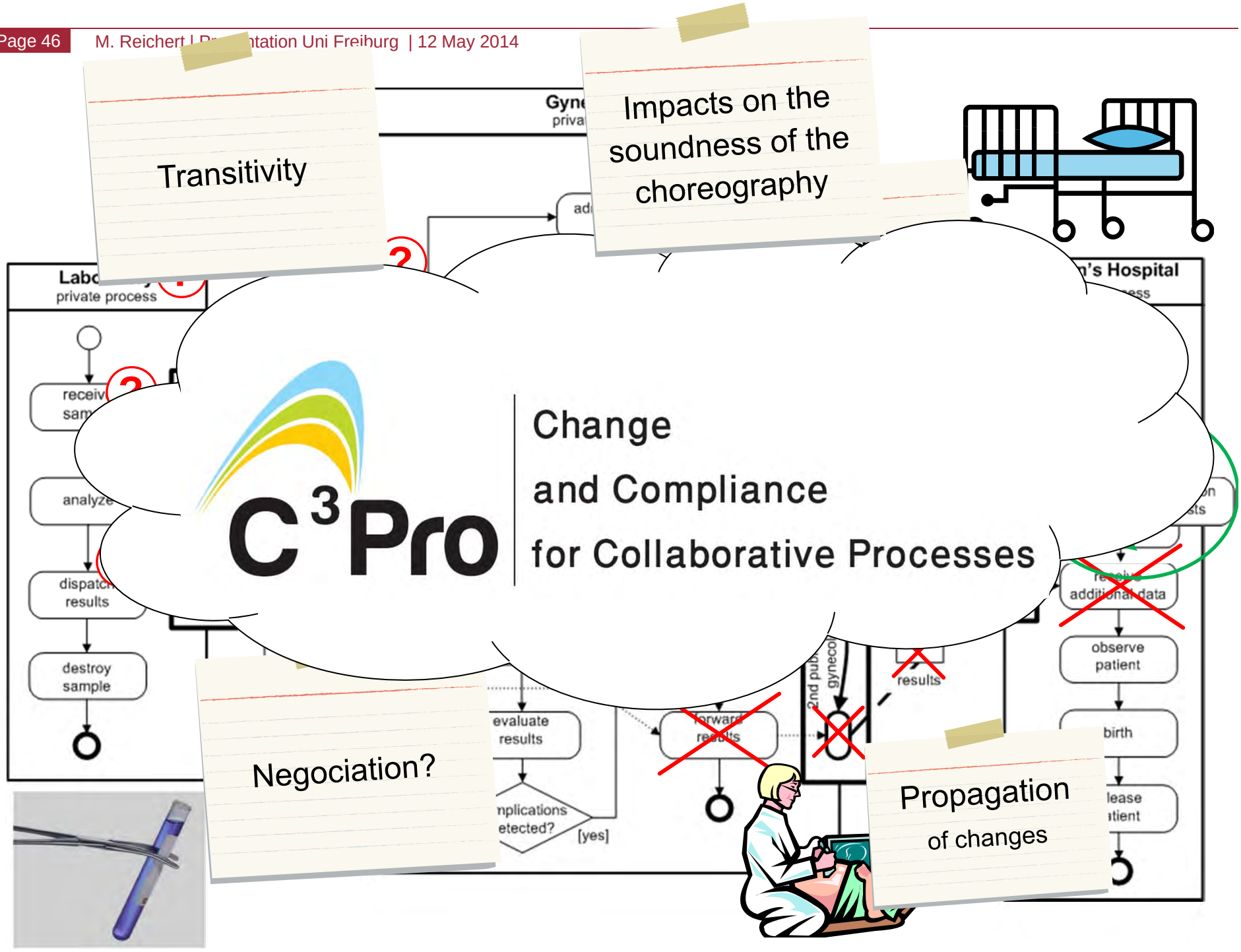


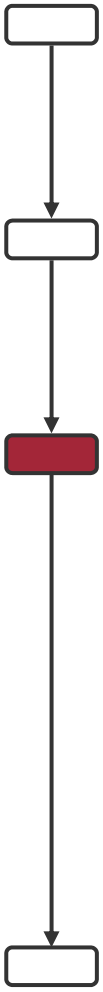
A current project: C3Pro

Rule 1: After a blood-test the bloodsample has to be destroyed.

Rule 2: If complications are detected the patient has to be transferred to the hospital and be observed




Transitivity
Impacts on the soundness of the choreography
C³Pro
Change and Compliance for Collaborative Processes
Negociation?
Propagation of changes
private process
analyze
dispatch results
destroy sample
evaluate results
observe patient
's Hospital



Process-Aware Information Systems

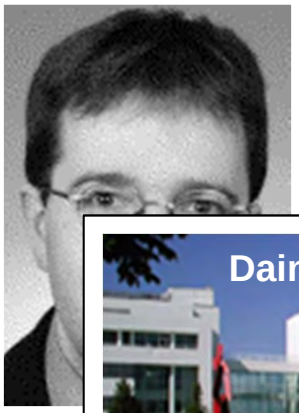
A Decade of Research on Flexible Process-Aware Information Systems and its Achievements

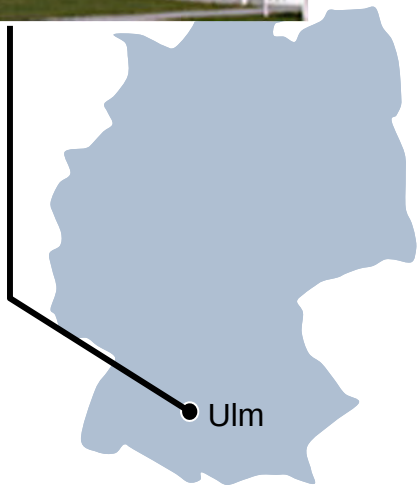
A Decade of Research on Large Processes in the Automotive Industry and Enabling Technologies

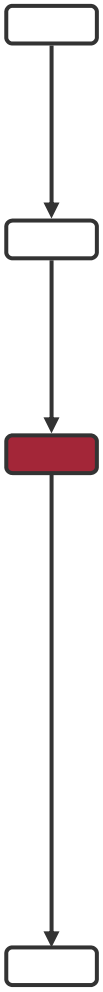
- **Large Process Models**
- **Large Process Collections**
- **Large Process Structures**

Other Running Projects

The Daimler BPM Round Table







Process-Aware Information Systems

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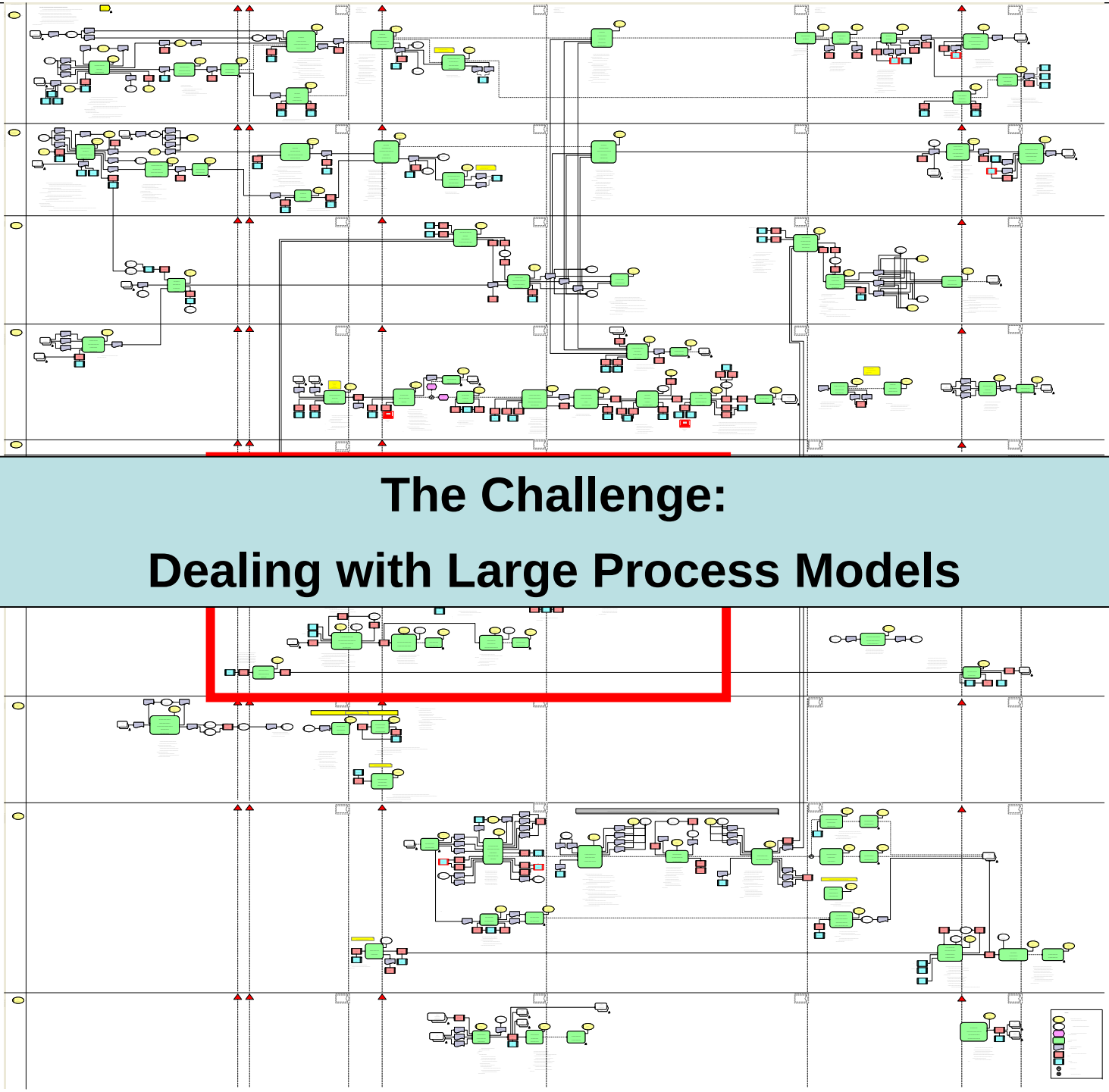
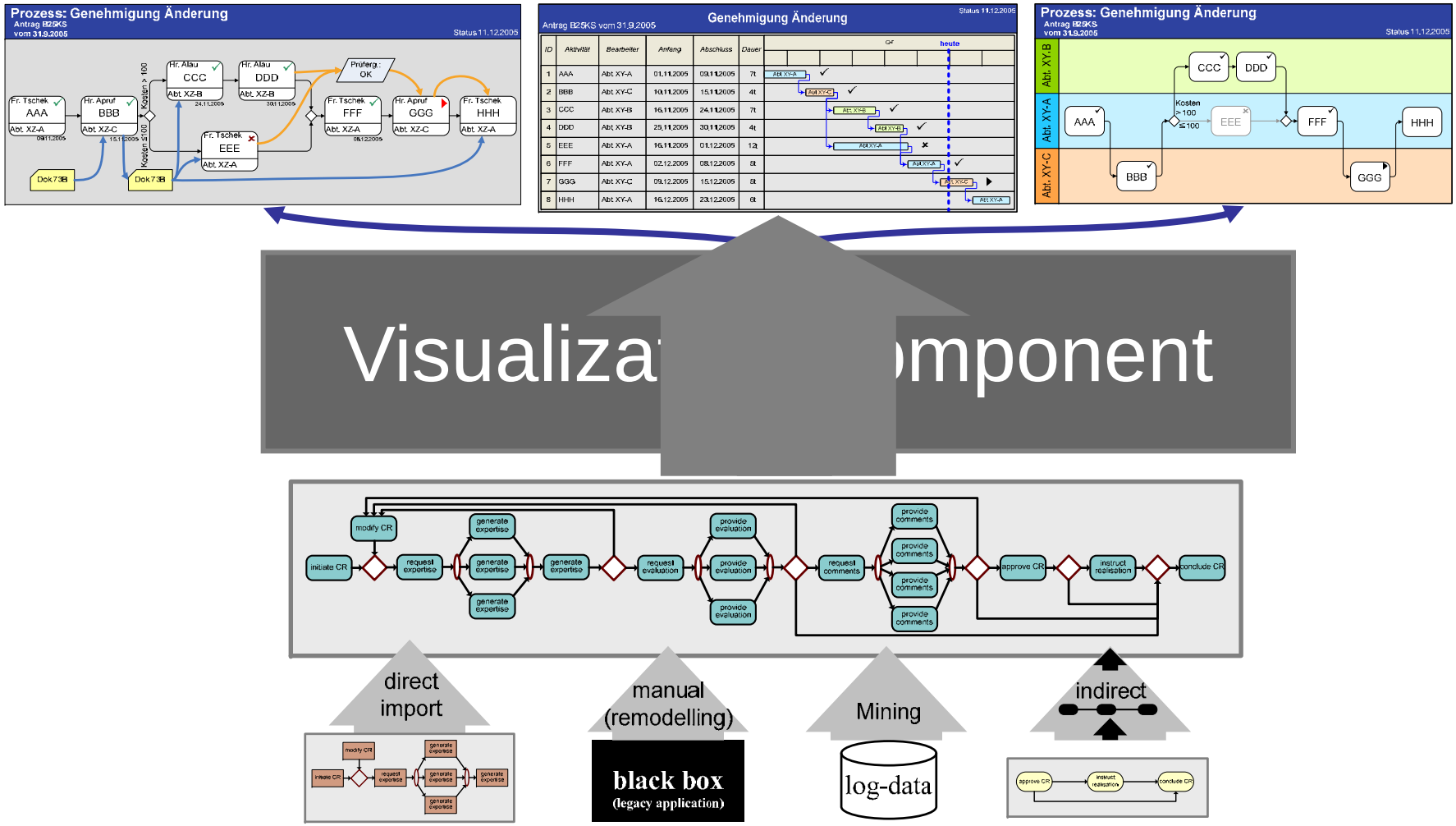
Other Running Projects



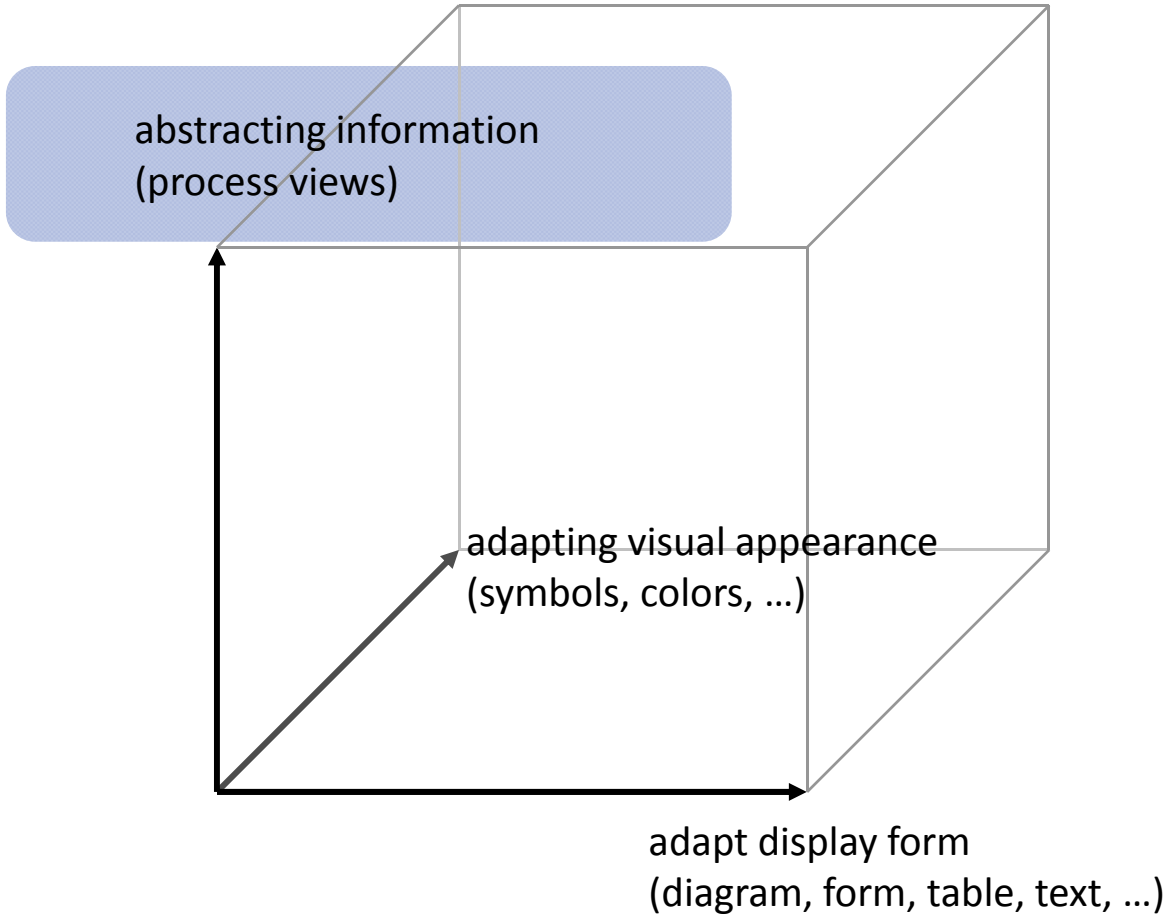
The Challenge:

Dealing with Large Process Models

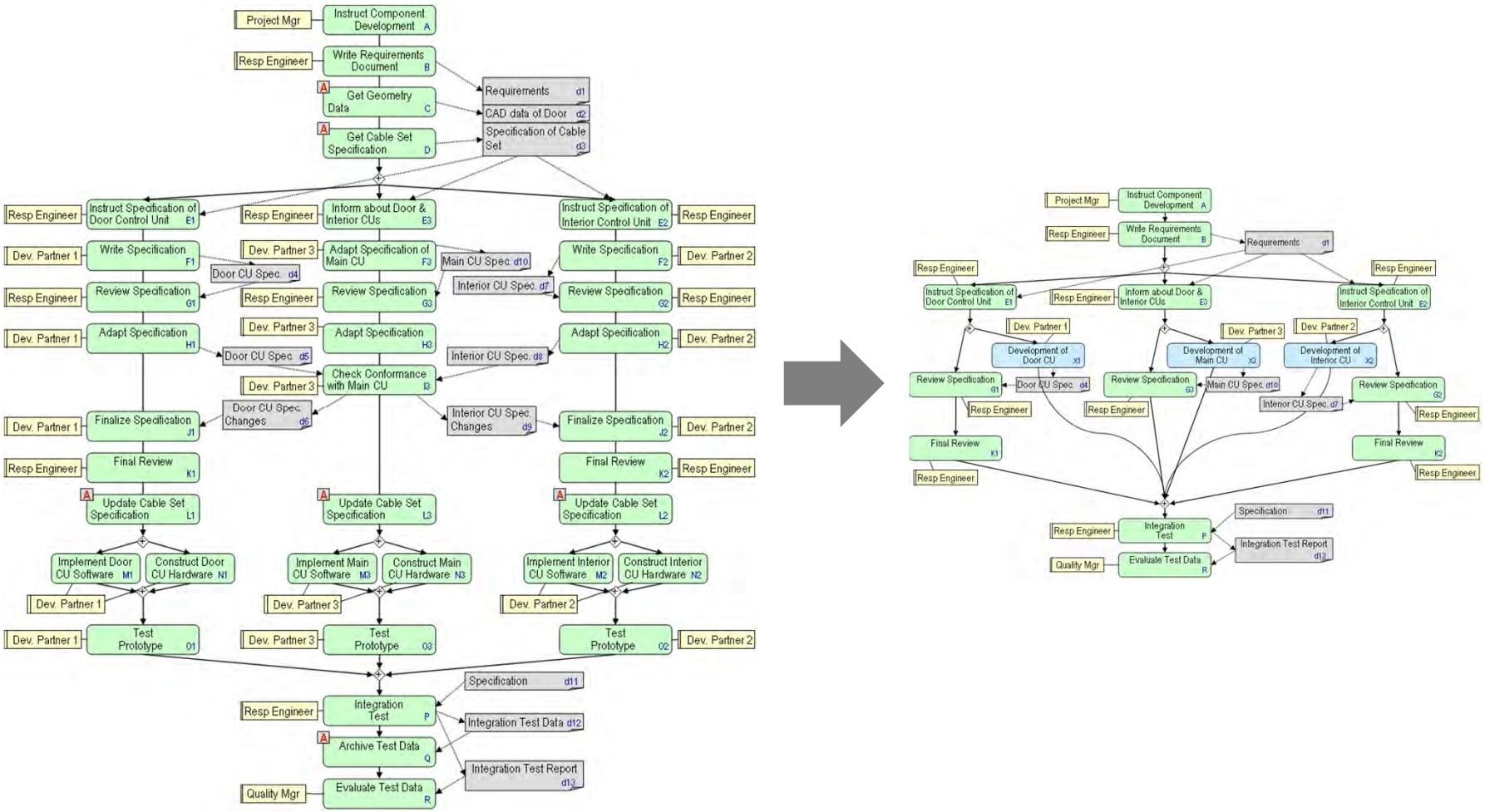
Dealing with Large Process Models: Need for an Advanced Visualization Framework



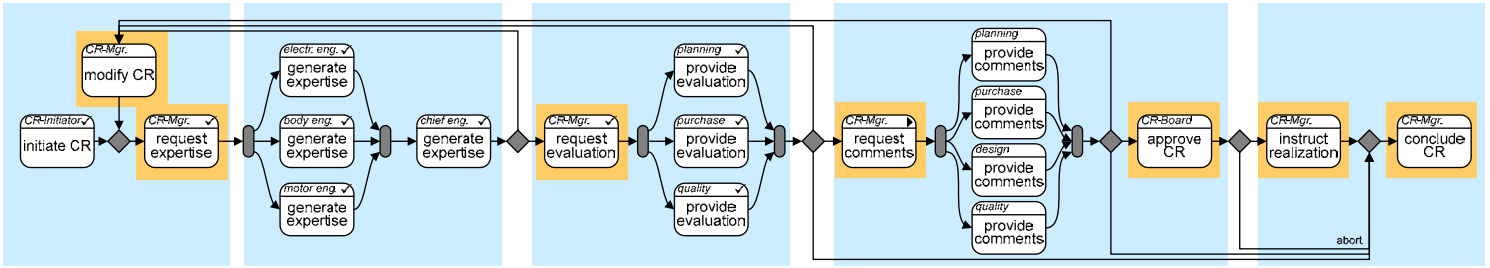
The Proviado Visualization Framework



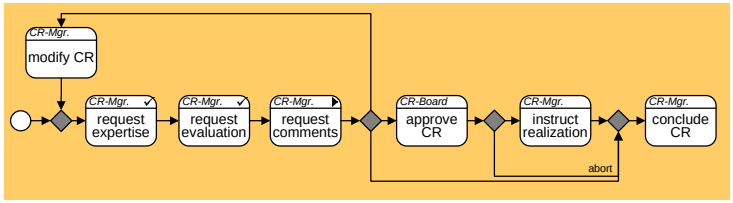
Proviado: Process Model Abstraction - Example



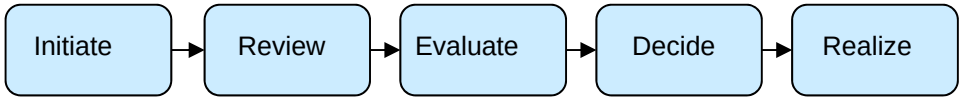
Proviado: Process Model Abstraction – Basic Operations (1)



CREATE REDUCED VIEW cr-manager AS
SELECT FROM cr-process p
WHERE p.activity.actor = „CR-Mgr.“



CREATE VIEW cr-overview AS
AGGREGATE(‚Initiate CR‘,…) AS ‚Initiierung‘
…
FROM cr-process

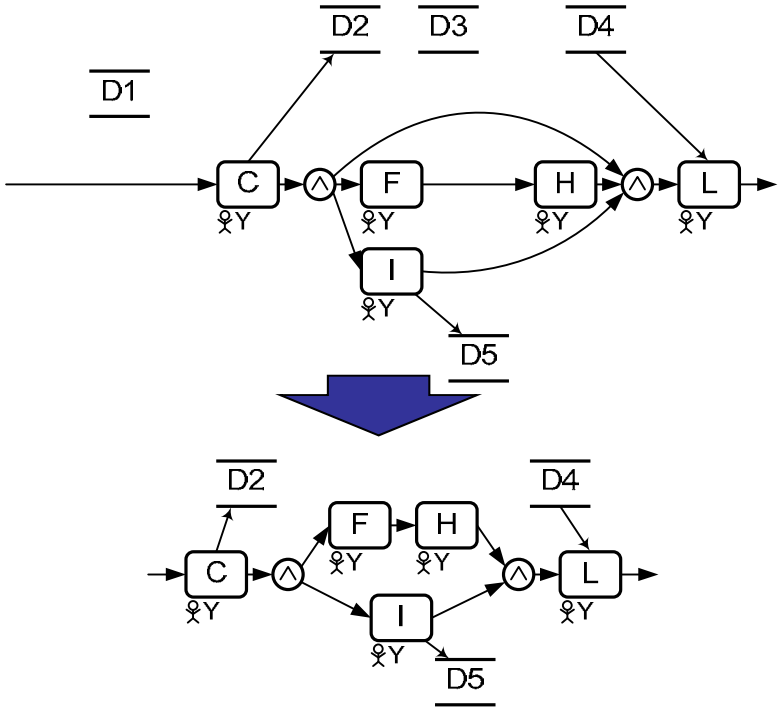


Some Requirements:

- Reduce complexity of (large) process models
- Aggregate or eliminate certain process information in a given application context
- Cover all process perspectives: behavior, data, …

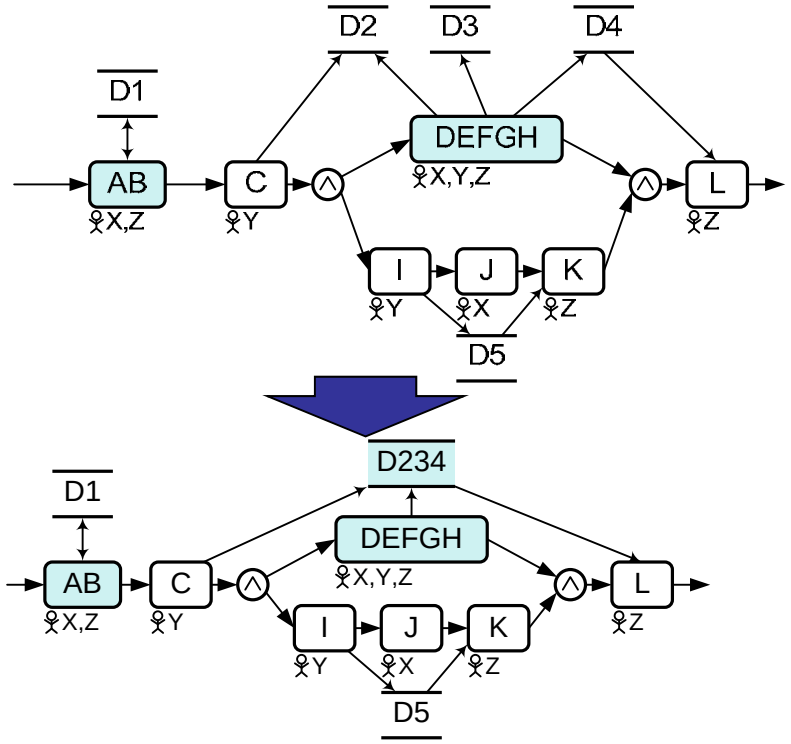
Proviado: Process Model Abstraction – Basic Operations (2)

Reduction



- Eliminate activities
- Simplify the resulting schema
- Remove adjacent satellite objects

Aggregation

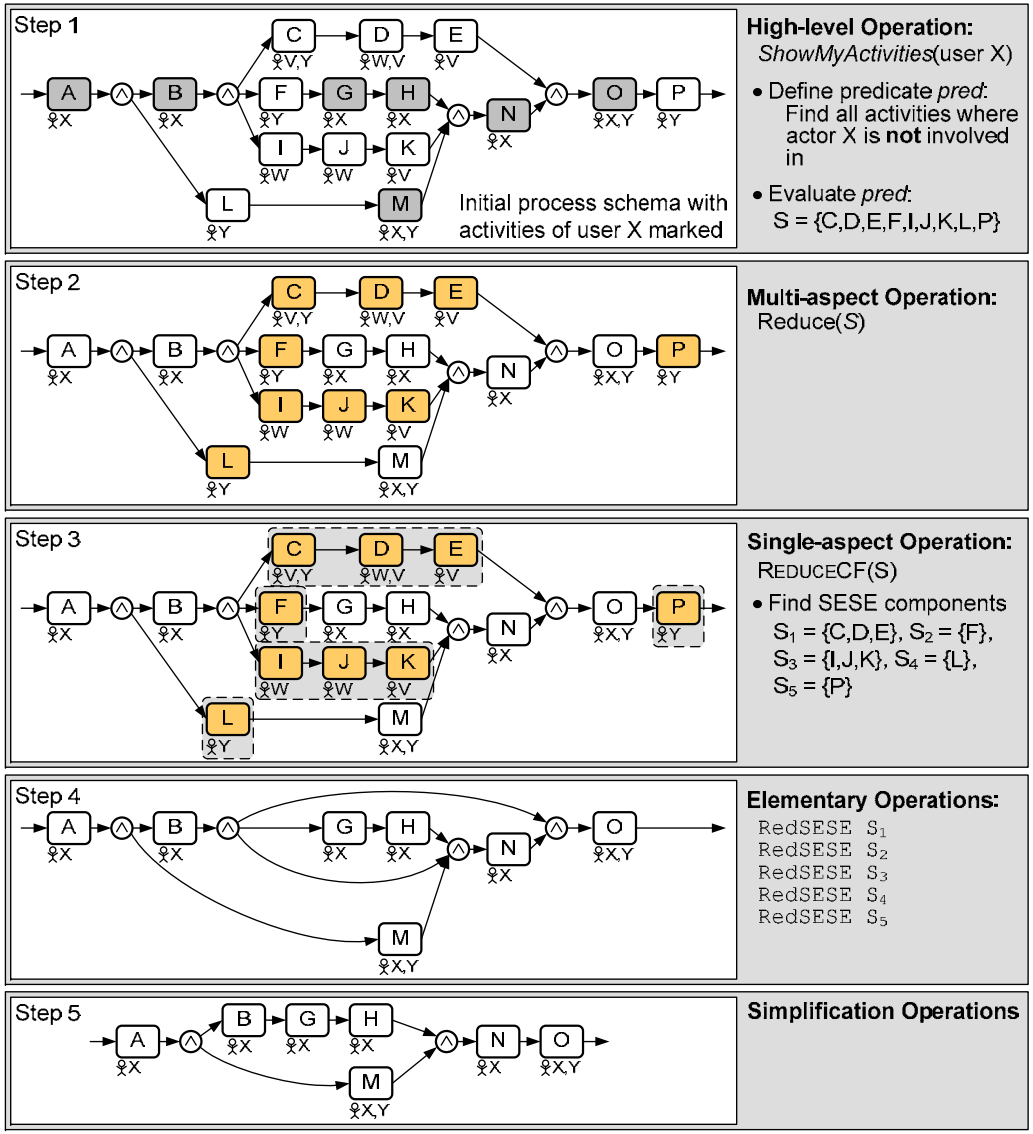


- Aggregate activities
- Aggregate adjacent objects if required

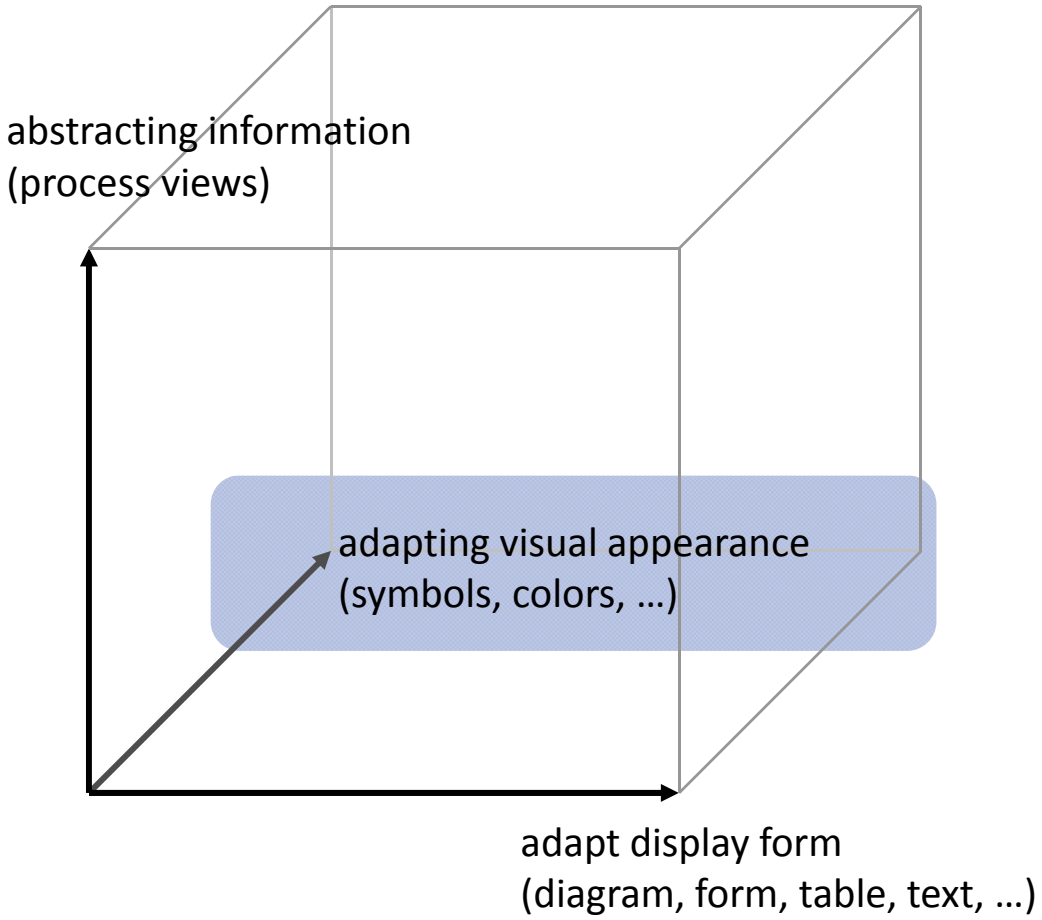
Proviado: Process Model Abstraction – High-Level Operations

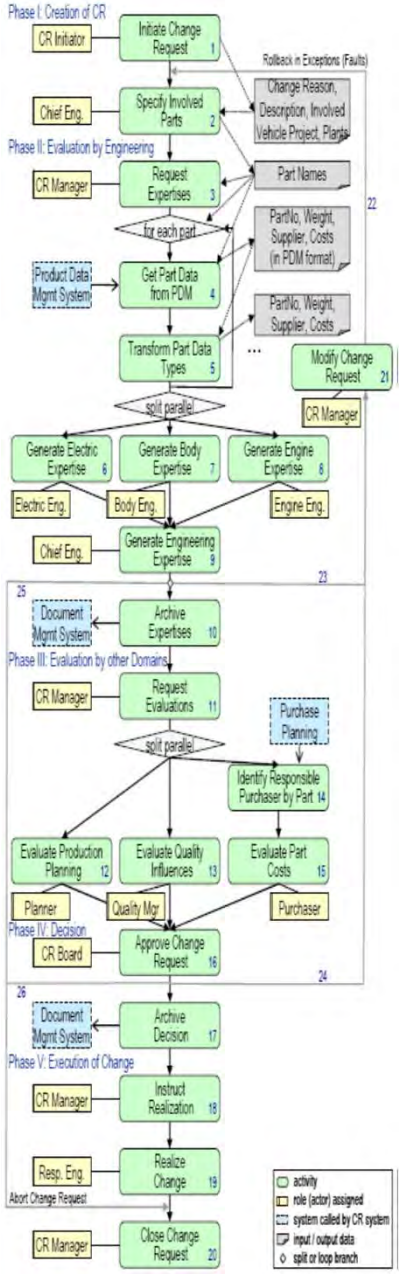
Example:

ShowMyActivities



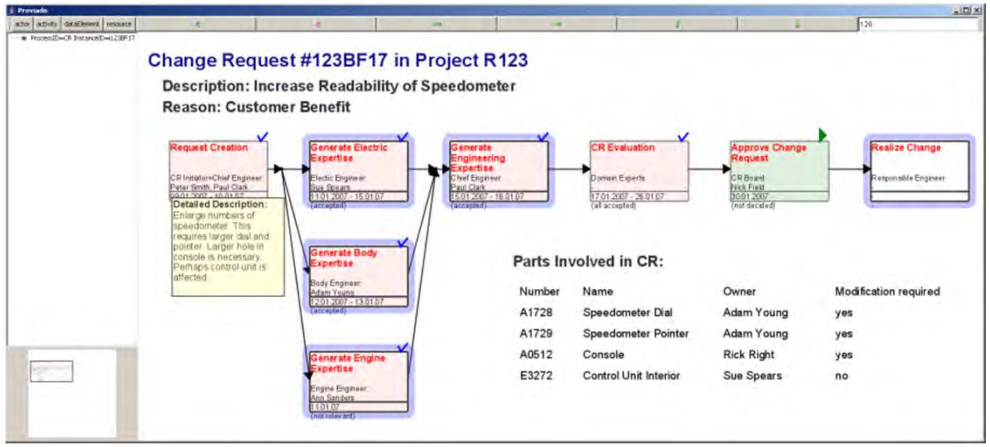
The Proviado Visualization Framework



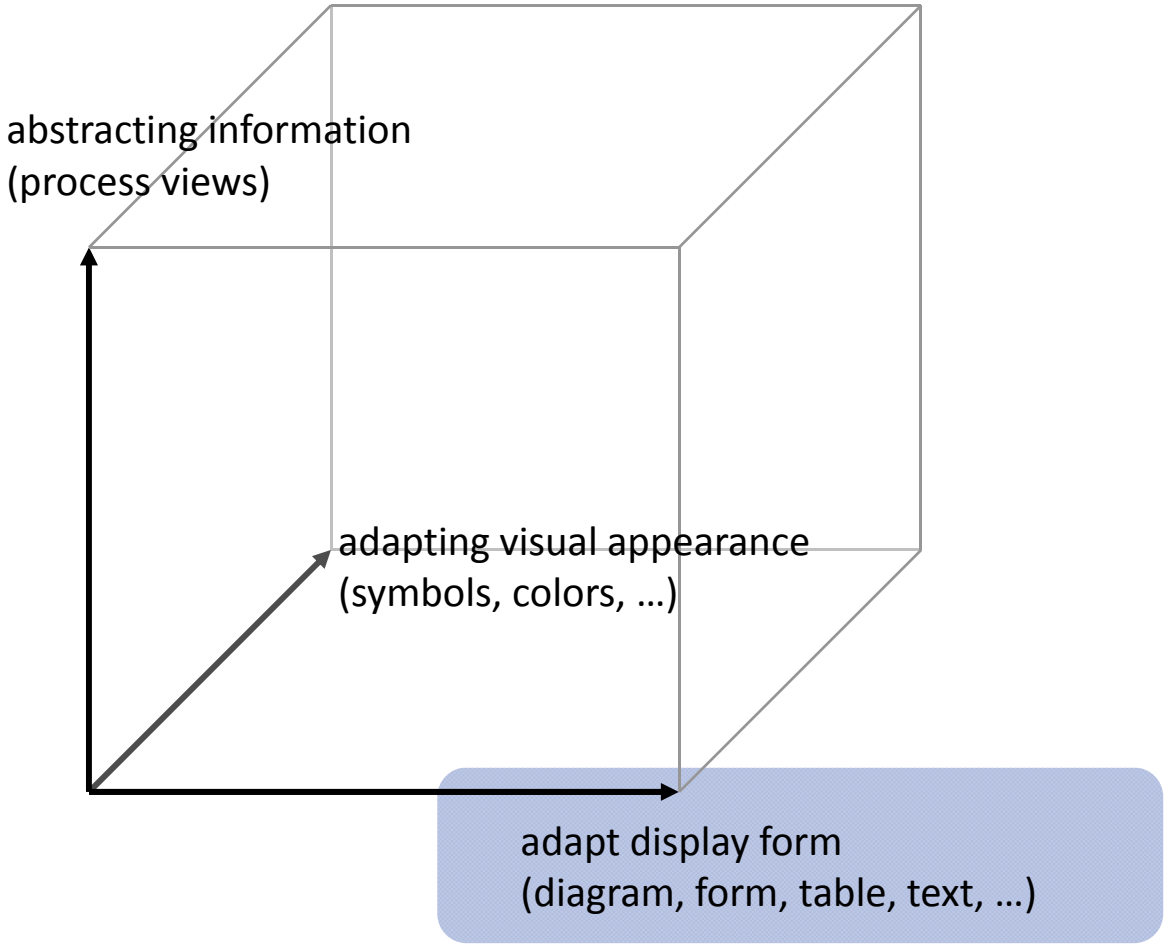


Proviado: Abstraction + Visual Configuration

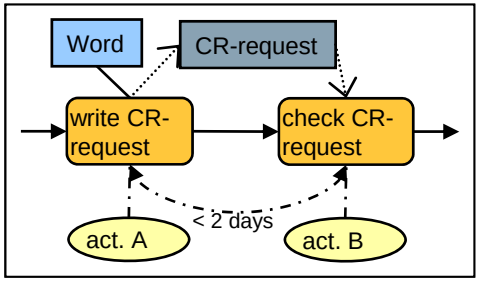
Personalized Visualization

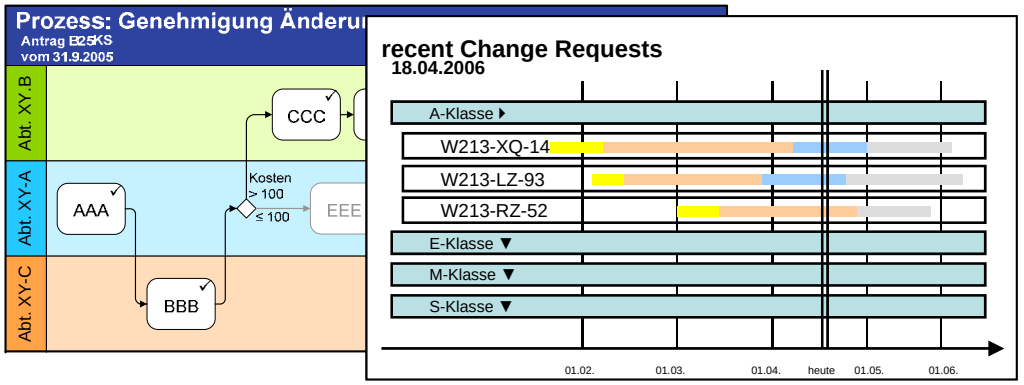


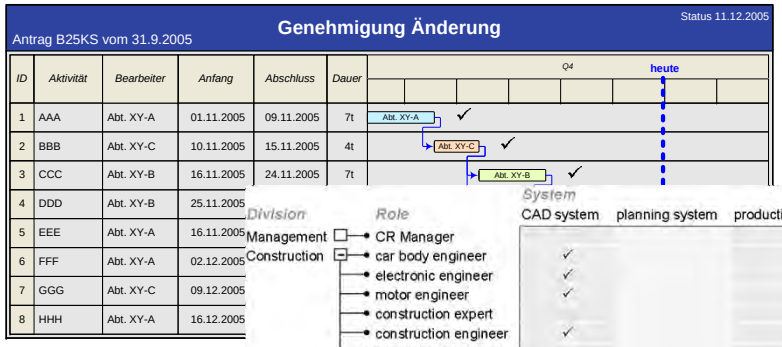
The Proviado Visualization Framework

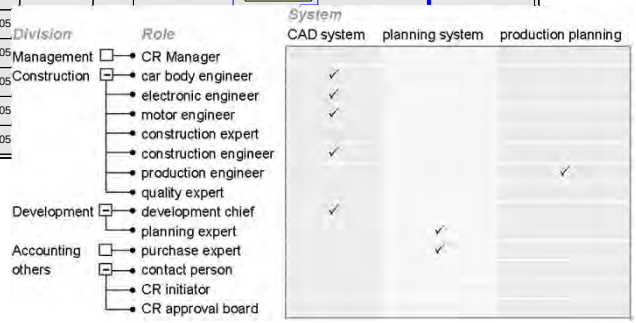


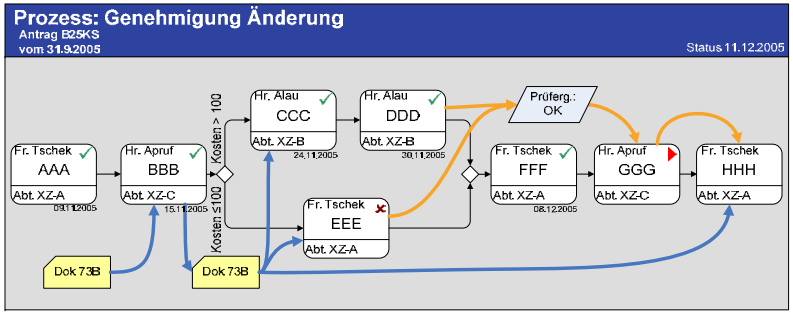
Proviado: Supporting Different Display Forms for Process Models



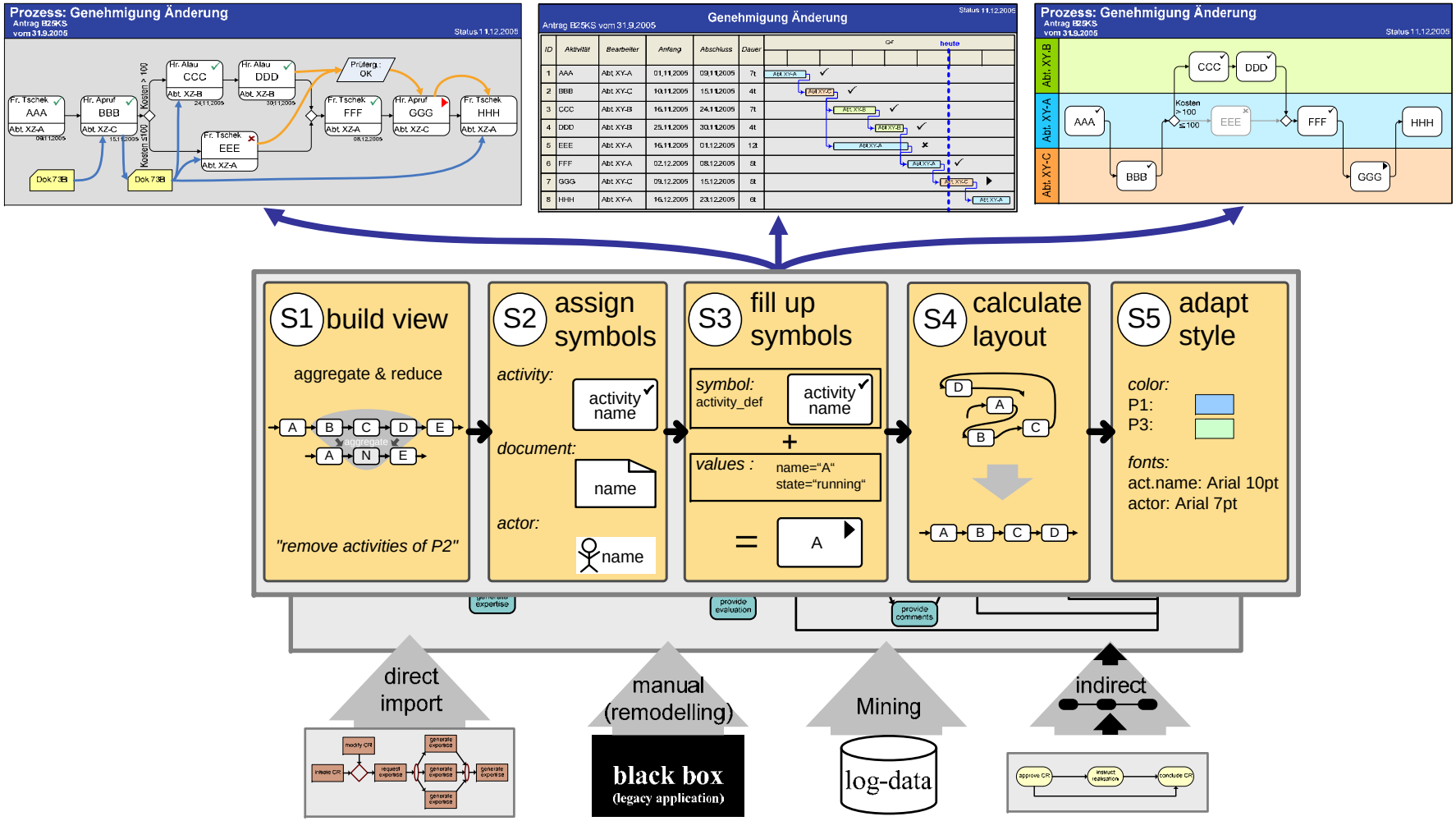






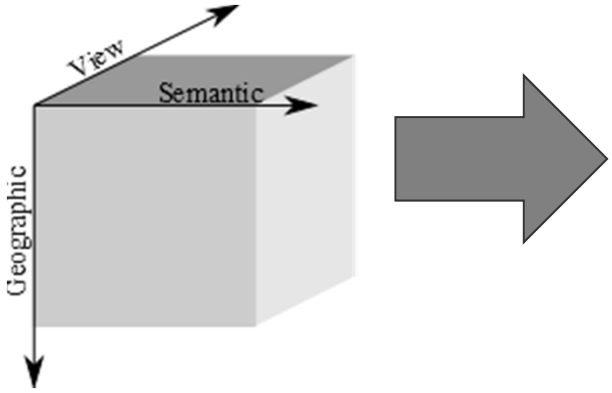


The Proviado Visualization Framework: Achievements

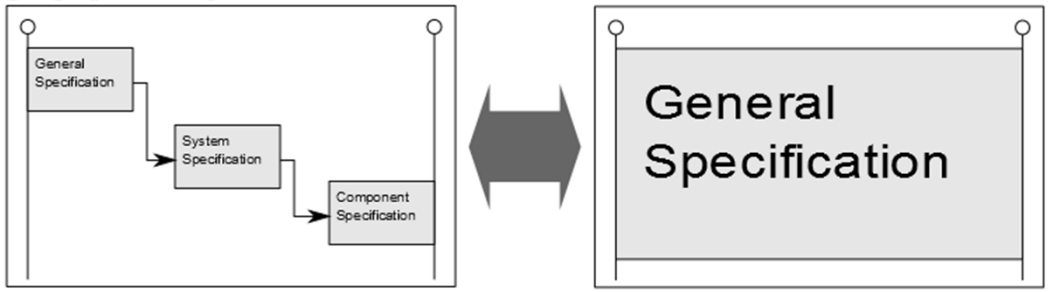


Topics we are currently working on …

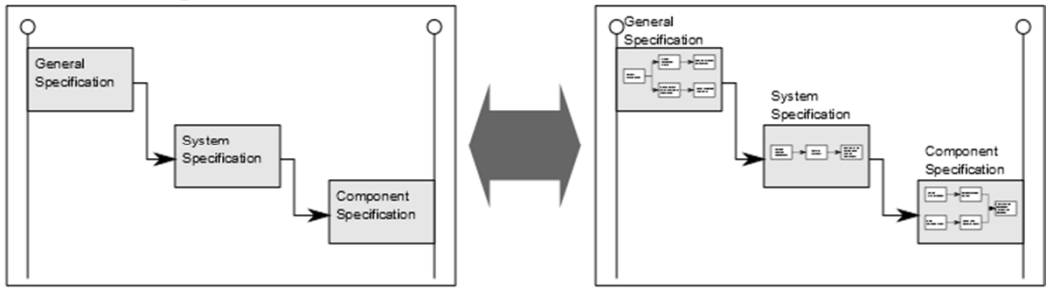
Process Navigation Support (niPRO project)



(a) geographic navigation dimension

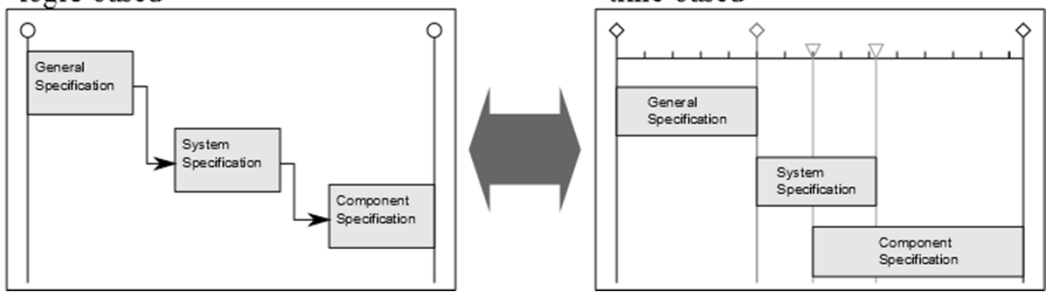


(b) semantic navigation dimension



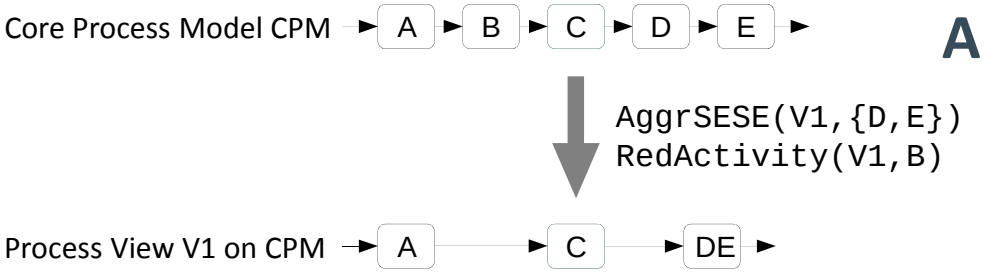
(c) view navigation dimension

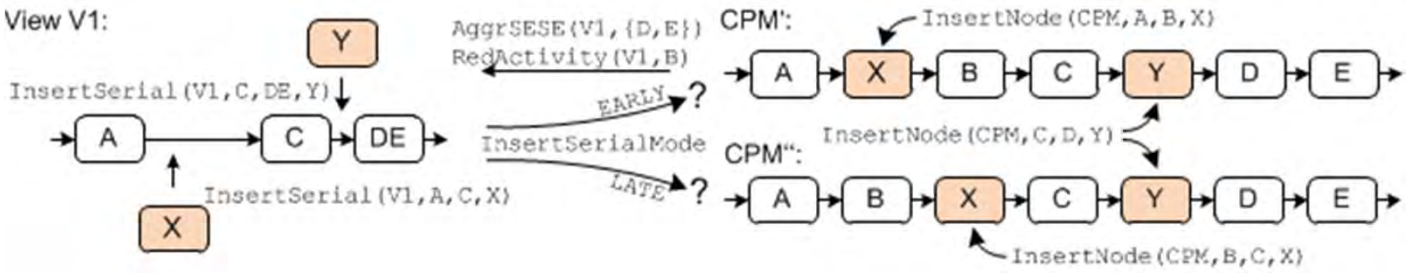
"logic-based" "time-based"



Topics we are currently working on …

Updatable Process Model Abstractions (Process Views)



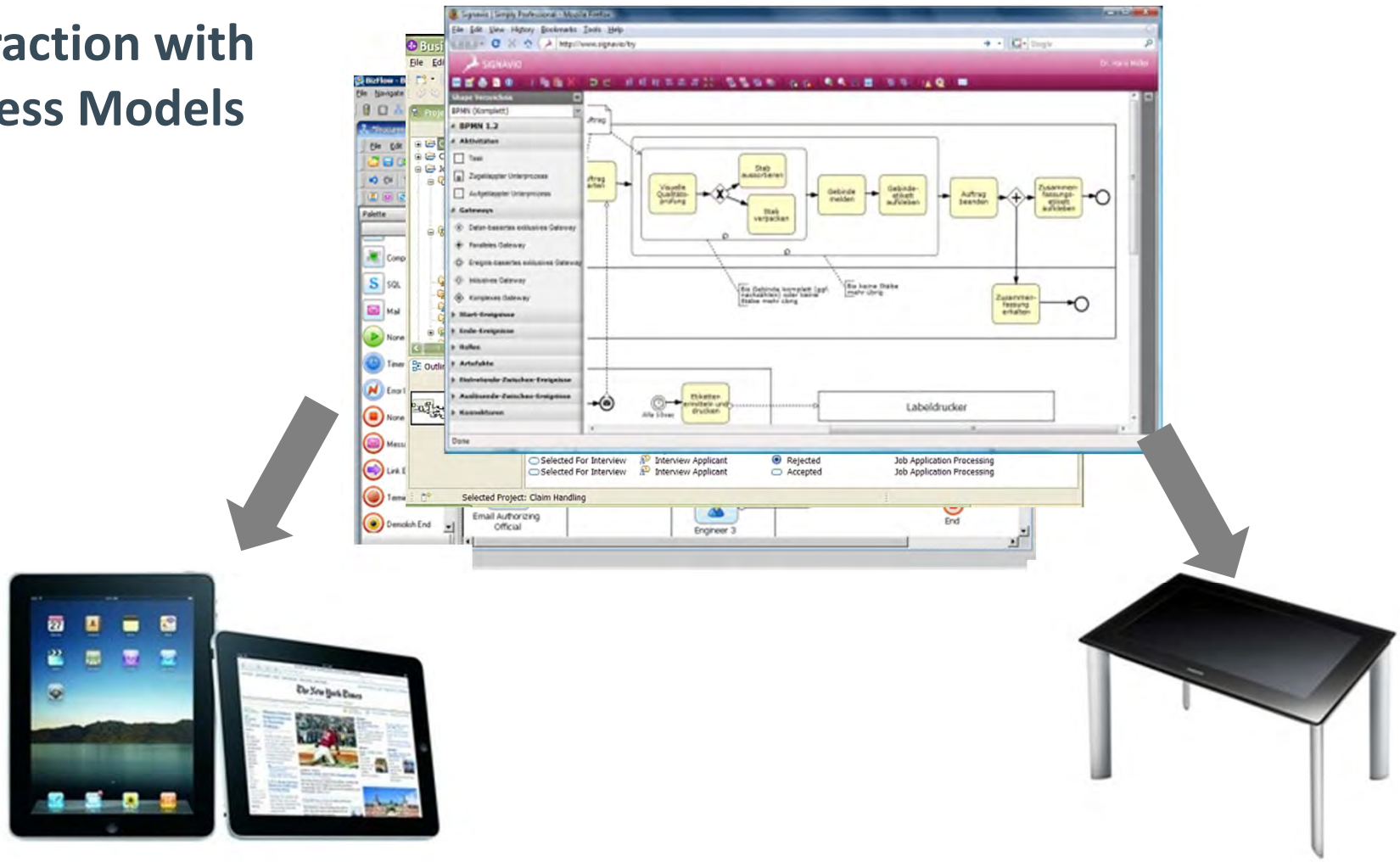


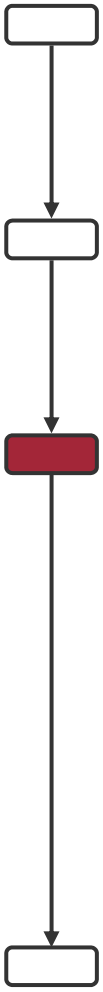
proVie

Create Update Execute Appearance

Topics we are currently working on …

Gesture-based Interaction with Process Models





Process-Aware Information Systems

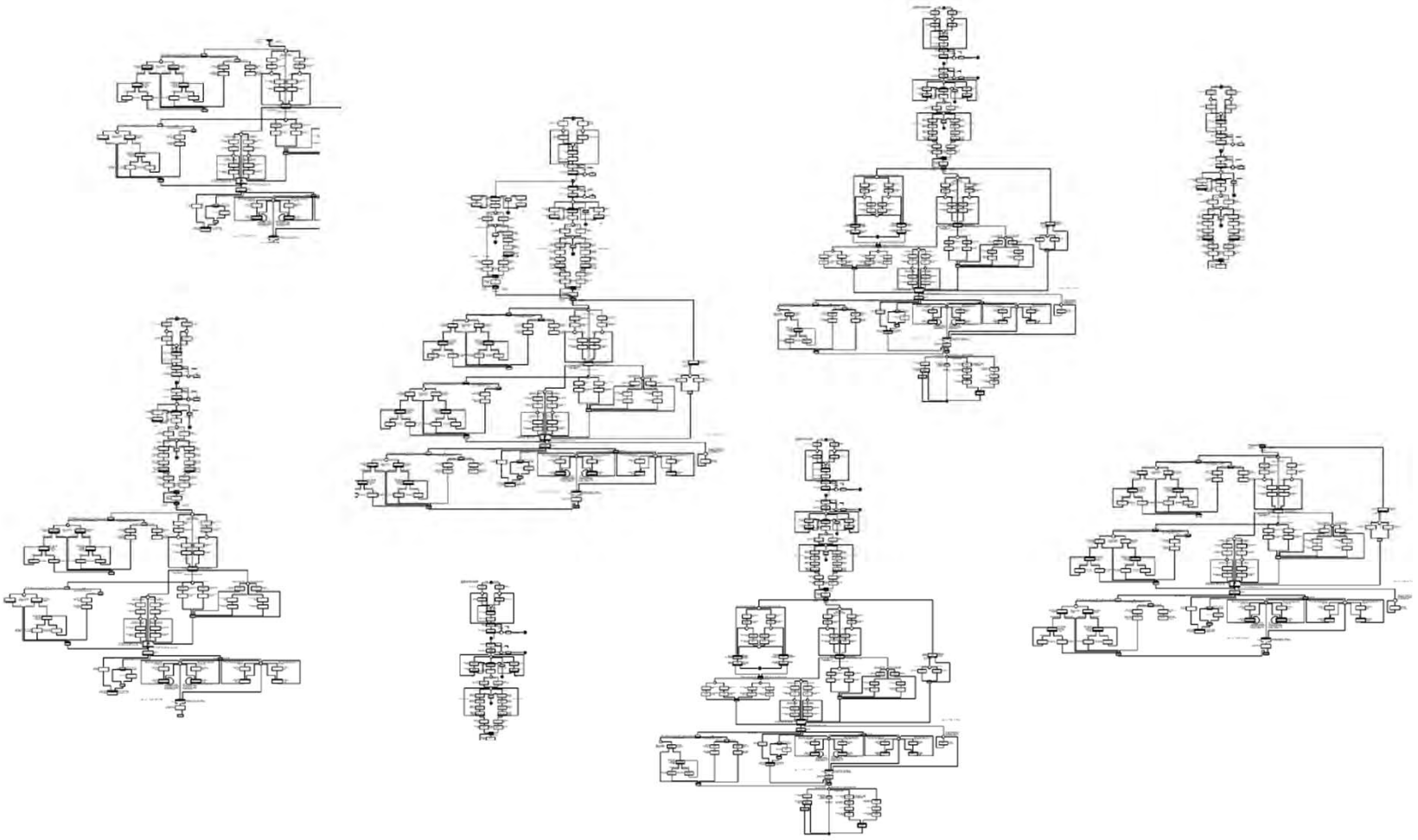
A Decade of Research on Flexible Process-Aware Information Systems and its Achievements

A Decade of Research on Large Processes in the Automotive Industry and Enabling Technologies

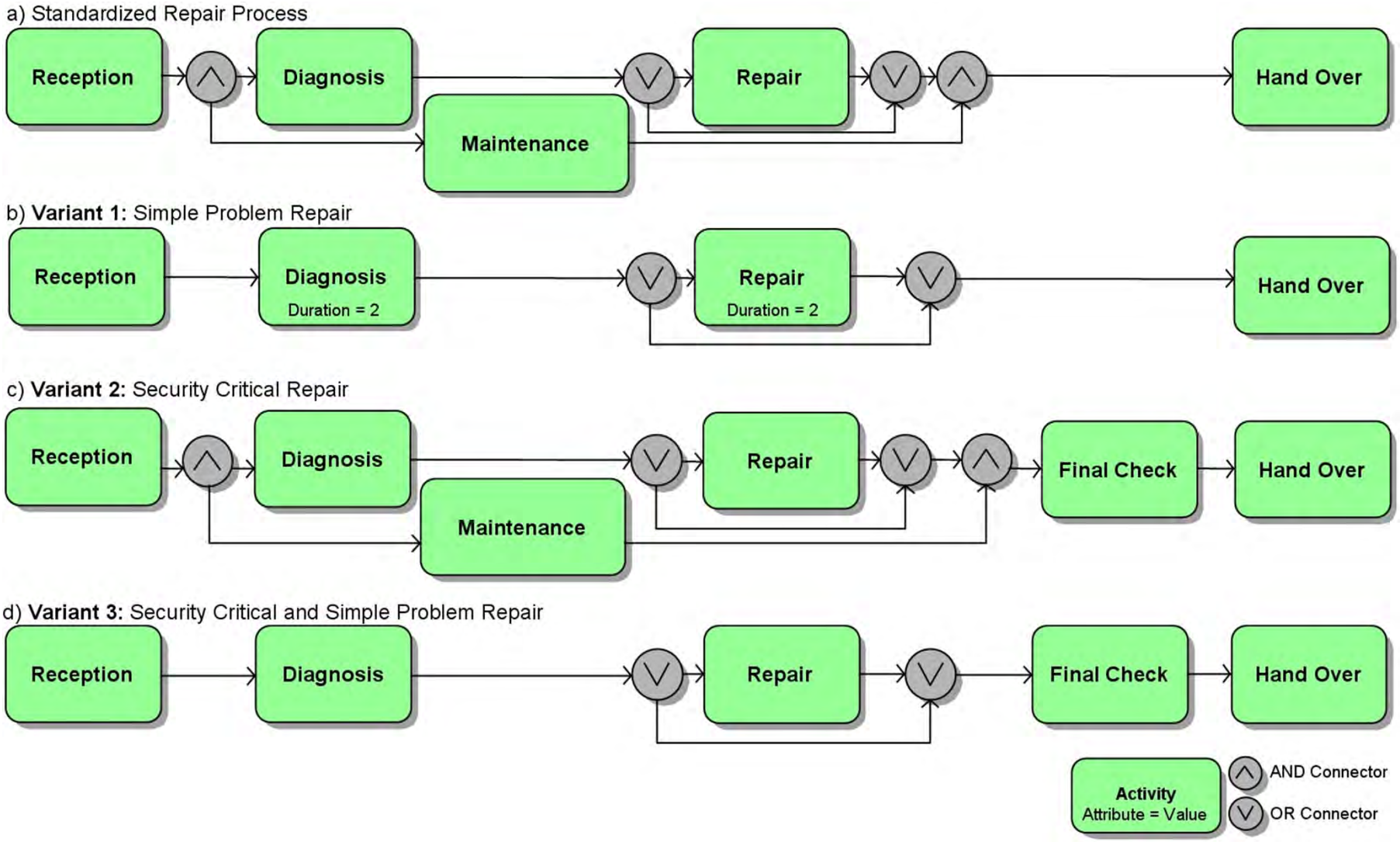
- **Large Process Models**
- **Large Process Collections**
- **Large Process Structures**

Other Running Projects

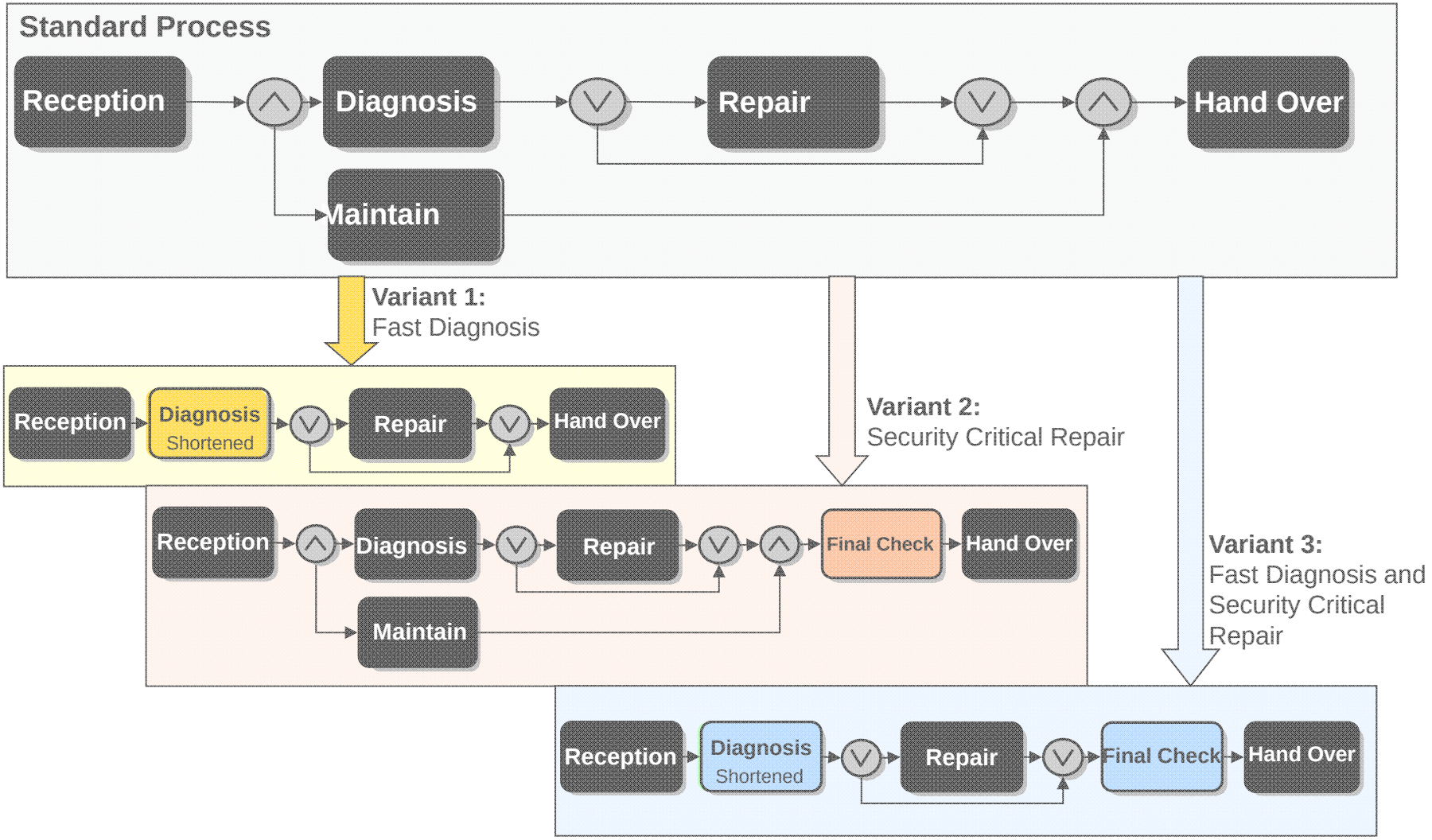
The Challenge: Dealing with Large Process Model Collections



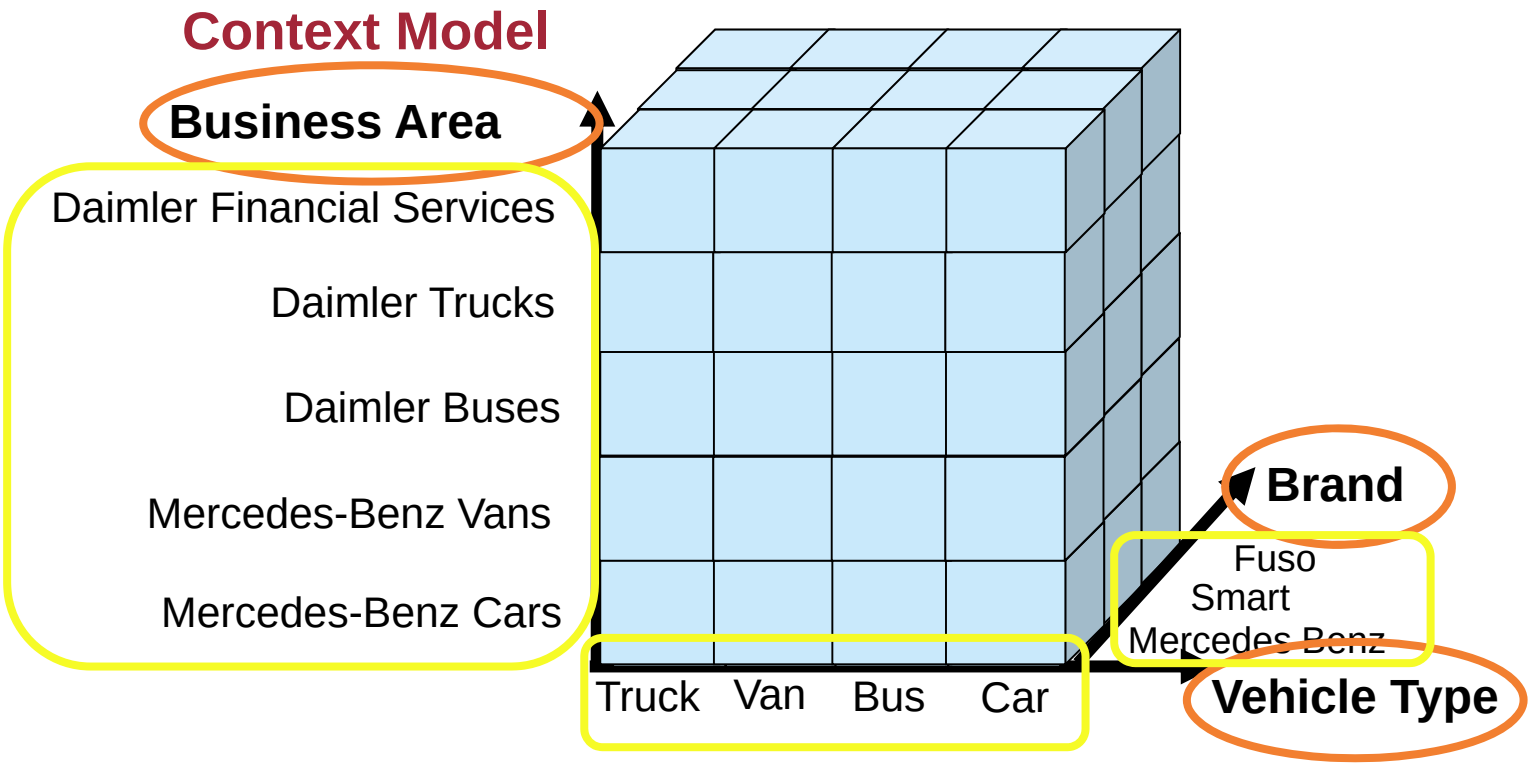
… and a Particular Challenge: Managing Process Variants



… and a Particular Challenge: Managing Process Variants



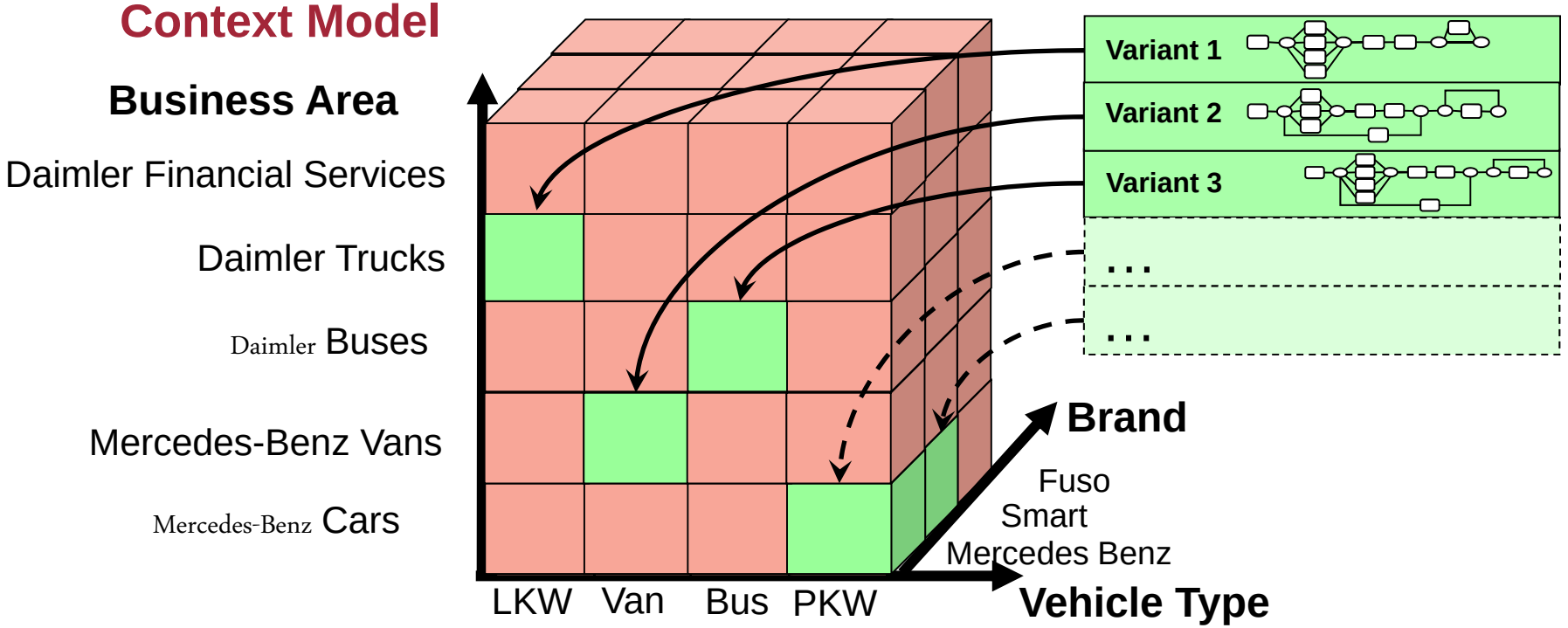
… and a Particular Challenge: Managing Process Variants



Problem: Not all value combinations make sense!

… and a Particular Challenge: Managing Process Variants

Context Model

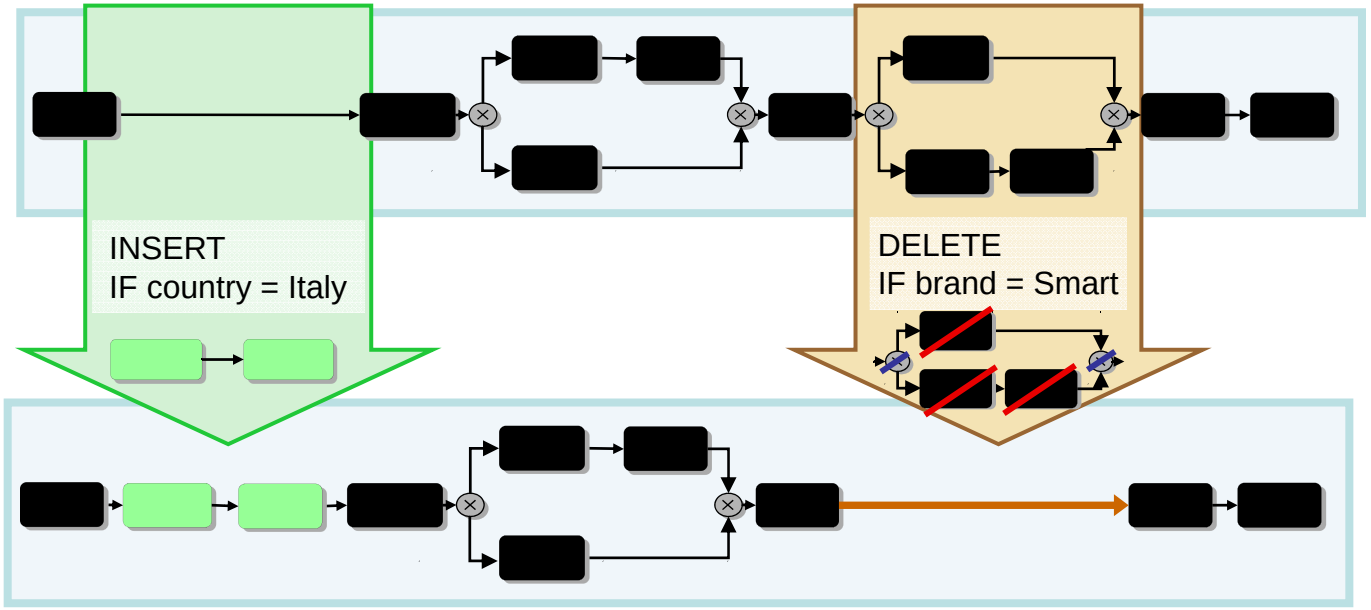


The Provop Approach for Managing Process Variants

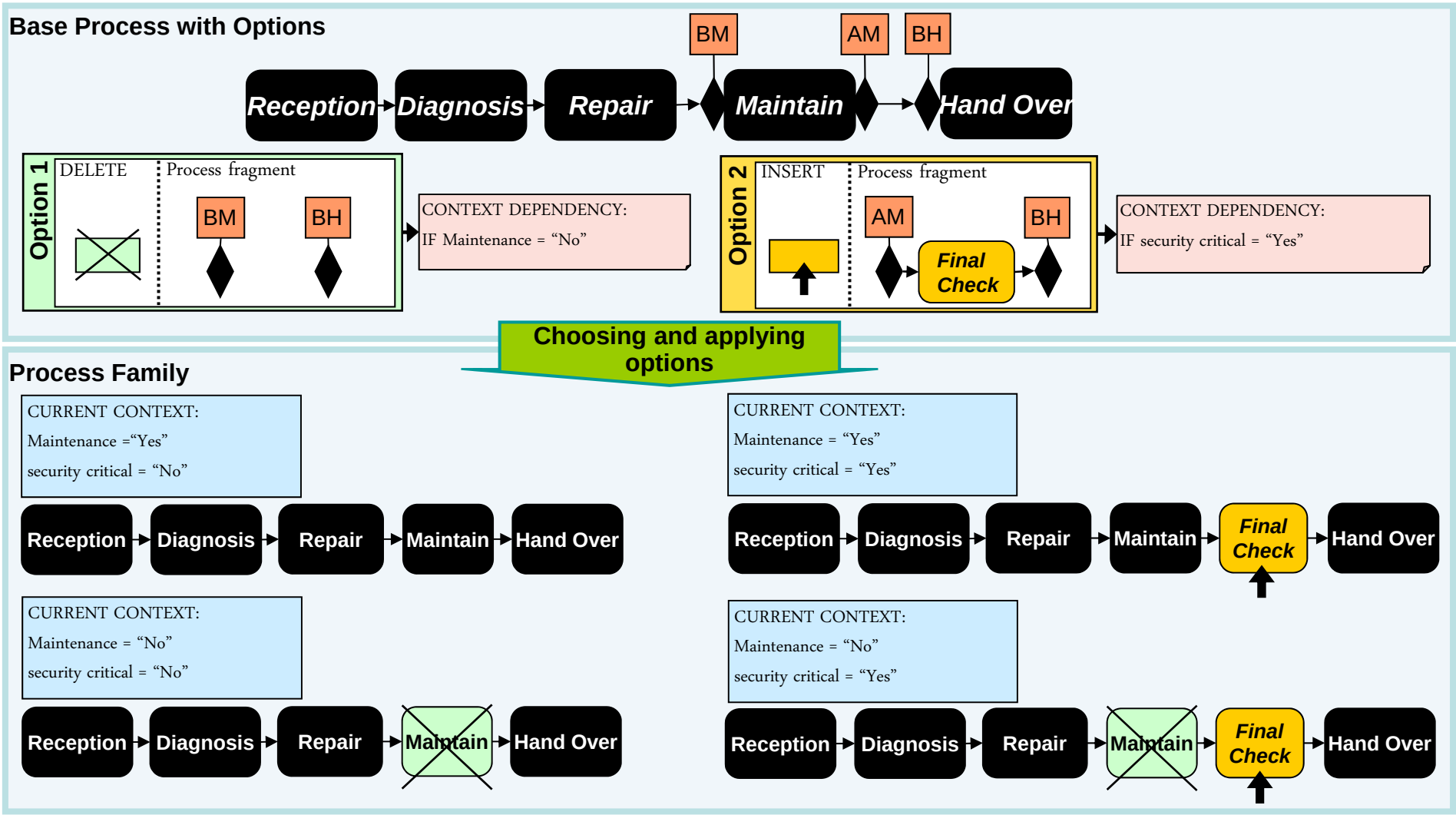
Base process

Variant specific adjustments

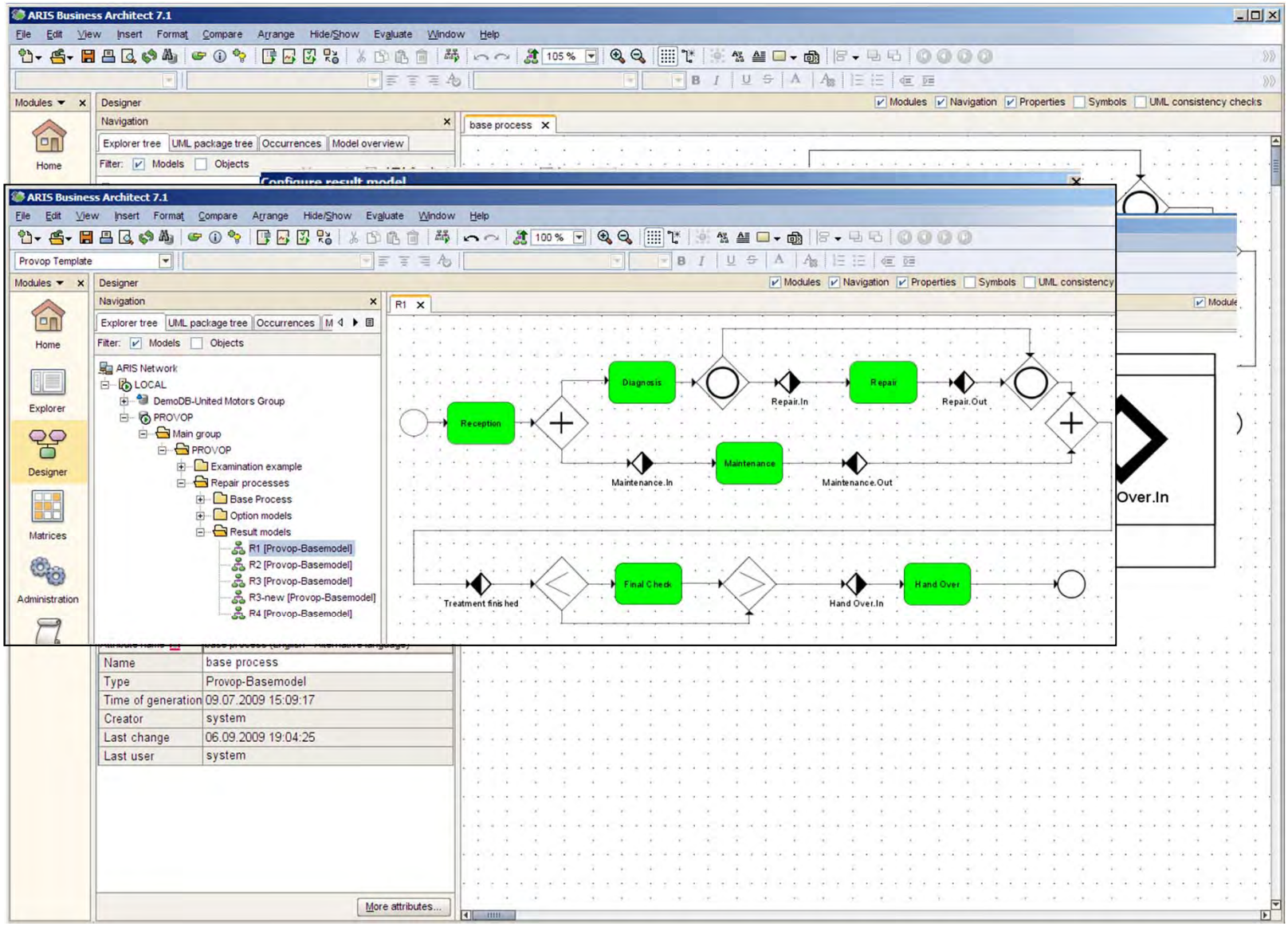
Configured process variant



The Provop Approach for Managing Process Variants



The Provop Approach for Managing Process Variants

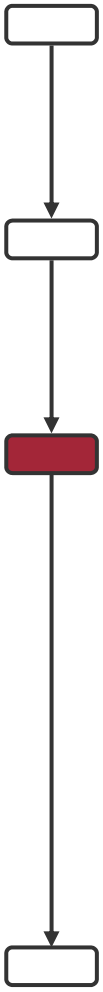


Topics we are currently working on, e.g.

VIVACE:

A Framework for the Systematic Evaluation of Variability Support in Process-Aware Information Systems

Clara Ayora, Victoria Torres,
Barbara Weber, Manfred Reichert



Process-Aware Information Systems

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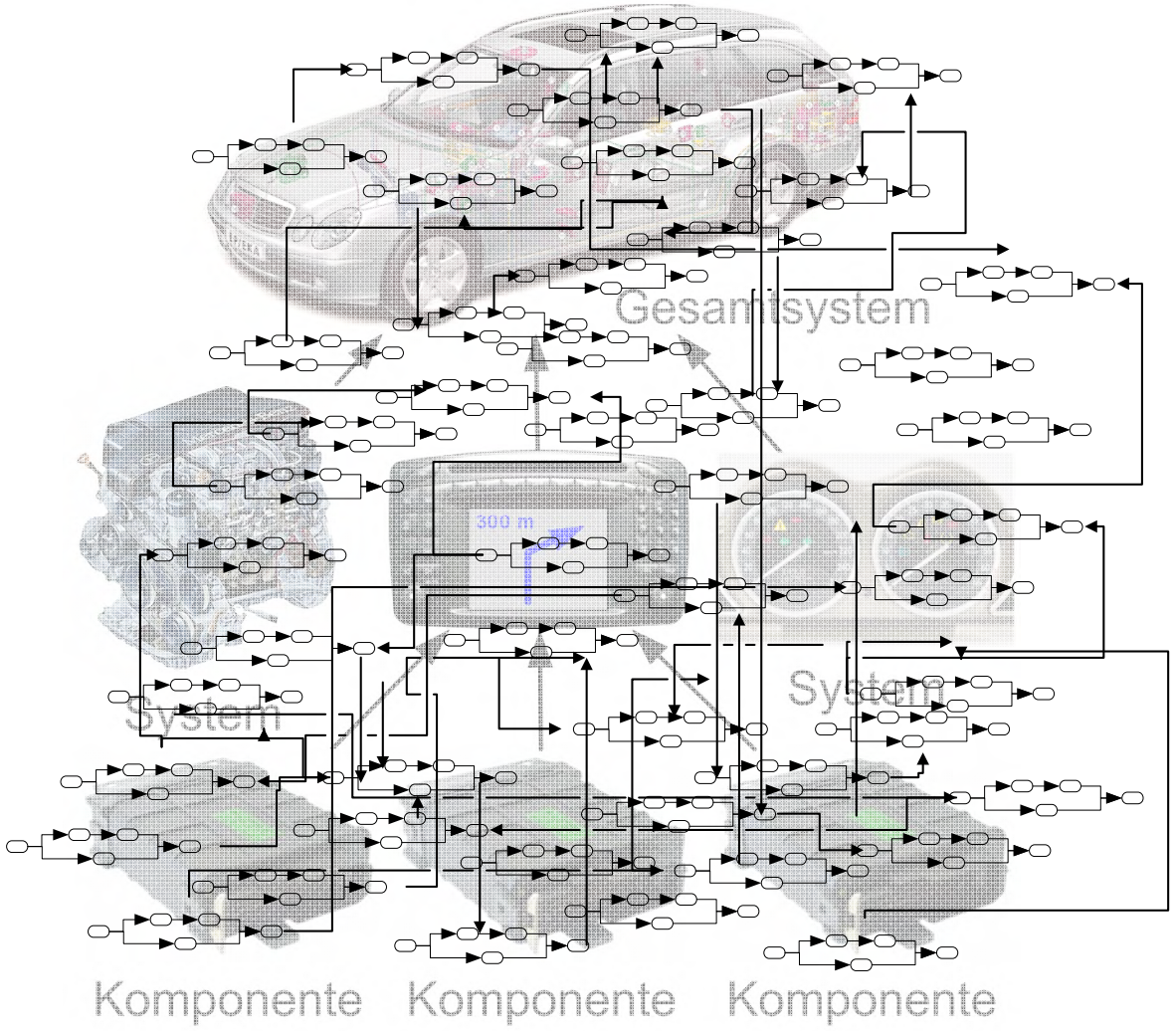
- **Large Process Structures**

Other Running Projects

The Challenge: Dealing with Large and Complex Process Structures



The Challenge: Dealing with Large and Complex Process Structures

Automotive Engineering:

- Electrical control units (ECUs) become more and more important:
  - provide many safety-critical functions
  - fast implementation of changes: adjustments and bug fixes by flashing new software onto the ECU
- Modern cars comprise up to 70 ECUs; >10.000.000 LoC
- ECUs interconnected by up to 10 buses with 2 kilometers of wires
- 90% of car innovations enabled by E/E systems

Example:
Electronics in side door

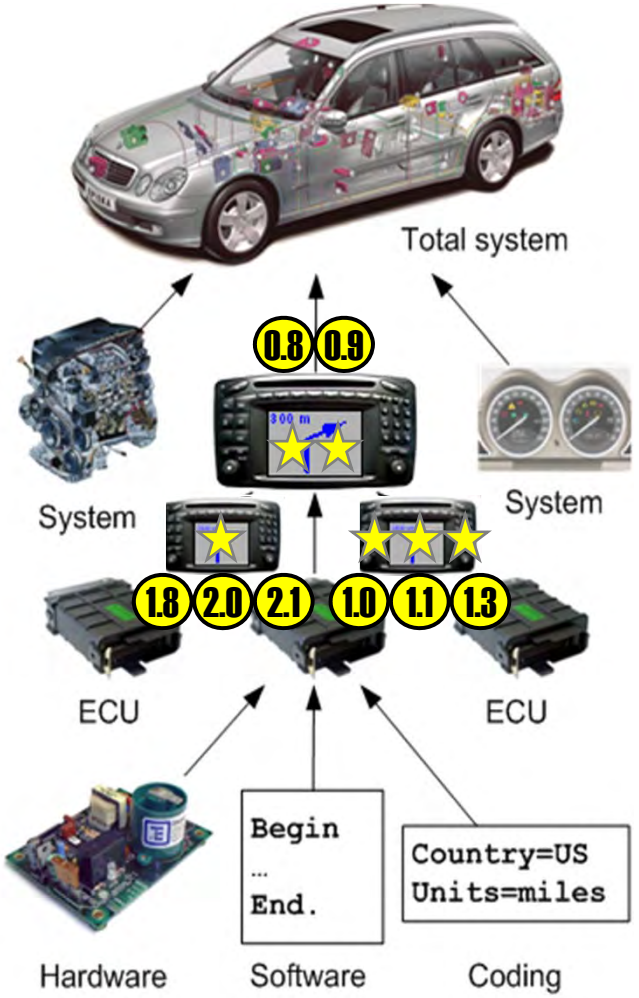
- **Power window**
  - Safety stop
  - Close with central locking system
  - Safety functions (Presafe)
  - Communication with air condition
- **Electrical side mirrors**
  - Electrical adjustment
  - Electrical heating
  - Memory function
  - Retractable side mirror
  - Automatic fading out
  - Ambient illumination
  - Turn indicator
- **Door lock**
  - Open / Close with central locking system
  - Sensors for alarm system
  - Power closing
- **Sidebags**
  - Side impact sensors
- **Active surround speakers**
- **Control unit for**
  - Power windows
  - Mirror adjustment
  - Seat adjustment
  - Memory function
  - Child safety lock
  - Central locking system

The Challenge: Dealing with Large and Complex Process Structures

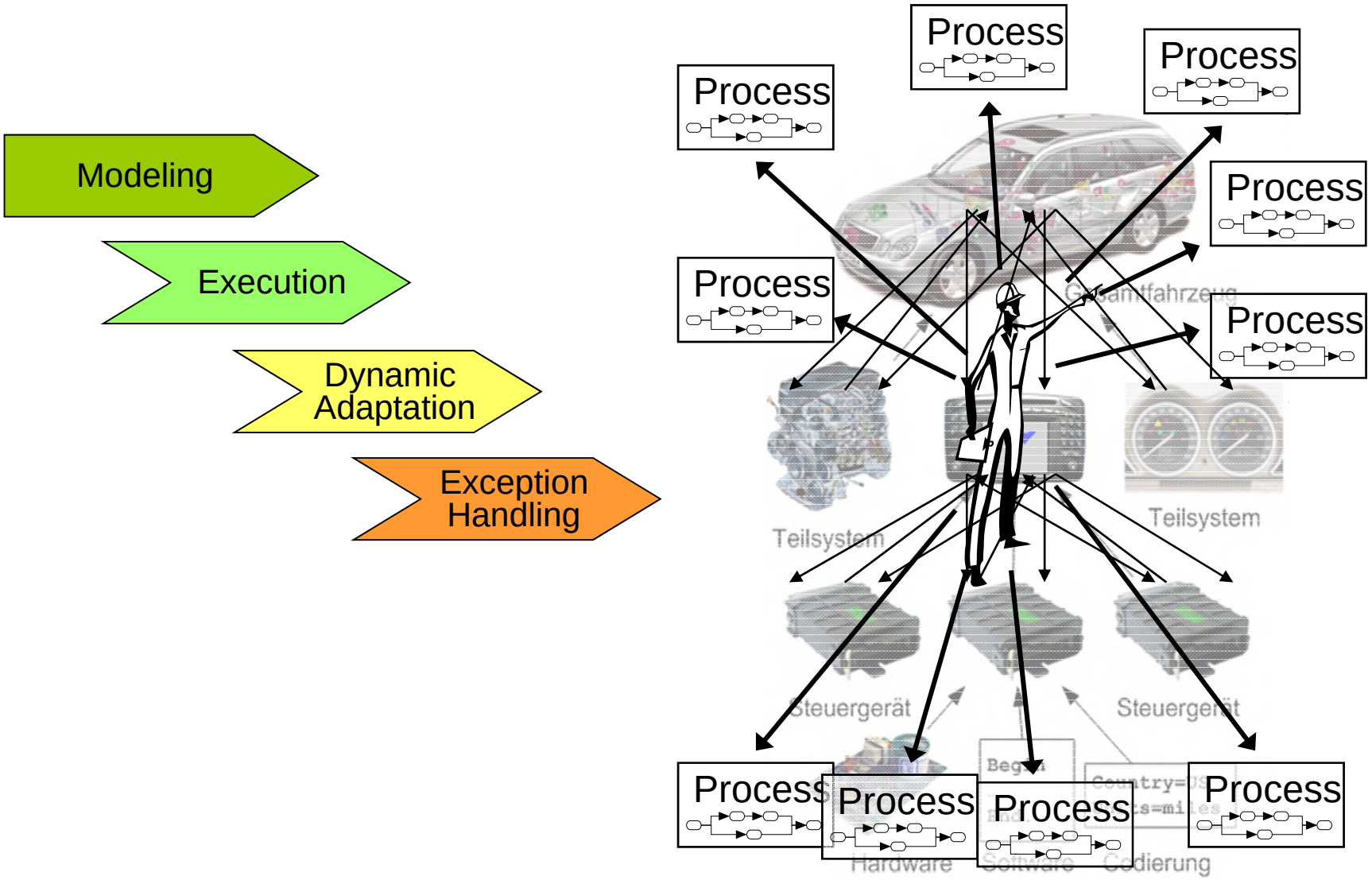
Current Problems in Automotive Engineering

- Up to 50% of all car breakdowns due to electrical / electronic problems
- Some facts
  - Many non-obvious dependencies between ECUs
  - Different life and development cycles of mechanics, hardware and software
  - Numerous ECU variants and versions

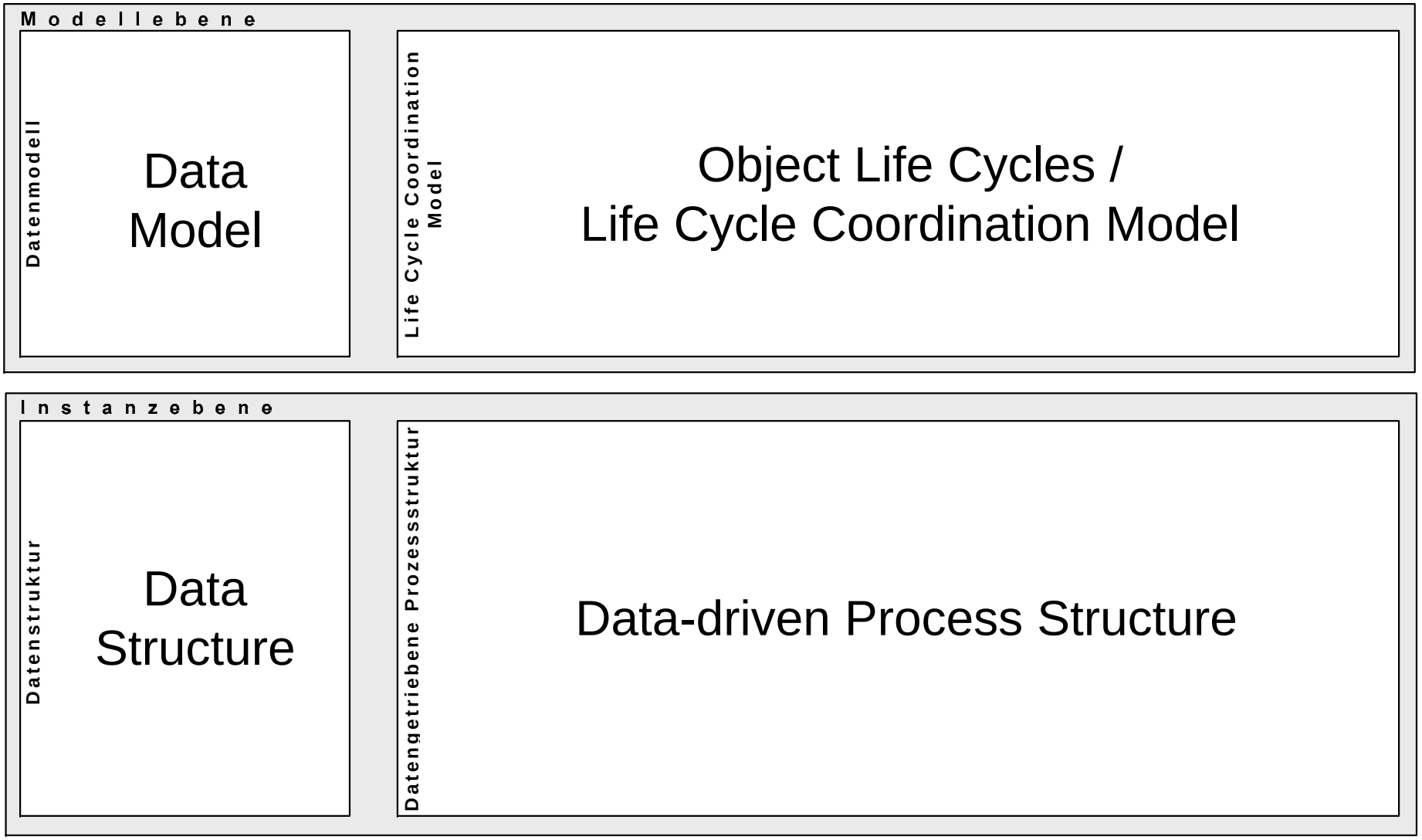
☞ **Systematic verification and release management required**



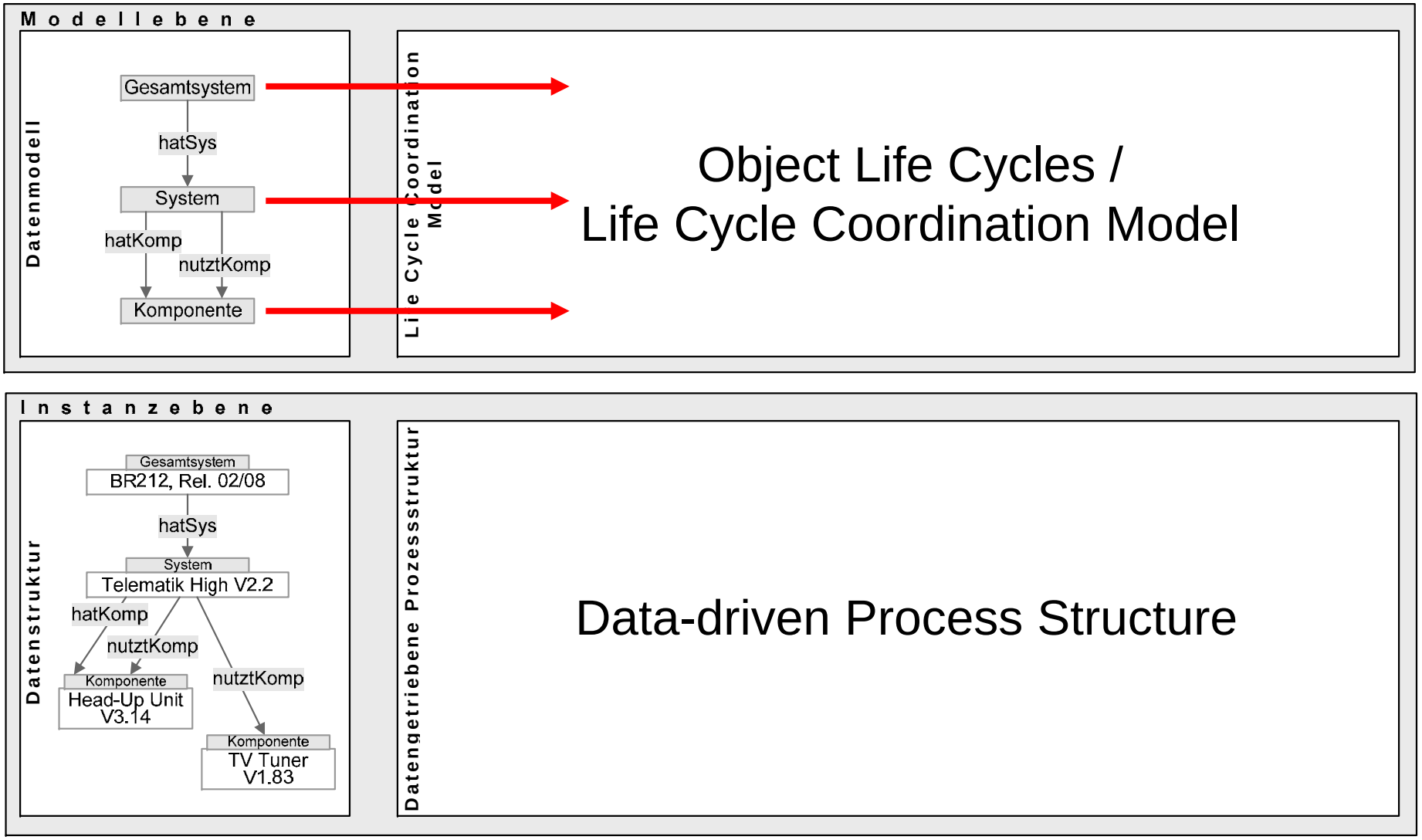
The Challenge: Dealing with Large and Complex Process Structures



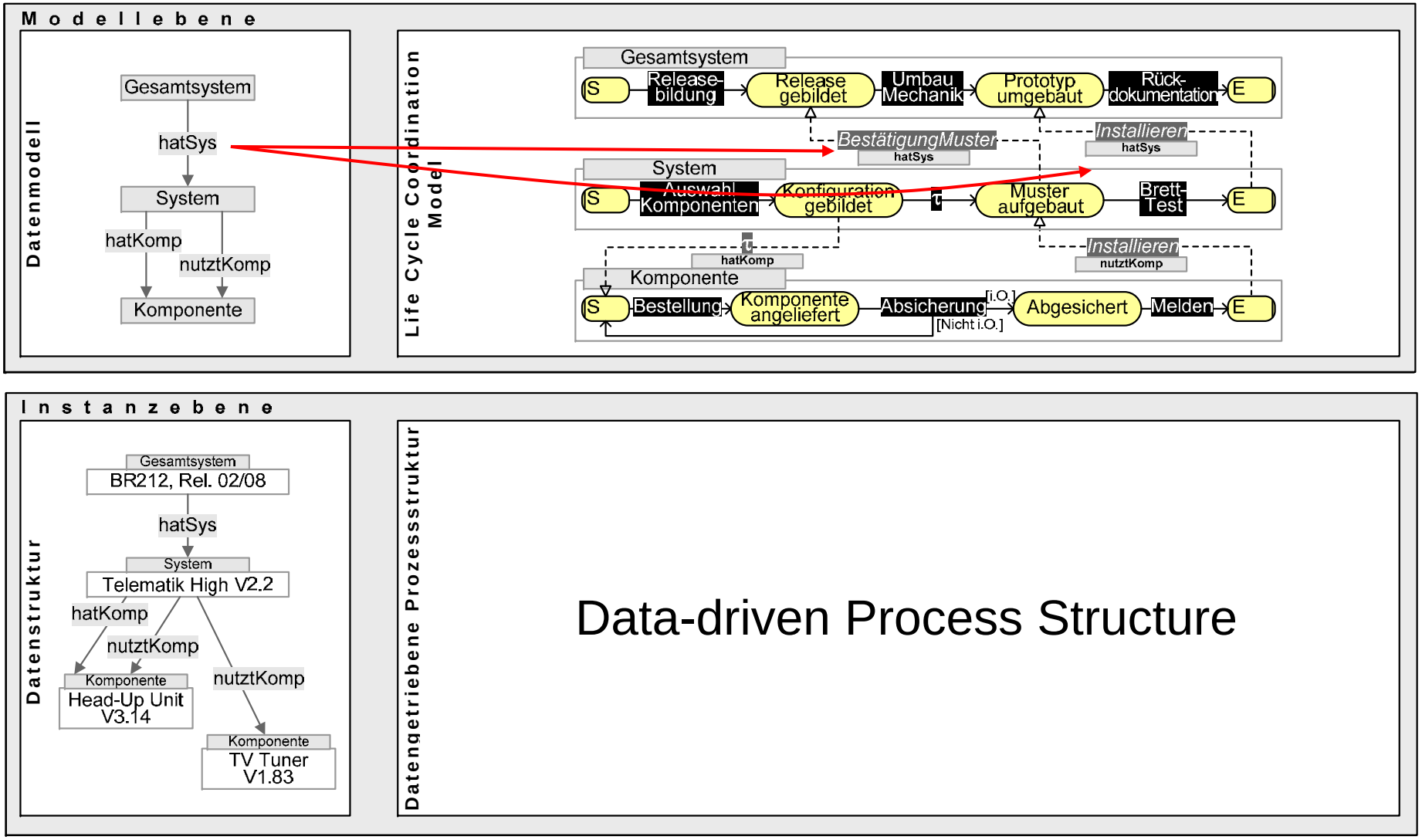
The Corepro Project – Basic Approach



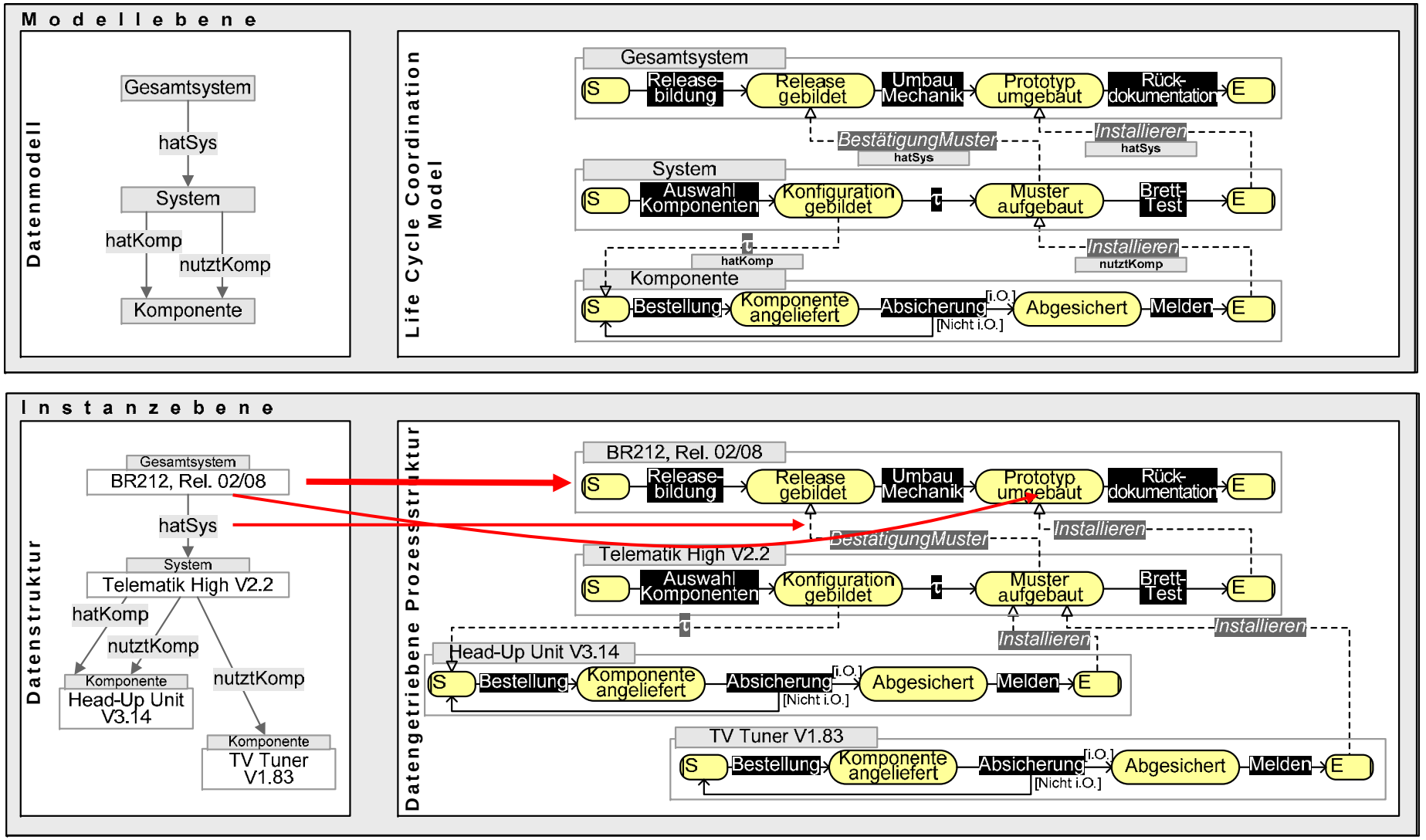
The Corepro Project – Basic Approach

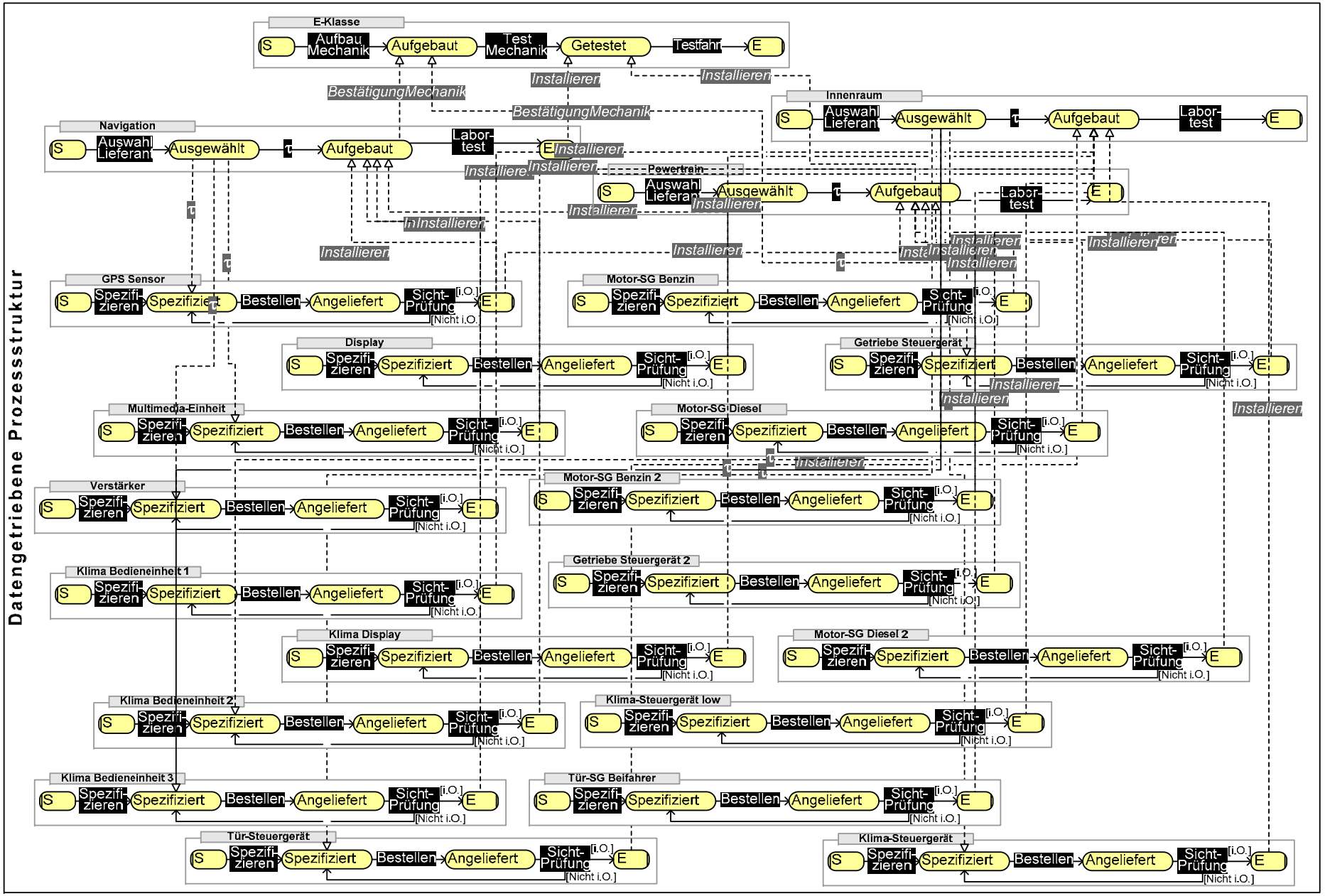


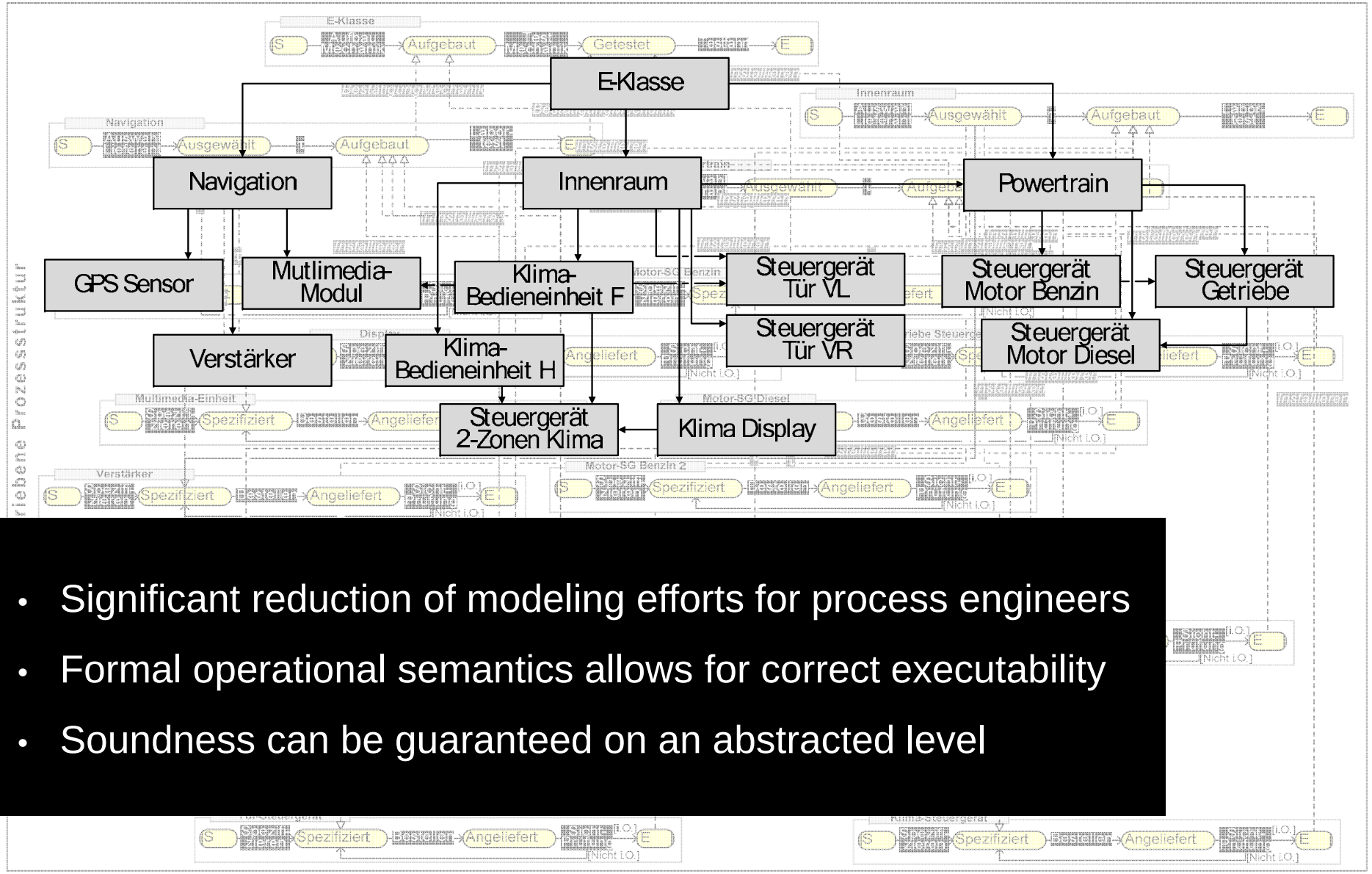
The Corepro Project – Basic Approach



The Corepro Project – Basic Approach



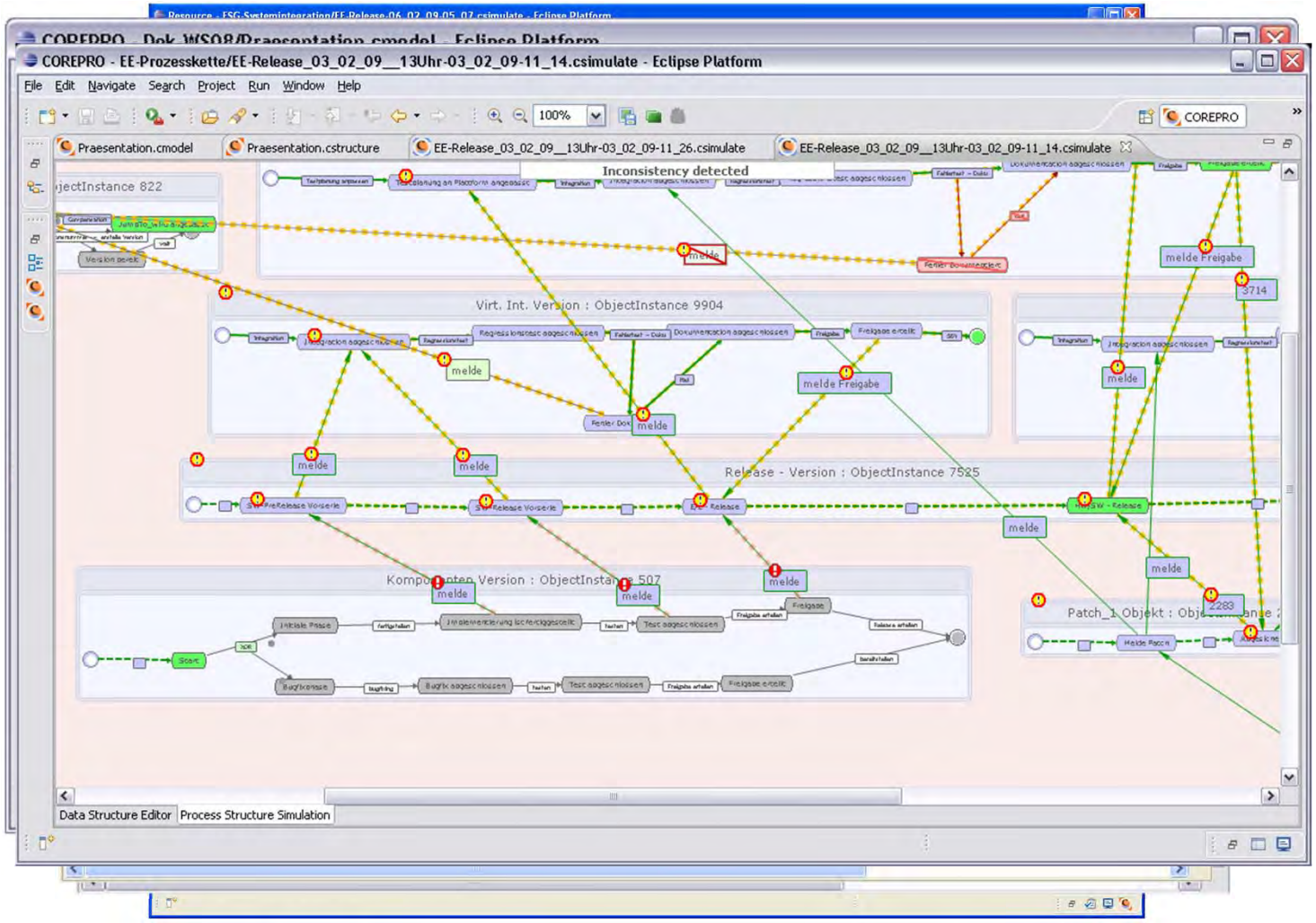

Datengetriebene Prozessstruktur
E-Klasse
S
Aufbau Mechanik
Aufgebaut
Test Mechanik
Getestet
Testfahrt
E
BestätigungMechanik
Installieren
Navigation
Auswahl Lieferant
Ausgewählt
Aufgebaut
Labor-test
Innenraum
Powertrain
GPS Sensor
Spezifi-zieren
Spezifiziert
Bestellen
Angeliefert
Sicht-Prüfung
[i.O.]
[Nicht i.O.]
Motor-SG Benzin
Display
Getriebe Steuergerät
Multimedia-Einheit
Motor-SG Diesel
Verstärker
Motor-SG Benzin 2
Klima Bedieneinheit 1
Getriebe Steuergerät 2
Klima Display
Motor-SG Diesel 2
Klima Bedieneinheit 2
Klima-Steuergerät low
Klima Bedieneinheit 3
Tür-SG Beifahrer
Tür-Steuergerät
Klima-Steuergerät



- Significant reduction of modeling efforts for process engineers
- Formal operational semantics allows for correct executability
- Soundness can be guaranteed on an abstracted level

The Corepro Project – Exception Handling

Au[illegible]sture



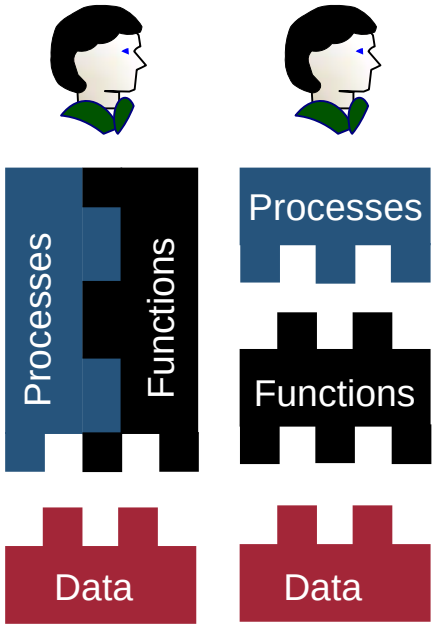
Topics we are currently working on, e.g.

The PHILharmonicFlows Project

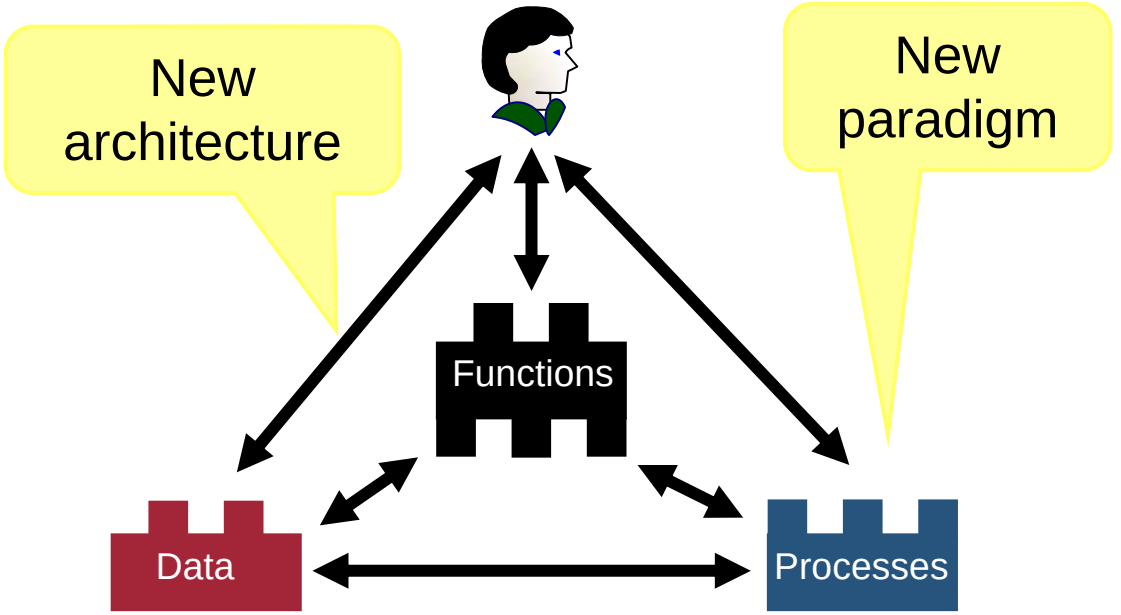
Object-Aware Process Management

Vera Künzle, Manfred Reichert & Persis GmbH

Object-Aware Process Management



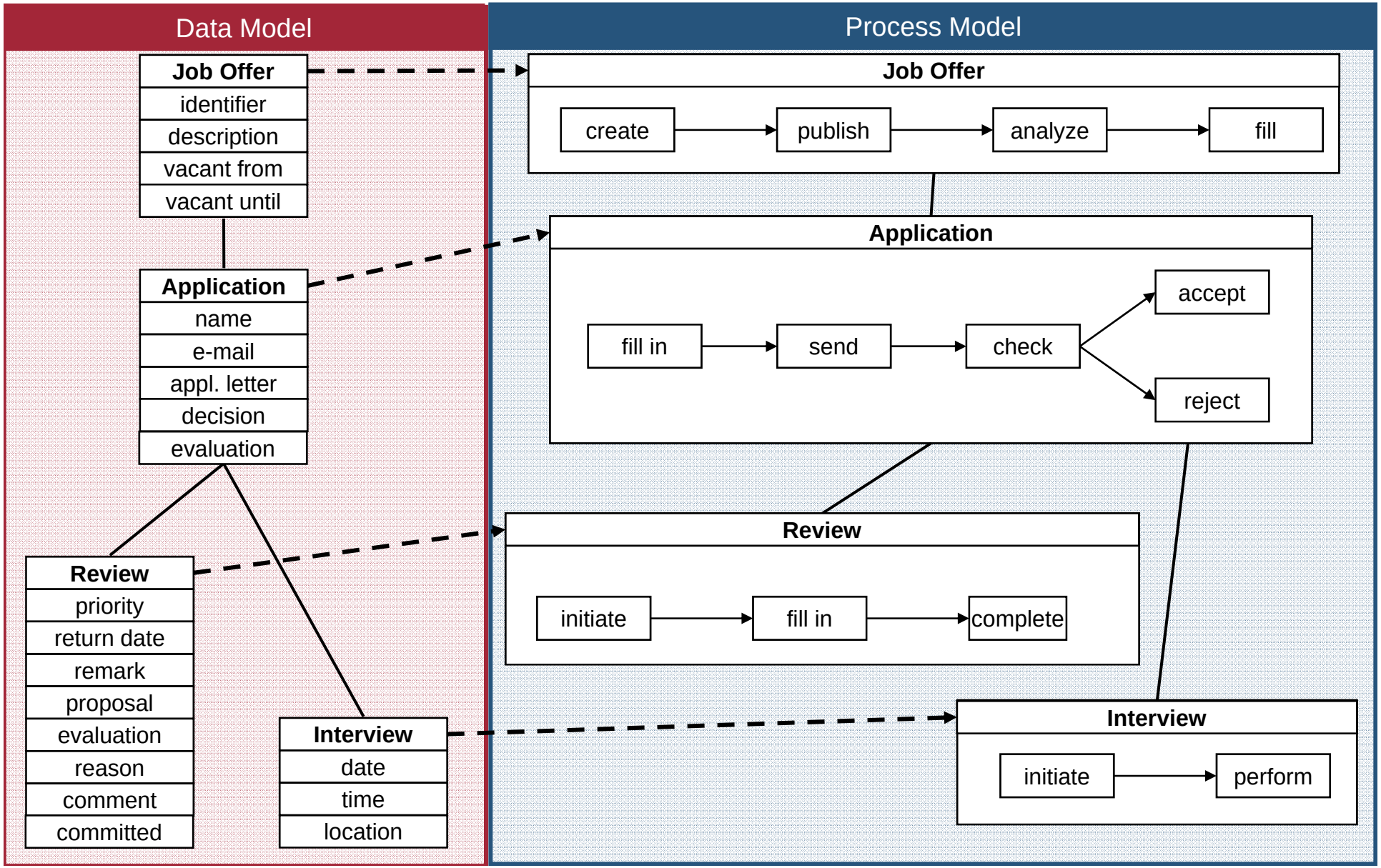
+ DBMS + PrMS



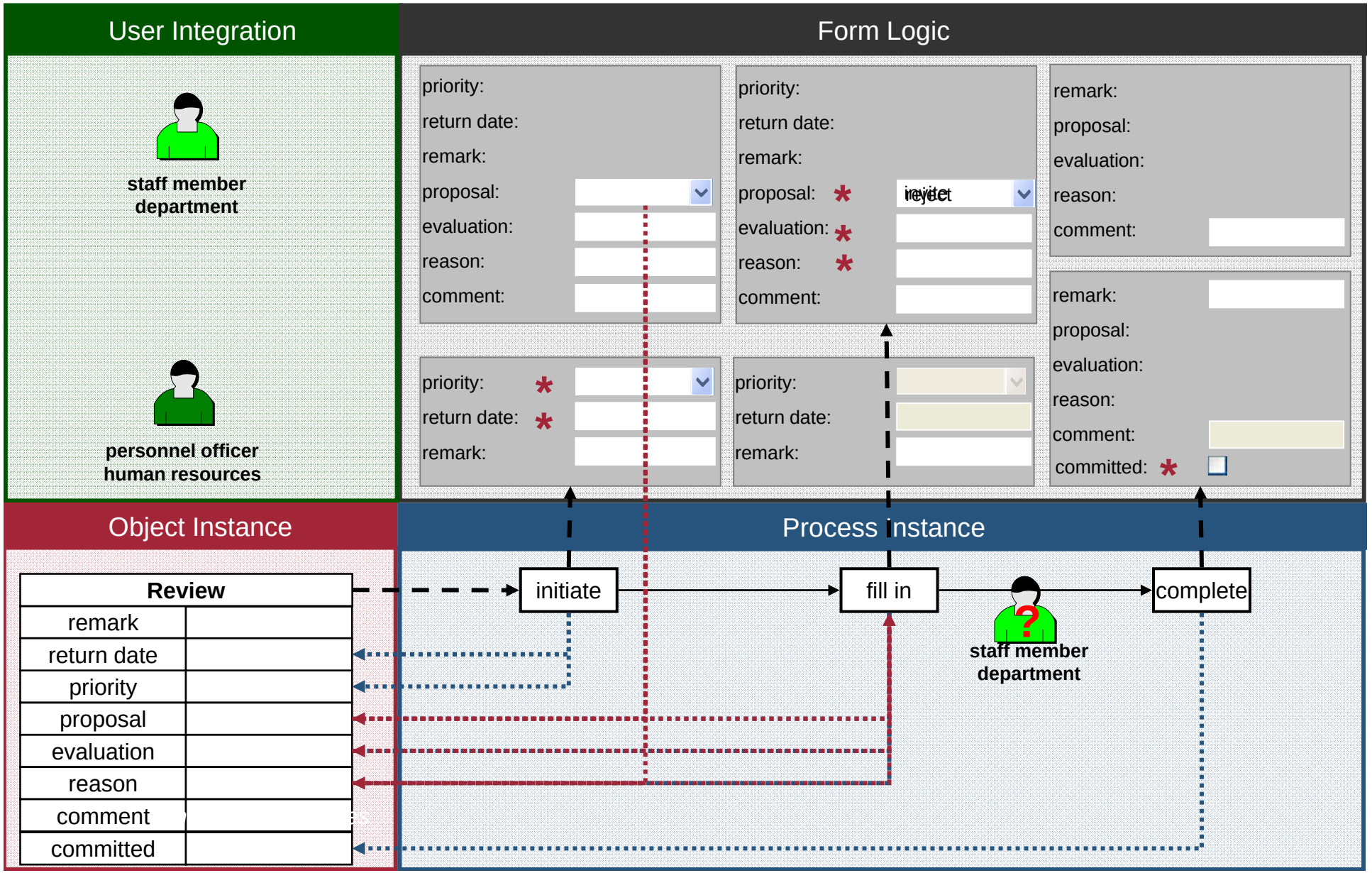
Object-aware Process Management

- Modeling object behavior and interactions
- Runtime interpretation based on a precise operational semantics
- Automated generation of end-user components (e.g. forms)

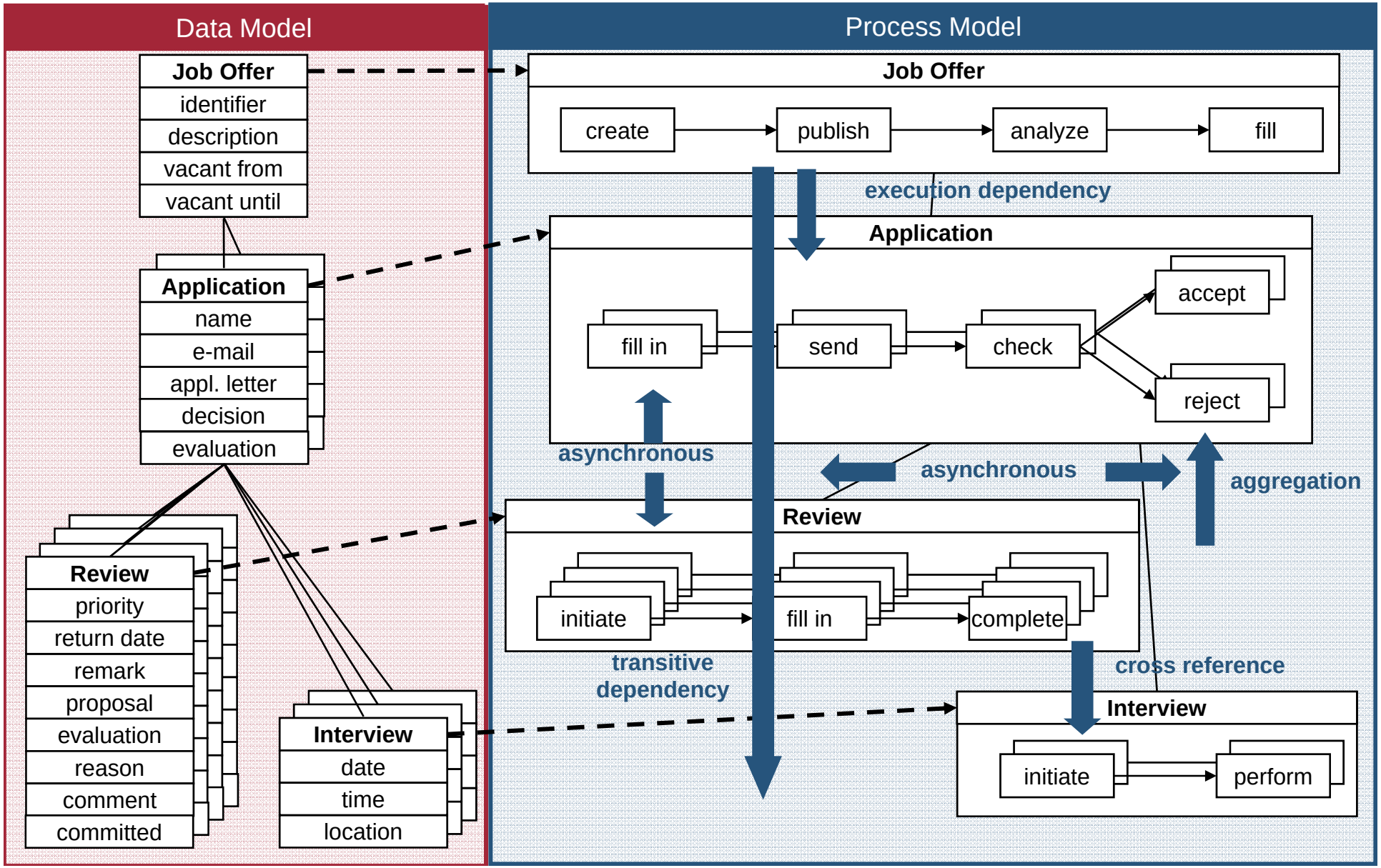
Object-Aware Process Management



Object-Aware Process Management: Object Behavior



Object-Aware Process Management: Object Interactions



Object-Aware Process Management: Flexible Activity Execution

User Integration

staff member department

context-sensitive activity

Job Offer

identifier: *salesman*

description:

vacant from: *10.09.2011*

vacant until: *01.01.2012*

Application

batch activity

decision: *reject*

Review

priority: *high*

return date: *12.12.2011*

remark: *complete soon*

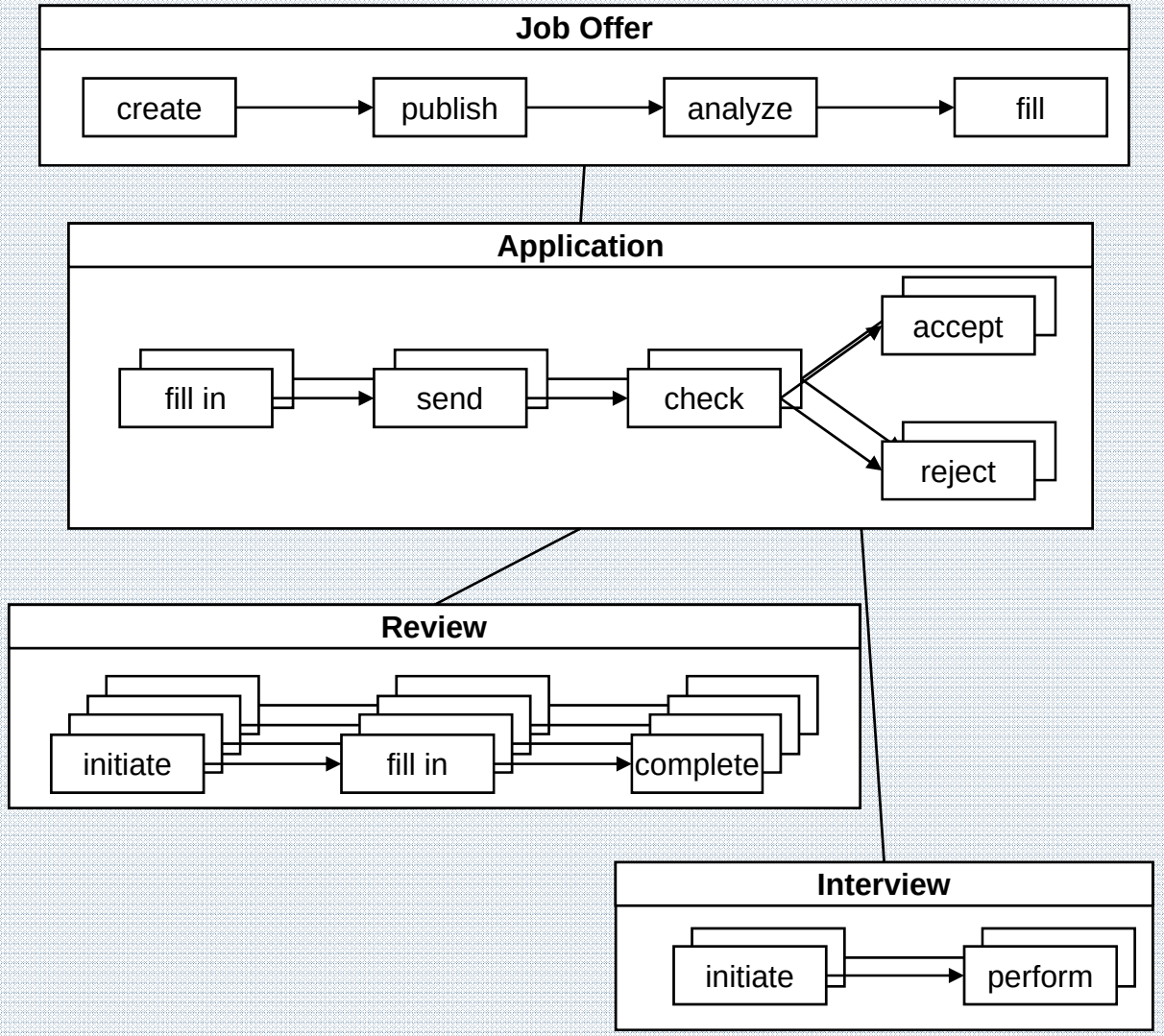
proposal: *invite*

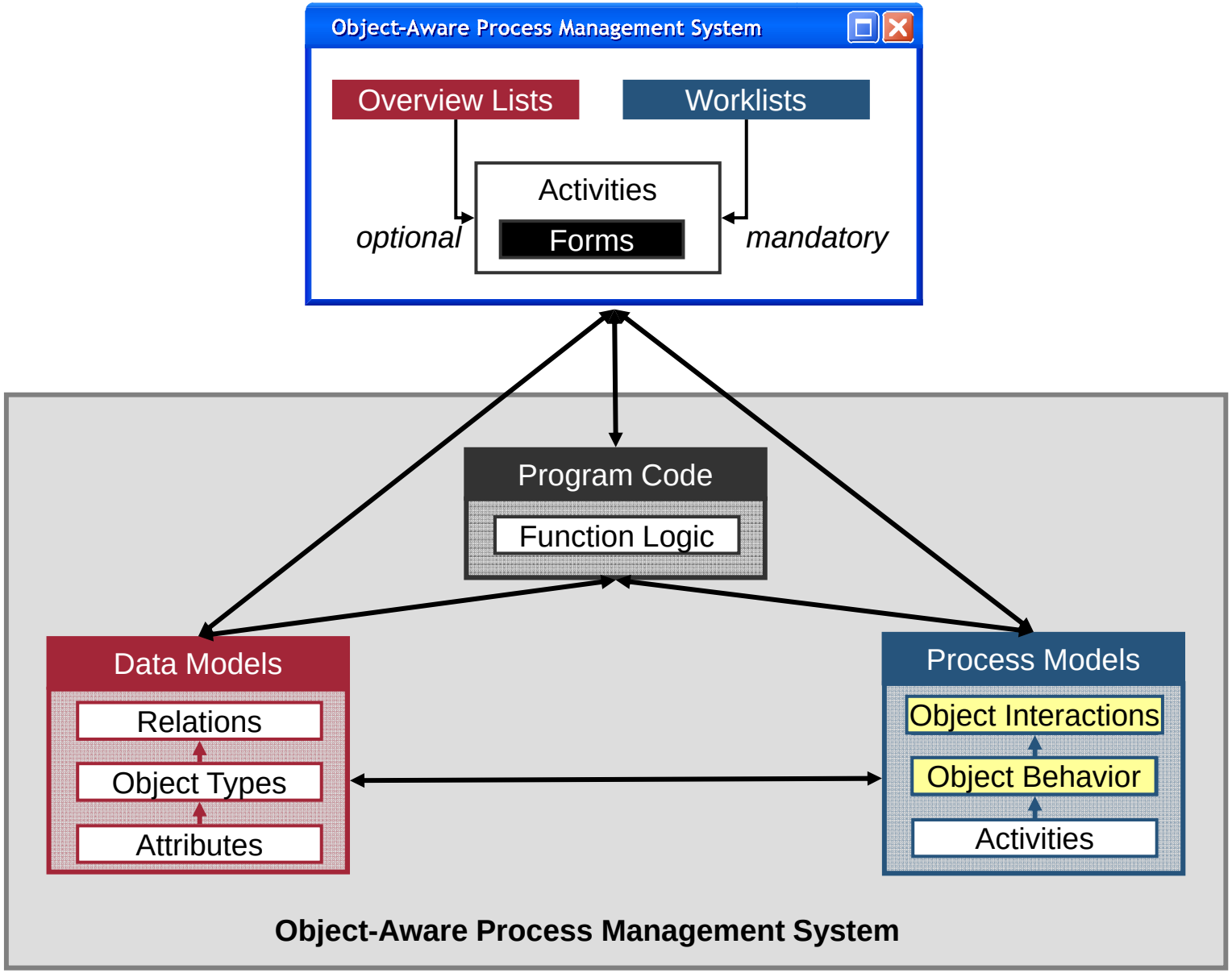
evaluation: *very good*

reason:

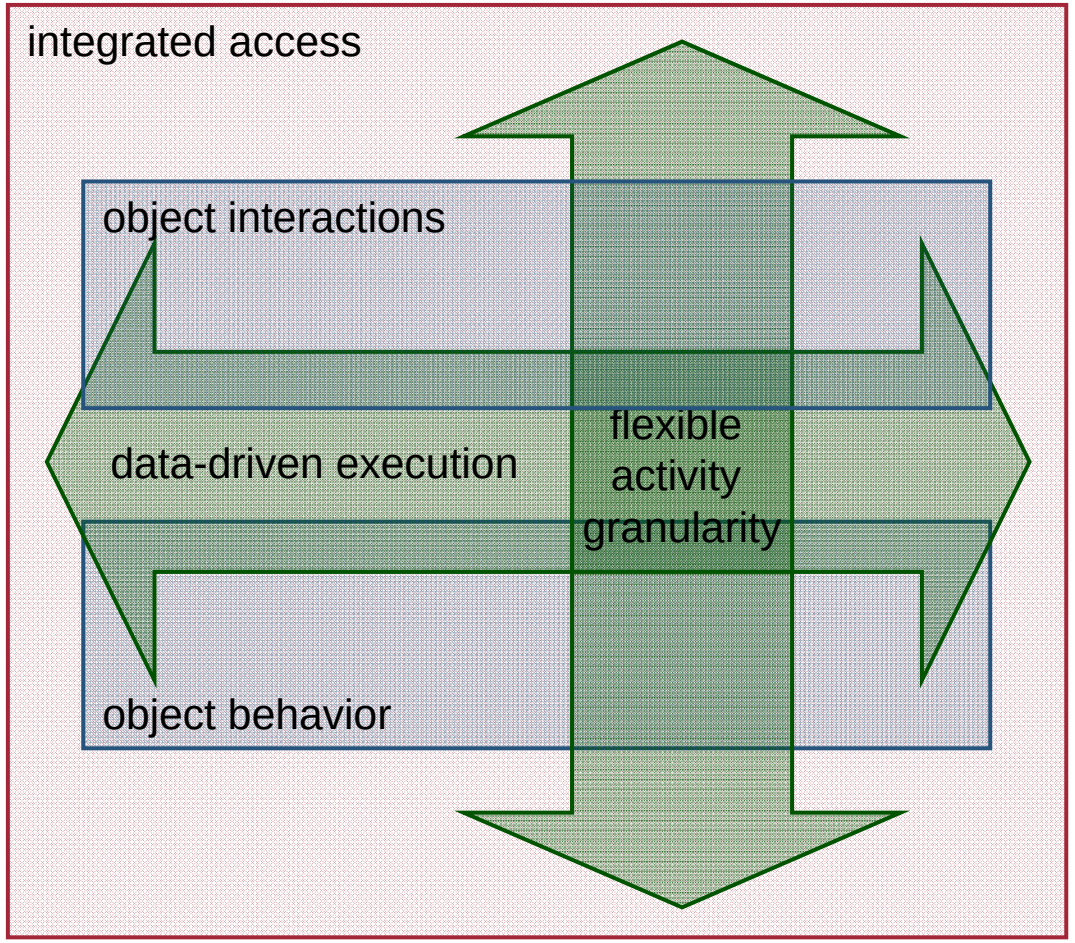
comment: *many competencies*

Process Model




Object-Aware Process Management System
Overview Lists
Worklists
Activities
Forms
optional
mandatory
Program Code
Function Logic
Data Models
Relations
Object Types
Attributes
Process Models
Object Interactions
Object Behavior
Activities
Object-Aware Process Management System

Object-Aware Process Management



Process-Aware Information Systems

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Other Running Projects

Other Running Projects

- ATAPIS (Adaptive Time- and Process-aware Information Systems)
- C³Pro (Enabling Change and Compliance for Collaborative Processes
- MARPLE (Managing Robust Mobile Processes in a Complex World)
- niPRO (Personalized and Intelligent Process Portals)
- PHILharmonic Flows (Linking Processes, Humans and Information)
- PROCEED (PROactive Consistency for EE product Data management)
- proCollab (Process-aware Support for Collaborative Knowledge Workers)
- proView (Personalized and Updatable Process Visualizations)
- Qube (Quality Assessment and Management in Business Process Design, Implementation and Enactment)
- QuestionSys (A Generic and Flexible Questionnaire System Enabling Process-Driven Mobile Data Collection)
- SOPHINA (Software Products and Processes with Integrated Variability Support)
- SustainHub (Sustainability Data Exchange Hub)

Structuring of our Research