State Propagation for Business Process Monitoring on Different Levels of Abstraction

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Overview

- Problem Statement
- The Vision
- How to get there
  - Application Scenarios
  - State Propagation Patterns
  - State Projections
  - Generic Architecture
- Current Limitations and Future Work
Problem Statement
Problem Statement

- Current status of a process instance is **undefined** on high-level

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<tr>
<th>[Image] XOR</th>
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Manual Refinement or Model Transformation

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Execution

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deployment

monitoring

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The Vision
The Vision

- Propagation of states *across the borders* of process models and process languages
How to get There:
Application Scenarios
Application Scenarios for Pattern Identification

- Abstract process modeling and custom monitoring
Application Scenarios for Pattern Identification

- Abstract process modeling and custom monitoring
Application Scenarios for Pattern Identification

- Modeling and monitoring in integration scenarios
Application Scenarios for Pattern Identification

- Modeling and monitoring in integration scenarios
How to get There:
State Propagation Patterns
State Propagation Patterns

- Direct state propagation
State Propagation Patterns

- State alteration

Low-level Model

- [X]
- [O]

High-level View

- [✓]
- [ ]
State Propagation Patterns

- State combination
State Propagation Patterns

- State deduction

Low-level Model: \( \emptyset \)  \[\rightarrow\]  High-level View: \( \checkmark \)
State Propagation Patterns

- Transition state

Low-level Model → High-level View
State Propagation Patterns

- Instance state aggregation
How to get There: State Projections
State Projections

- Abstract Process Modeling and Custom Monitoring
State Projections

- Modeling and Monitoring in Integration Scenarios

![Diagram showing state projections and alterations]
State Projections: Instance State Aggregation

- Modeling and Monitoring in Integration Scenarios
How to get There:
A Generic Architecture
How to get There: A Generic Architecture

Client

- Browser

Application Server

- Monitoring Frontend
- Monitoring Service
- View Generator
- Process Engine Adapter

Admin

- View Designer

Diagram

Process Data & Monitoring Data

View Transformation Rules & High-level Models & State Propagation Rules

Transformed Process Data & Monitoring Data

Process Data & Monitoring Data

Process Data & Events

Adapters for other Process Engines

Mgmt API

Events

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Current Limitations and Future Work
Current Limitations and Future Work

- Undesirable projection phenomena
  - Token jumps in dead paths
  - Tokens appearing twice in block structures
- Projection soundness
  - Across process models
  - Across process languages
  - In multi-level projections
- State propagation patterns
  - Pattern composition
  - Algebra for state propagation