Applicability of Process Viewing Patterns in Business Process Management

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Overview

- Process View Fundamentals
  - Process view metamodel constructs
  - Process viewing patterns (excerpt)

- Process Viewing Scenarios
  - Process design
  - Process deployment
  - Process monitoring
  - Visual process analysis
  - General purpose

- Conclusion and Outlook
Process View
Fundamentals
Process Views

- What is a process view…?
  - The presentation of the result from specific *transformations* applied to a process model

- What is the purpose of a process view…?
  - Reduction of complexity
  - Separation of concerns
  - Providing a problem-specific perspective

- What are process viewing patterns?
  - Elementary forms of transformations to alter processes
Process View Metamodel Constructs

- **Nodes**
  - Typed nodes
  - Abstract node
  - Aggregate node
  - Inserted node

- **Edges**
  - Control edge
  - Conditional control edge
  - Inserted edge
  - Data edge

- **View Transformation**

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Structure Transformation Patterns

- Omission
- Aggregation
- Abstraction
Augmentation Transformation Patterns

- Runtime Augmentation
- Calculated Augmentation
- Human-assisted Augmentation
Presentation Patterns

- Appearance
- Organizational Information
- Custom Categories
Process Viewing
Scenarios
Process Viewing Scenarios

- Predefined views (discussed in the following)
  - Good solutions to *common* problems
  - View transformation can be predefined

- Custom views
  - Solutions tailored to *specific* problems
  - View transformation specified ad hoc
Part I: Process Design

- Process modeling on multiple levels of abstraction
- Extraction of process logic for reuse
- Process outsourcing

Diagram:
- Modelling
- Analysis
- Refinement, Deployment
- Monitoring
- Execution
Process Modeling on Multiple Levels of Abstraction

- Abstract process modelling
  - Modelling one and the same process on *multiple levels of abstraction*

- Solution
  - Layering concepts can be applied to provide multiple levels of abstraction
  - Aggregation and omission of nodes and artifacts
  - Layers are generated dynamically by executing transformations
  - A layer can be seen as a view on a view
  - Problem: updating the models in lower layers
Extraction of Process Logic for Reuse

- Extraction of process logic for reuse
  - Some parts of a process might be *reusable* in other processes
  - Therefore, they shall be extracted

- Solution
  - Creation of a view which only contains the functionality that shall be reused
  - At first, these nodes need to be specified which shall be extracted for later reuse
  - In a next step all other activities are omitted
  - Control dependencies are preserved
  - But: dealing with ambiguities - automatic, manual, mixture?
Public Views for Process Outsourcing

- Public views for process outsourcing
  - No disclosure of internal parts of the business process
  - Show the *visible behavior* of a process

- Solution
  - Classification of “confidential” and “internal” structures
  - Omission of these structures
  - Preserving required constructs
  - For each partner a different view can be generated
Part II: Process Deployment

- View on security
- Process distribution
View on Security

- View on security
  - Security-related aspects are typically defined externally

- Solution
  - *Augment a process* and emphasize security-related aspects
  - Annotations about the required security levels
  - Visualize the required security level
    - Use swimlanes for different security levels
    - Border colors
    - Decorators for particular security-related aspects
Process Distribution

- Process distribution
  - Manage the *location* of the actors and programs that execute tasks

- Solution
  - Runtime augmentation needs to provide information about the location of actors of the process
  - Those “coordinates” are used by the layouting function
  - Example: analyze and modify a process whose services are distributed over different cloud providers
Part III: Process Monitoring

- Status of an instance
- Custom business process monitoring
Status of an Instance

- Status of an instance
  - Process mining provides runtime information about a process
  - Having a clear view on the *status* of an instance

- Solution
  - Runtime augmentation of the process with the current status of an instance is a basic prerequisite
  - Presentation can use decorators to show the current state, while lowering the contrast for activities that are not ready yet
  - This solution can also be used for visualizing a simulation
Custom Business Process Monitoring

- Custom business process monitoring
  - Modelling and execution of processes is often performed at various different levels of abstraction
  - Users near to business use more high level notations
  - Technical staff is more familiar with programming languages

- Solution
  - Define *custom views for monitoring* for different stakeholders
  - Define projections of activities and states
Part IV: Visual Process Analysis

- Bottlenecks
- Probable execution path
- Path analysis
- Process automation
**Bottlenecks**

- **Bottlenecks**
  - Bottlenecks are *hot spots* in a process model
  - They require more resources than currently are available
  - A bottleneck can be rooted in the services or humans performing activities, or in the size of the transferred data

- **Solution**
  - Augment the process with runtime information ("cost")
  - The width of the nodes can be bound to the cost of nodes
  - Data transfer cost can be bound to the thickness of edges
  - As custom theme a linear time bar can be shown
Probable Execution Path

- Probable execution path
  - In some cases it is useful to predict the future execution path
  - Intelligent proposals like “people who chose A, also liked B”

- Solution
  - Runtime augmentation enriches the process with probabilities
  - Presentation shows the current status using decorators
  - Size of nodes can be bound to the calculated probability
  - Possible extension: Omit improbable steps
Path Analysis

- Path analysis
  - Having a clear view on the longest or most expensive path in a process is essential in business reengineering
  - Immediate feedback if a changed design will probably lead to a cheaper execution is desirable

- Solution
  - Augmentation with calculated information about the
    - Cheapest path
    - Most expensive path
    - Shortest path (i.e., cost = time)
    - ...
  - The different paths can be shown with different colors for edges
Process Automation

- **Process automation**
  - Processes are partially or completely executed by humans or by software
  - Getting a clear insight which parts of a process are automated and which are not, is useful in many scenarios of process analysis

- **Solution**
  - Node properties allow to distinguish which nodes are executed by programs and which by humans
  - Otherwise, runtime augmentation can provide this information
  - This information can be displayed using decorators
  - When using omission it is also possible to show just the human process graph as well as the automated process graph
Part V: General Purpose

- Custom appearance
- Abstraction from details
- Set a focus
- Access control
  → Applicable in all phases
Custom Appearance

- Custom appearance
  - Activities may have speaking labels
  - But: no *obvious shapes* that show their meaning

- Solution
  - Presentation of nodes and artifacts with particular appearance
  - Use “speaking” shapes that denote their meaning
  - Human-assisted augmentation can provide a classification of activities, possibly based on an ontology
Abstraction from Details

- Abstraction from details
  - Some nodes and artifacts are of *minor importance*

- Solution
  - Multiple abstraction levels, or user profiles
  - Complexity can be reduced by removing details
  - Omission of nodes and artifacts
Abstraction from Details

- Multiple activities are serving only one single purpose
- Their aggregation can be …
  - User-driven, e.g. specifying which structures to aggregate
  - Patterns can be defined to describe higher level structures
  - Precise views can thereby be created automatically

→ Abstracting known structures into meaningful aggregates
→ Shapes for such aggregates can be automatically assigned
Set a Focus

- Set a focus
  - Process models quickly become complex and “crowded”
  - It is helpful to focus on one or more *points of interest*

- Solution
  - Omission of all nodes that are out of the focus
  - On a process model
  - On a process instance
Access Control on the Process Model

- Access control on the process model
  - People with particular roles are only allowed to see certain parts of a process
  - The rest shall be invisible or obfuscated (and locked)

- Solution
  - Human-assisted augmentation with access control information about roles and access rights
  - Disambiguation has to be applied for cases, where updates of the originating process shall be performed (problem: visibility)
  - Straightforward solution
    - Abstraction of all “invisible/locked” artifacts
    - Show that something happens while hiding what exactly happens
Conclusion and Outlook
Conclusion

- General conclusion
  - Process views have the potential to increase the efficiency of BPM dramatically
  - Views transformations can be concatenated
  - Analysis support versus modelling support

- Outlook
  - Traditional role of modelling tool is going to change into a powerful and flexible platform
  - Augmentation with semantics has manifold benefits
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