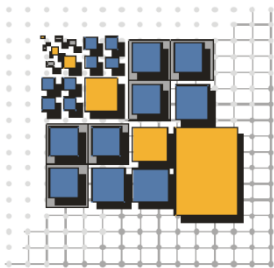


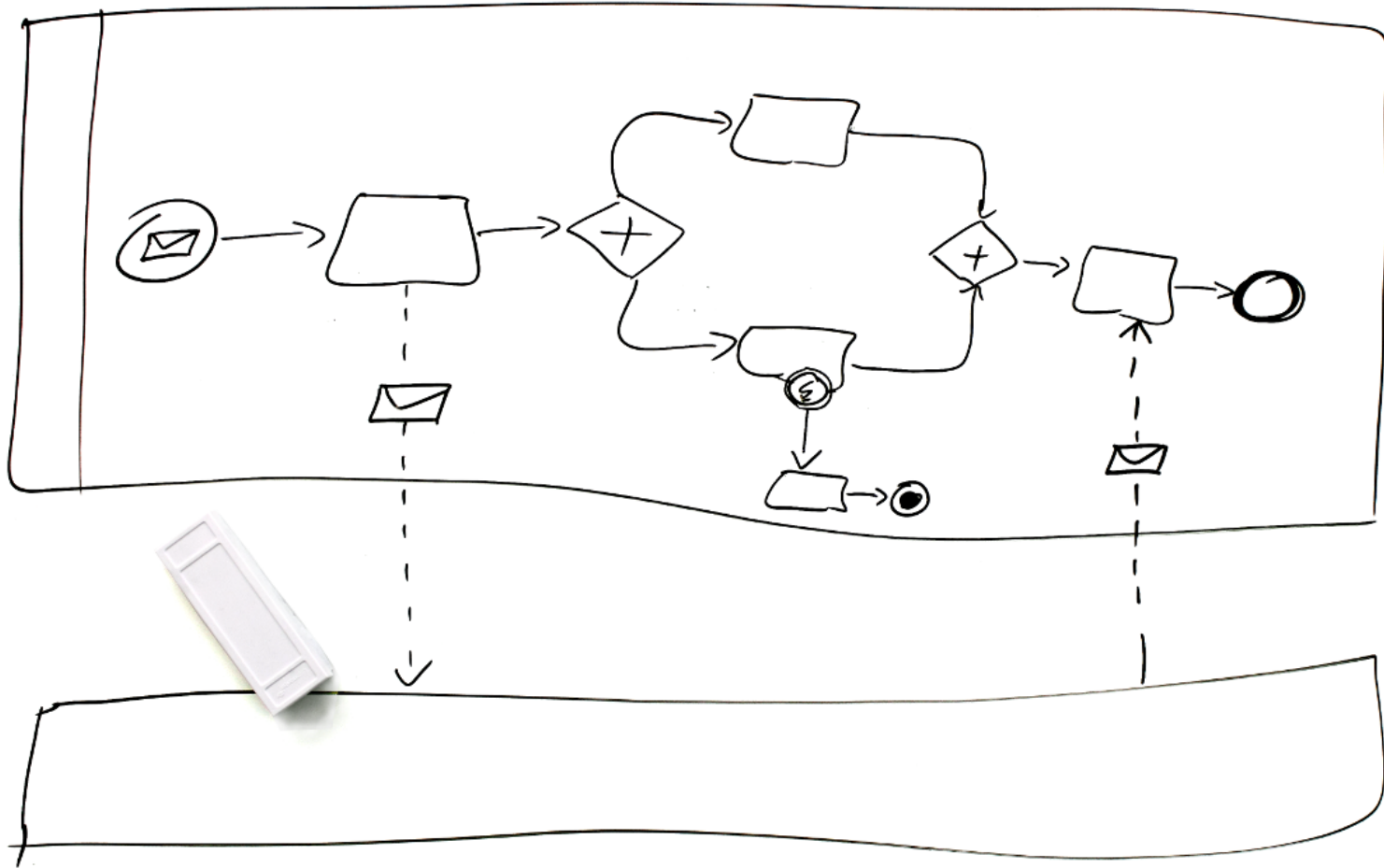
Automatic Standard Compliance Assessment of BPMN 2.0 Process Models



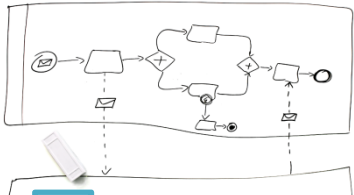
Outline

- Why is **standard compliance** relevant?
- Why is it **hard to assess**?
- How can you **check compliance automatically**?
- What about **actual standard compliance** in published process collections?
- What is **still missing**?

Why is standard compliance relevant?



Why is standard compliance relevant?

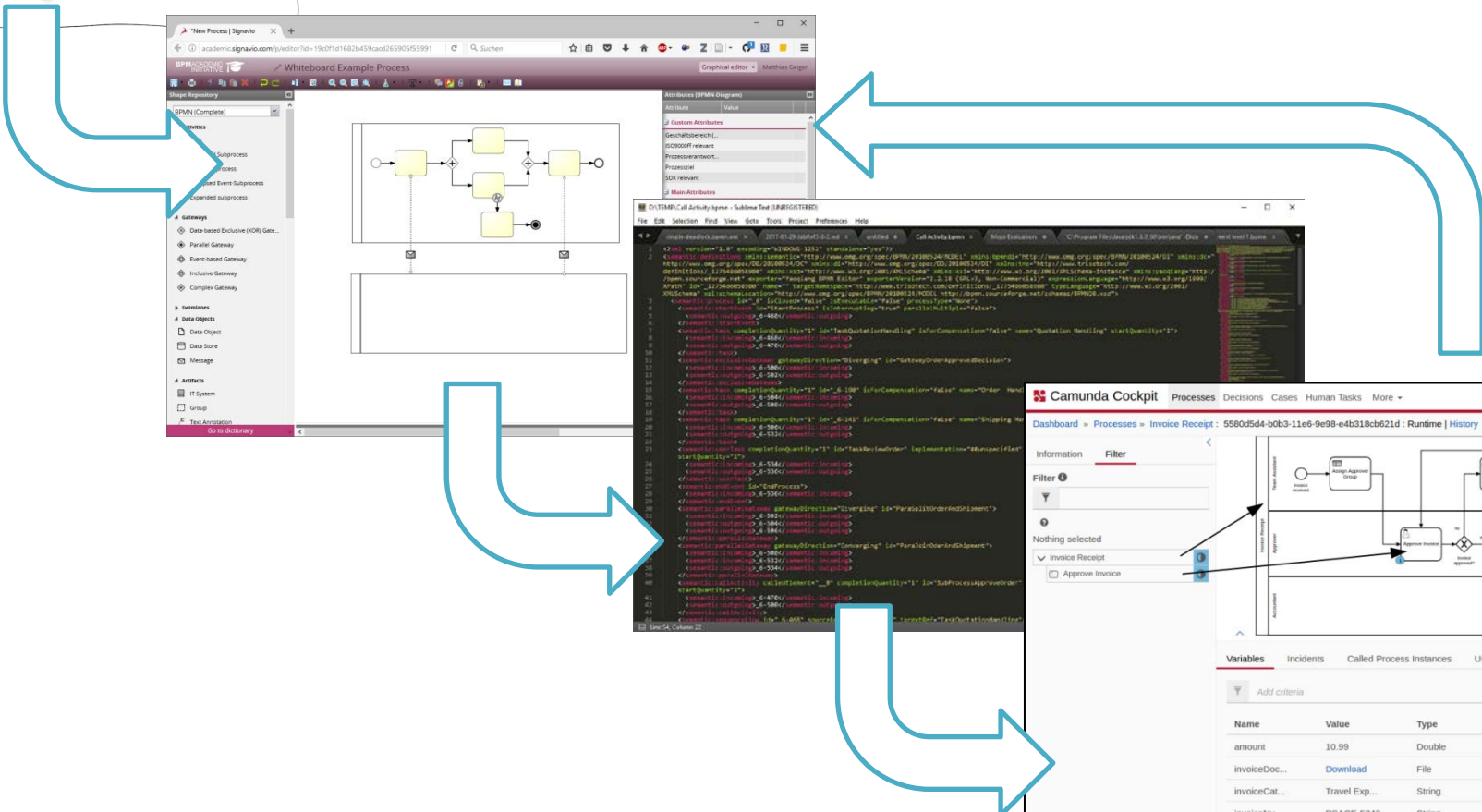


A screenshot of the Signavio BPMACADEMY Whiteboard Example Process graphical editor. The interface shows a graphical editor with a process diagram in the center, a left-hand menu with various BPM elements like Subprocess, Gateway, and Data Objects, and a right-hand panel for attributes. The process diagram shows a flow from a start node through several tasks and decision points.

A screenshot of a Sublime Text editor showing BPMN XML code. The code is a snippet of an XML document representing a process definition, including elements like `startEvent`, `task`, `exclusiveGateway`, and `endEvent`. The code is color-coded and includes comments.

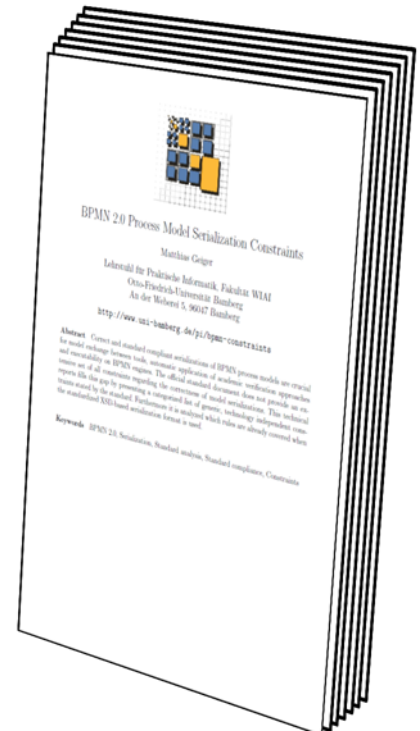
A screenshot of the Camunda Cockpit interface. The top navigation bar includes "Processes", "Decisions", "Cases", "Human Tasks", and "More". The main content area shows a process instance for "Invoice Receipt" with a runtime history. Below the process diagram, there is a "Variables" tab with a table of process variables.

Name	Value	Type	Scope	Actions
amount	10.99	Double	Invoice Receipt	[edit] [delete]
invoiceDoc...	Download	File	Invoice Receipt	[edit] [delete]
invoiceCat...	Travel Exp...	String	Invoice Receipt	[edit] [delete]
invoiceNu...	PSACE-5342	String	Invoice Receipt	[edit] [delete]



Why is it hard to assess?

- 1 Complexity of the specification
- 2 Quality of the specification
- 3 No reference implementation,
no certification authority
- ~~4 Not even a list of all constraints~~



How can you **check compliance automatically?**

- 1** Basic **structural, cardinality, and value constraints**
- 2** Reference integrity
- 3** Extended, more **complex constraints**

How can you check compliance automatically?

What about using an XML schema validation?

- 1 Basic structural, cardinality, and value constraints ✓
- 2 Reference integrity X
- 3 Extended, more complex constraints X

How can you check compliance automatically?

What about using a state-of-the-art modeling tool?

1 Basic structural, cardinality, and value constraints ✓

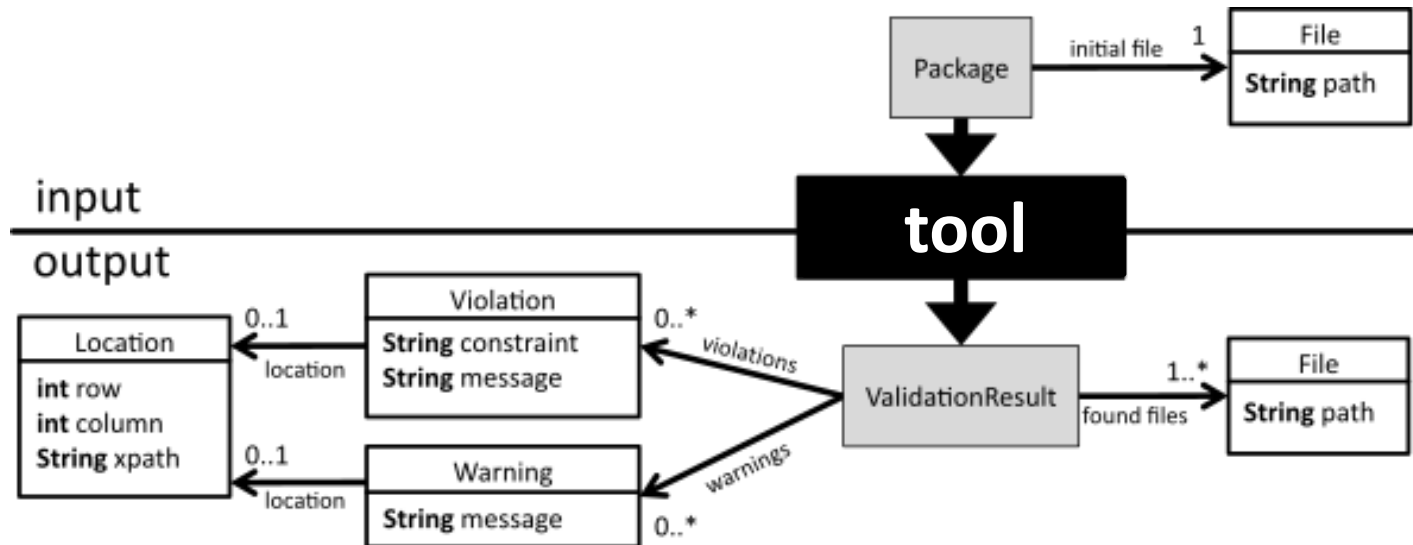
2 Reference integrity ⁺/₋

3 Extended, more complex constraints ⁺/₋

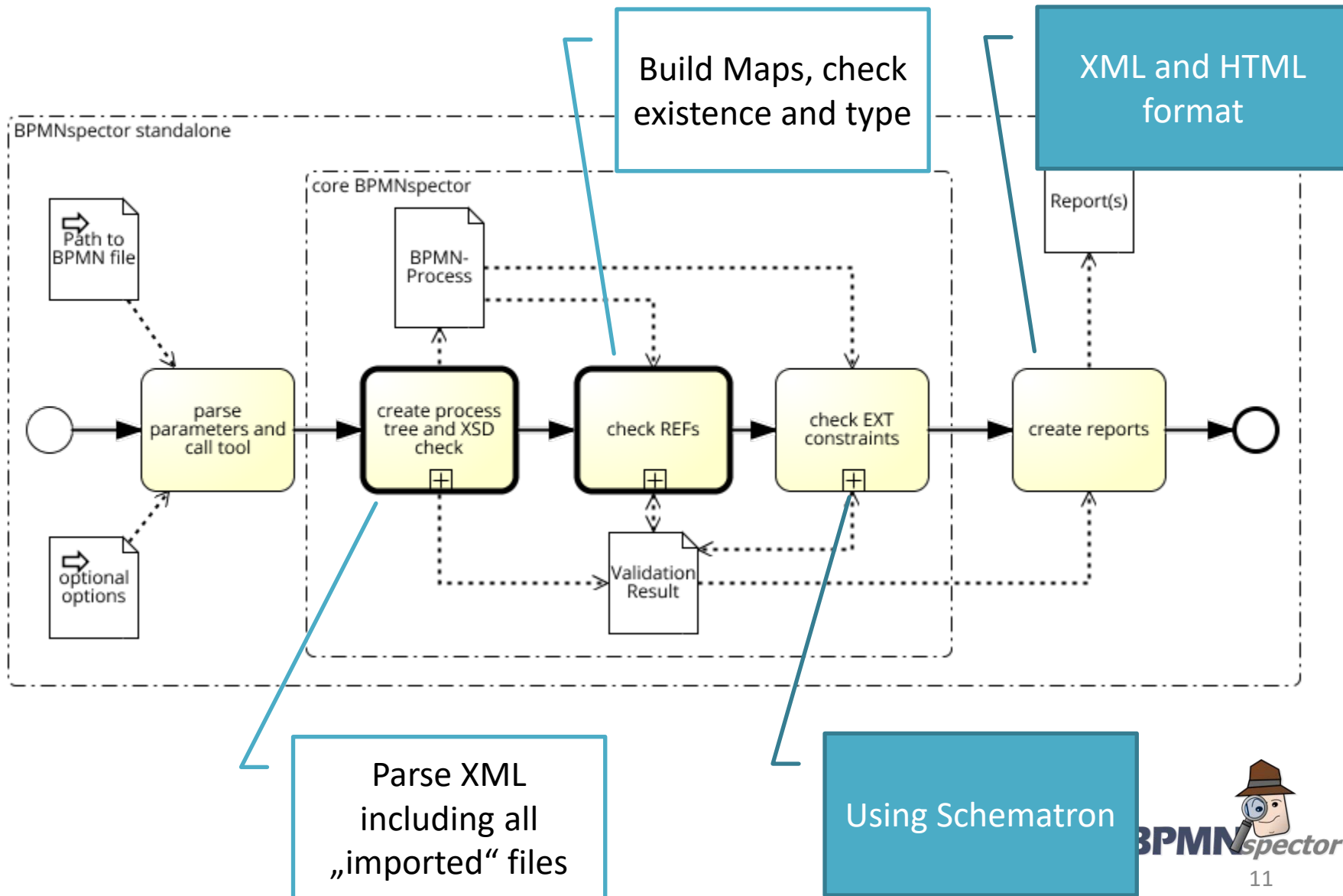
How can you
check compliance automatically?



How can you check compliance automatically?



How can you check compliance automatically?



How can you check compliance automatically?



schematron

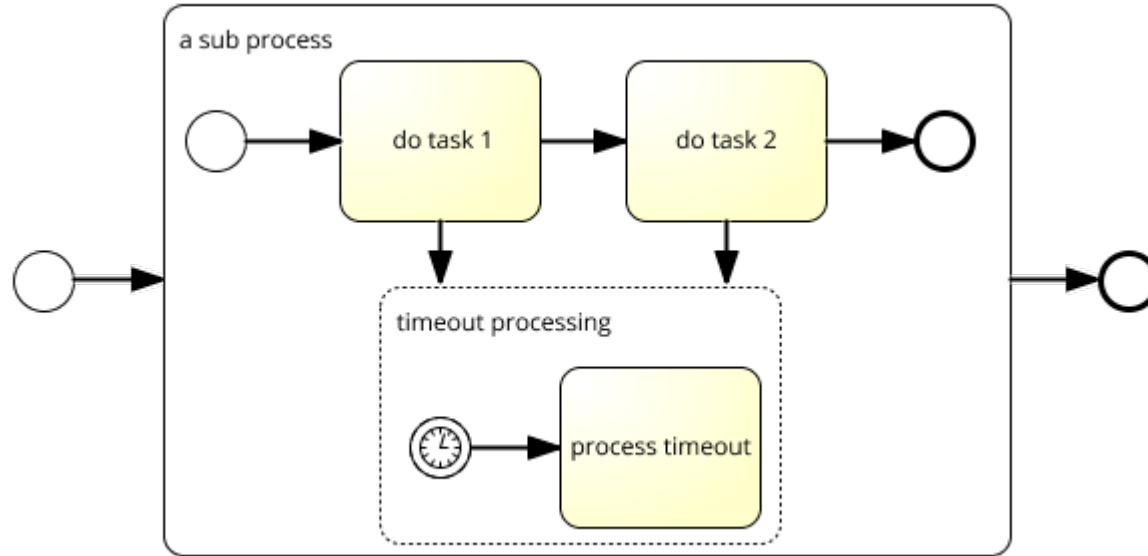
A language for making assertions about patterns found in XML documents

A.57 Rule EXT.057: EventSubProcessNoSequenceFlows

Rule #			Conf.Level
EXT.057			proc
Label:	EventSubProcessNoSequenceFlows		
Affected Element:	SubProcess		
Attribute/Sub Element:	-		
Constraint:	An Event Sub-Process MUST NOT have any incoming or outgoing Sequence Flows.		
(Pre-) Condition:	the process is an EventSubProcess, e.g., triggeredByEvent=true		
Source:	"An Event Sub-Process MUST NOT have any incoming or outgoing Sequence Flows."		
		Chapter	pg.
		10.2.5	177

```
<iso:pattern name="EXT.057">
  <iso:rule context="bpmn:subProcess[@triggeredByEvent='true']">
    <iso:assert test="not(bpmn:incoming) and not(bpmn:outgoing)" diagnostics="id">
      EXT.057|An Event Sub-Process MUST NOT have any incoming or outgoing Sequence Flows.
    </iso:assert>
  </iso:rule>
</iso:pattern>
```

How can you check compliance automatically?



```
<subProcess id="EventSub" triggeredByEvent="true" ...>  
  <incoming>SeqFlow_Sub_Task1_EventSub</incoming>  
  <incoming>SeqFlow_Sub_Task2_EventSub</incoming>  
  <startEvent id="Timer_Start" isInterrupting="true" name="">  
    <outgoing>SeqFlow_Timer_Start_Task</outgoing>  
    <timerEventDefinition id="some_id"/>  
  </startEvent>  
</subProcess>
```

```
<iso:pattern name="EXT.057">  
  <iso:rule context="bpmn:subProcess[@triggeredByEvent='true']">  
    <iso:assert test="not(bpmn:incoming) and not(bpmn:outgoing)" diagnostics="id">  
      EXT.057|An Event Sub-Process MUST NOT have any incoming or outgoing Sequence Flows.  
    </iso:assert>  
  </iso:rule>  
</iso:pattern>
```

How can you check compliance automatically?

BPMNpector Validation Result for resource D:\forschung\ownPapers\2017-ZEUS\presentation\Example Event SubProcess.bpmn



Rule violations have been detected. See details below.

Checked resources

D:\forschung\ownPapers\2017-ZEUS\presentation\Example Event SubProcess.bpmn **violations found**

Found Violations

#	Resource	Line	Constraint	Message
1	D:\forschung\ownPapers\2017-ZEUS\presentation\Example Event SubProcess.bpmn	34	EXT.022	For a Process: Of the types of FlowNode, only Activities, Gateways, and Events can be the target. However, Activities that are Event SubProcesses are not allowed to be a target
2	D:\forschung\ownPapers\2017-ZEUS\presentation\Example Event SubProcess.bpmn	37	EXT.105	An end event must be present when a start event is used in the same process level
3	D:\forschung\ownPapers\2017-ZEUS\presentation\Example Event SubProcess.bpmn	34	EXT.057	An Event Sub-Process MUST NOT have any incoming or outgoing Sequence Flows.



How can you check compliance automatically?



With **BPMN** *spectator*:

- 1 Basic structural and cardinality constraints ✓
- 2 Reference integrity ✓
- 3 Extended, more complex constraints ✓

What about **actual standard compliance** in published process collections?

BPMN 2.0 by Example

Version 1.0 (non-normative)

OMG Document Number: dtd/2010-06-02
Standard document URL: <http://www.omg.org/spec/BPMN/2.0/examples/PDF>
Associated File: <http://www.omg.org/spec/BPMN/2.0/examples/ZIP>



QuDiMo

...because quality matters!

of models

valid

invalid

26

16

10

12

8

4

32

0

32

What about **actual standard compliance** in published process collections?

Some **frequent problems**:

- Schema invalid
- **Omission of mandatory elements**
(esp. for executable processes)
- **invalid SeqFlows** (wrong implementation, invalid or missing connections)

What about **actual standard compliance** in published process collections?

Some **take home points**:

- Creating standard compliant processes is **hard**
– **even for experts**
- BPMN MIWG only **partially successful**
- Should the standard be changed to be **less strict?**

What is **still missing**?

- What about **behavioral properties**?
- What about **integrating BPMNspector into modeling tools and engines**?
- Are the **findings representative**?



**Thank you for your attention.
Any questions?**

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BPMNspector.org