Reasoning over Secure Business Processes

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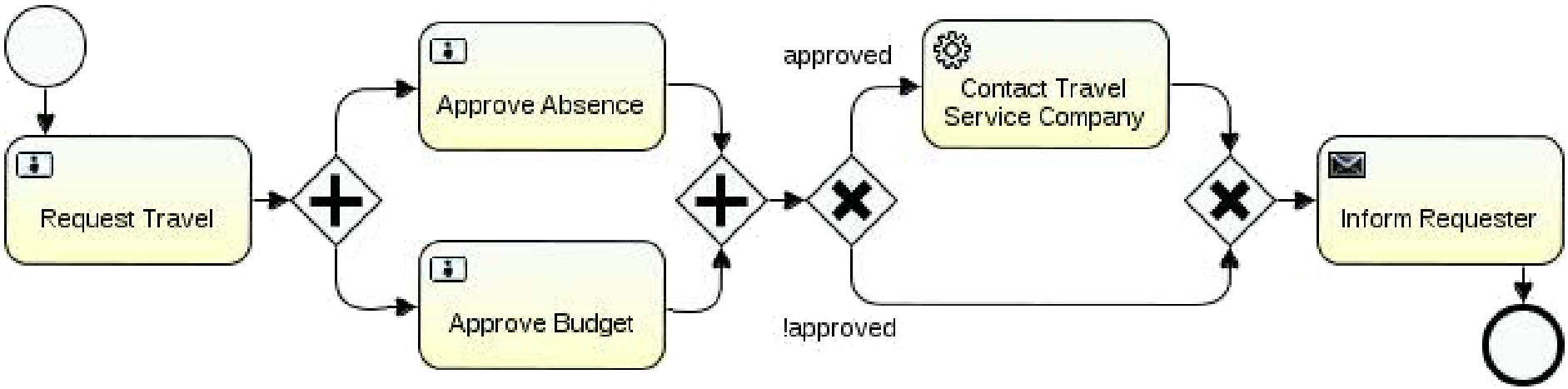
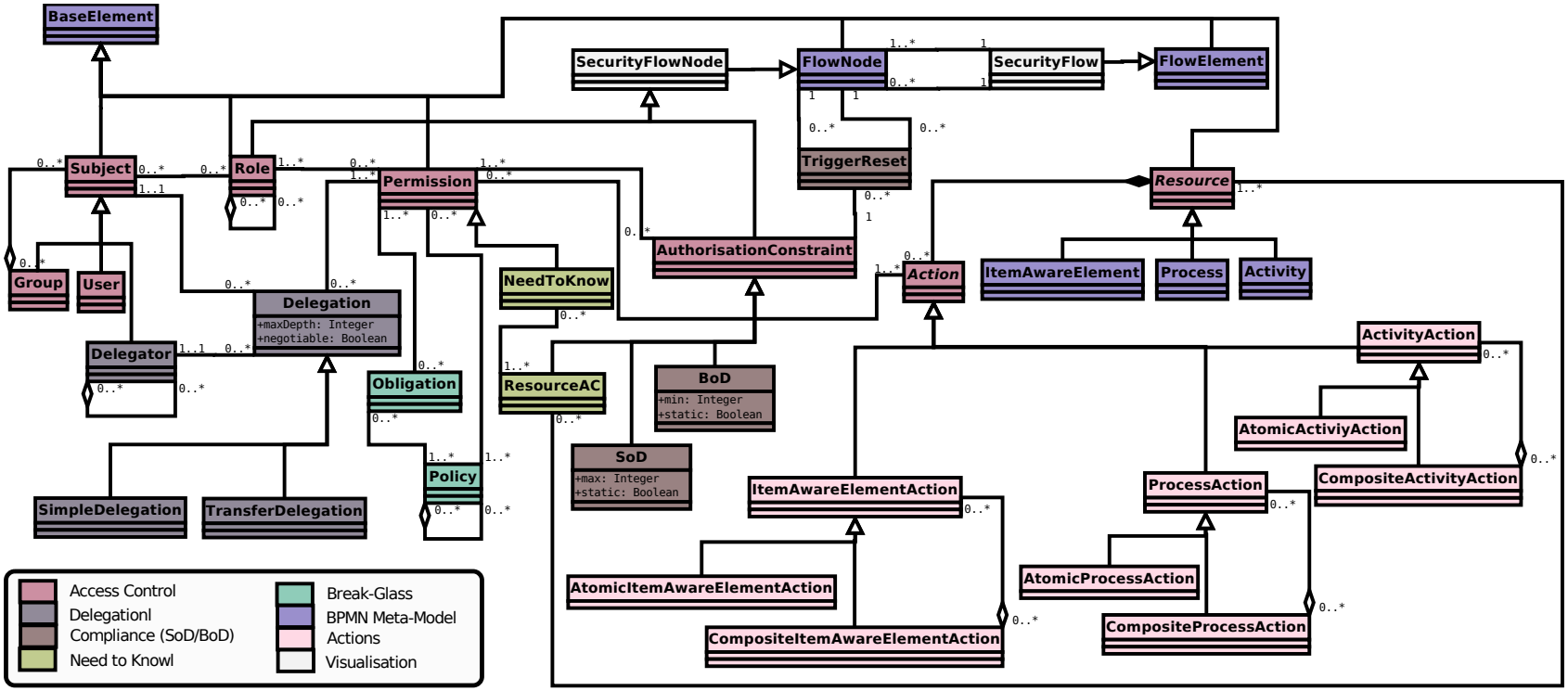
Abstract

Modern enterprise systems are often process-based, i.e., they allow for the direct execution of business processes that are specified in a high-level language such as BPMN.
We present an approach for validating the compliance of the business processes during design-time. Basically, while modeling a business process the business analyst specifies as well the security and compliance requirements the business process should comply to. By pressing a button, these requirements are validated and the results are presented in a graphical format to the business analysis. As proof-of-concept we created a prototype in which the SVaaS Server is deployed on the SAP NetWeaver Cloud and two SVaaS Connectors are built to enable two well-known BPMN tools, SAP NetWeaver BPM and Activiti, to consume SVaaS against industrial relevant business processes.

Business Process Modeling



SecureBPMN



- Access Control
- Delegation
- Separation/Binding of Duty
- Need to Know
- Break Glass

What and Where to Check

What to Check

- Structural issues
  - deadlocks
  - . . .
- Compliance issues
  - need to know
  - separation of duty
  - binding of duty
  - data confidentiality
  - . . .
- Security issues
  - access control
  - . . .

Where to Check

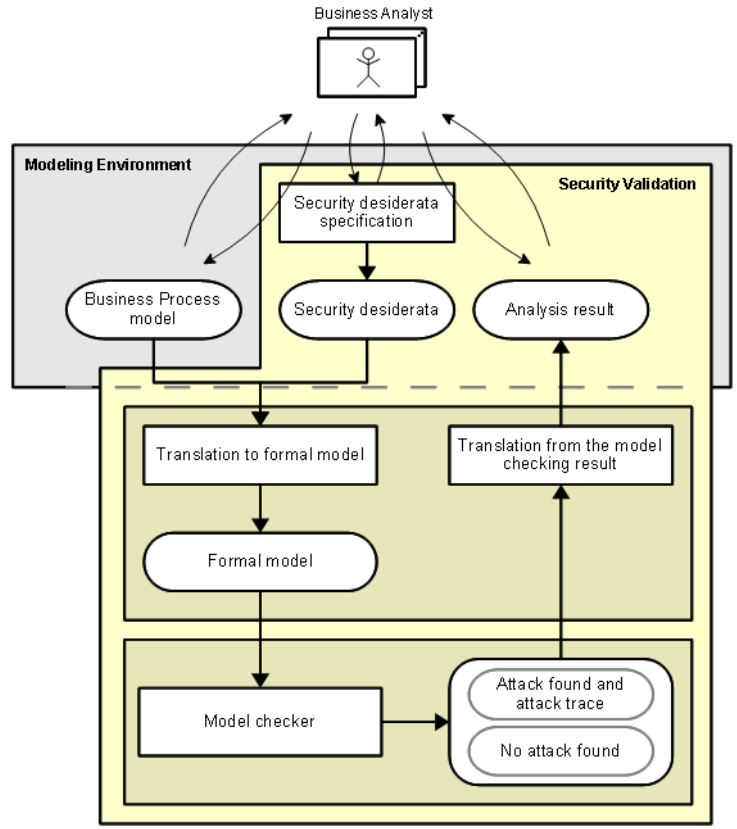
- Process level
  - consistency of security specifications
  - static vs. dynamic enforcement
  - . . .
- Implementation level
  - access control infrastructure
  - data flows (confidentiality)
  - . . .

How to Check

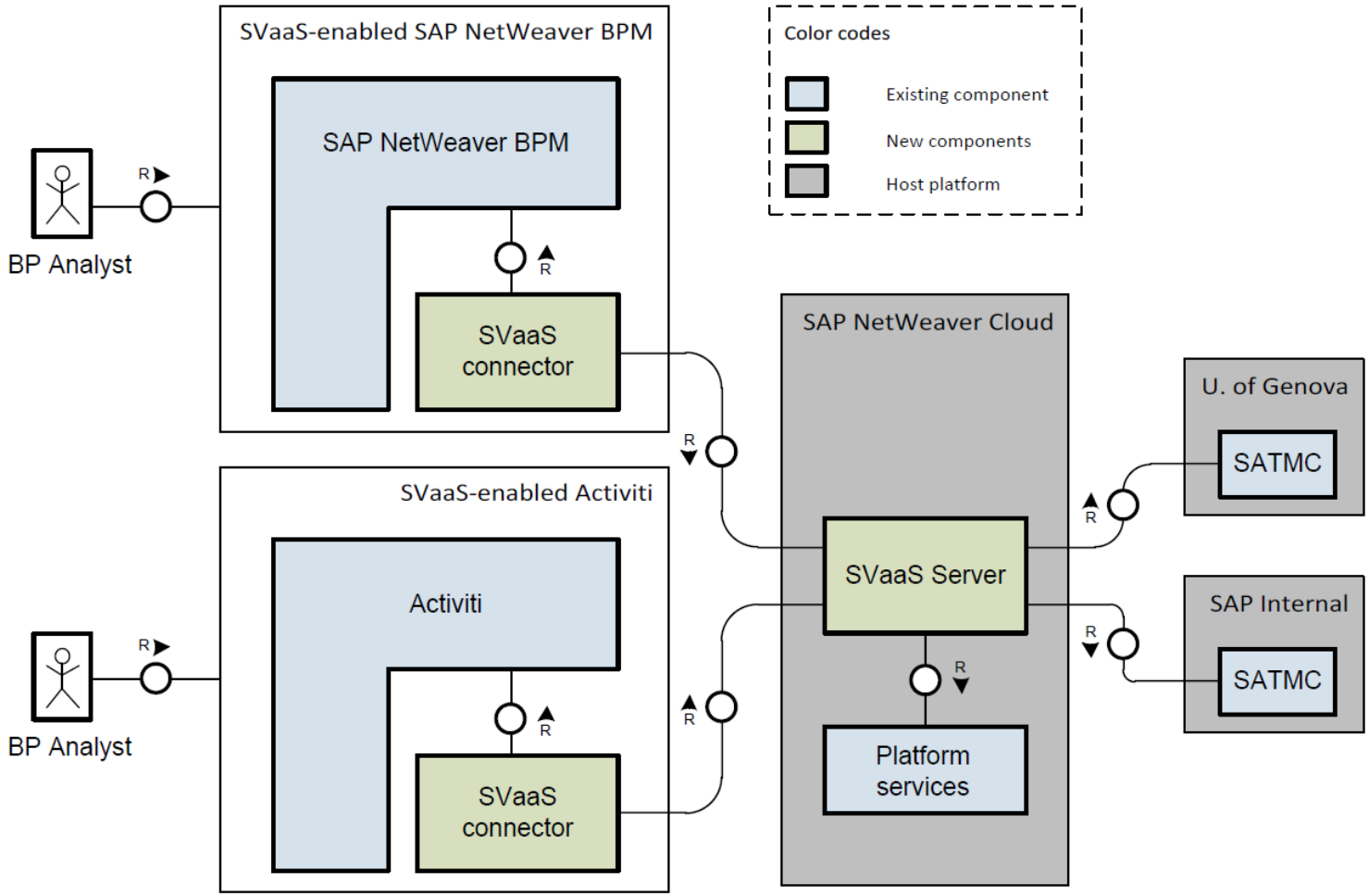
- Model checking
- Theorem proving (e.g., SMT)
- Static code analysis

Security Validation of Business Process

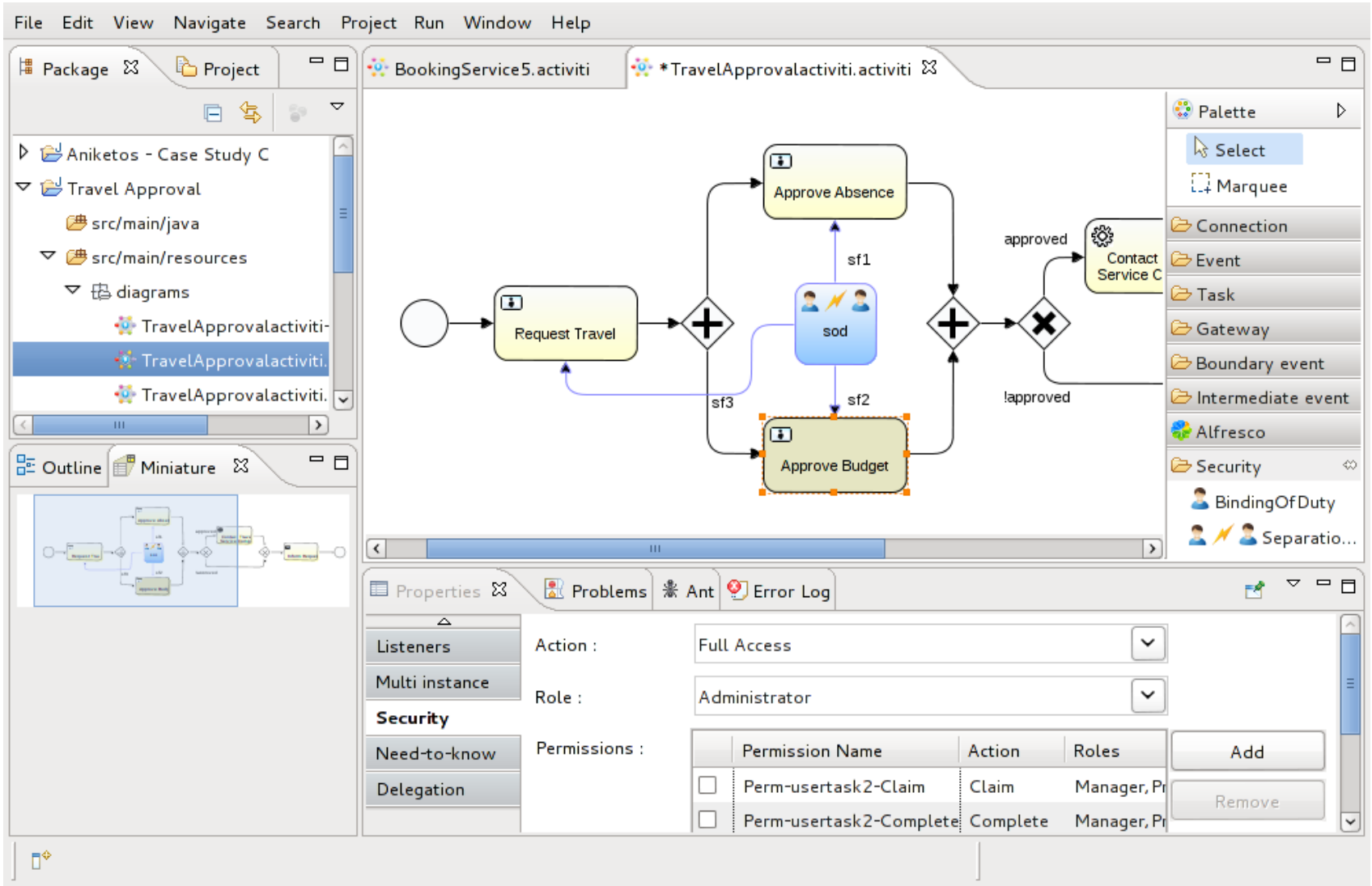
- Express security requirements
- Detect vulnerabilities at design time
- Highlight execution paths leading to a security violation so to provide guidelines in solving the problem
- Mitigate the deployment of non-compliant business processes



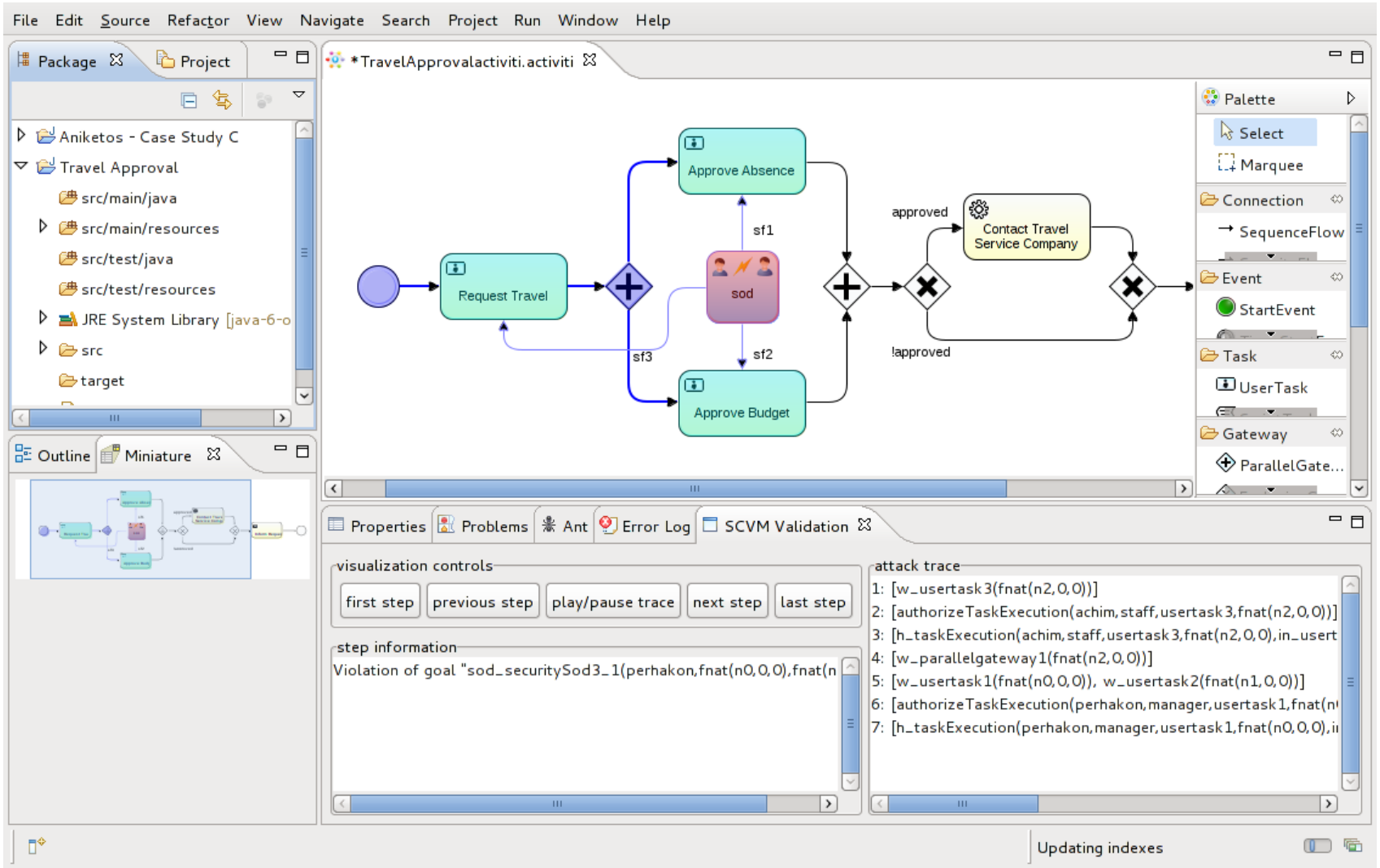
A Cloud-based Architecture



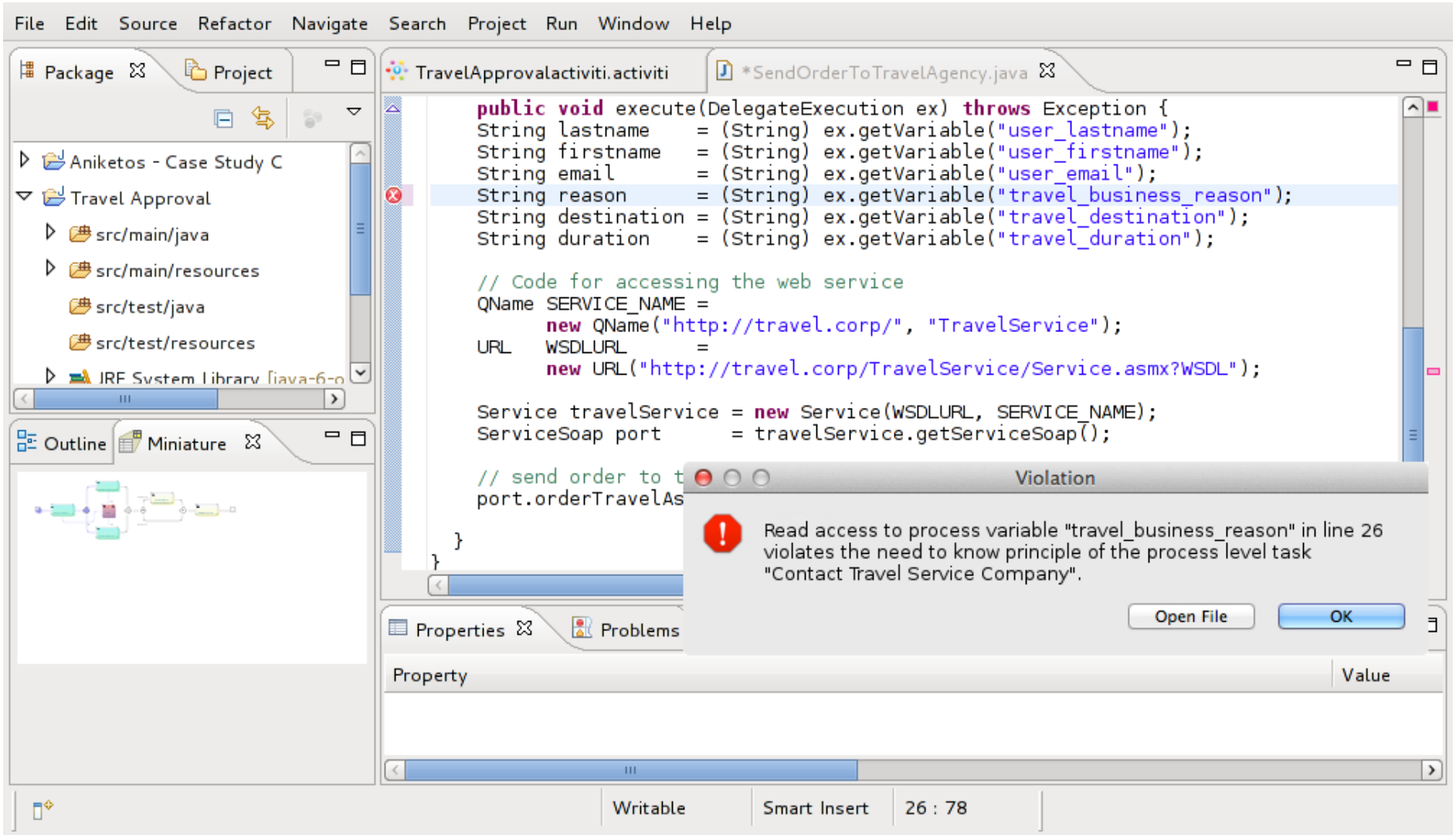
Demo: Business Process Modeling



Demo: Business Process Level Reasoning



Demo: Implementation Level Reasoning



Thank you!

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