

Ontology-Based Privacy Compliance Checking for Clinical Workflows

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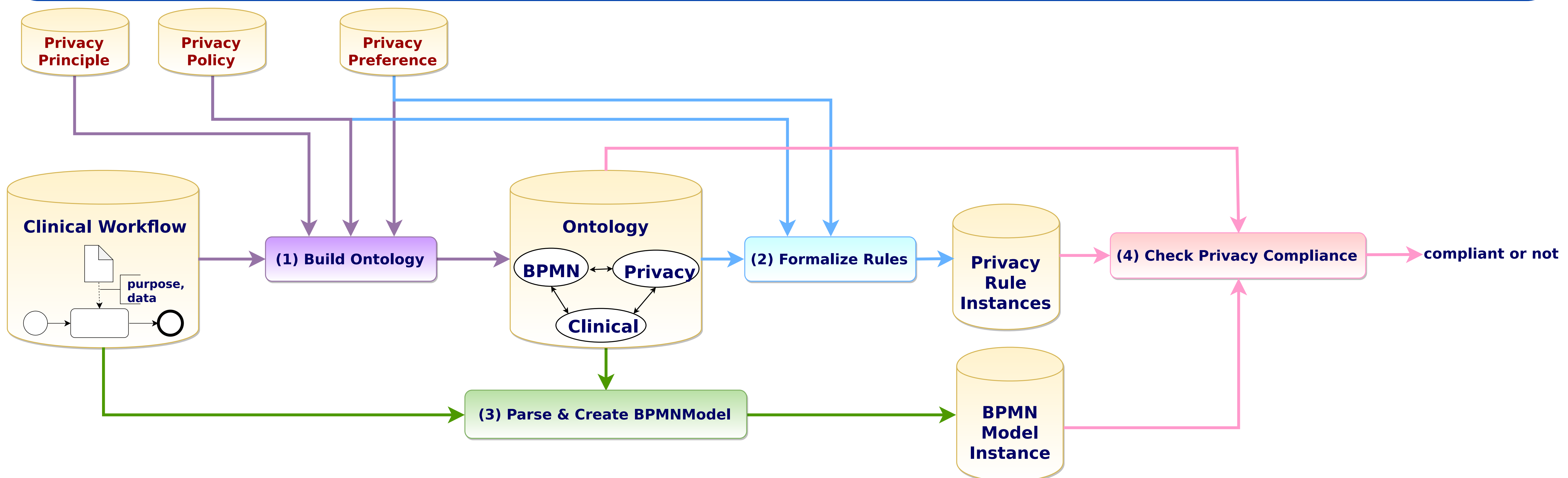
Problem Statement

A clinical workflow might be vulnerable to privacy violations due to sensitive patient data accessed by multiple healthcare providers. Our research aims to detect the possible privacy violations.

Privacy-aware Workflows are compliant with:

- **privacy principles** based on the European Union General Data Protection Regulation,
- **privacy policies** provided by healthcare providers, and
- **privacy preferences** of data subjects (patients).

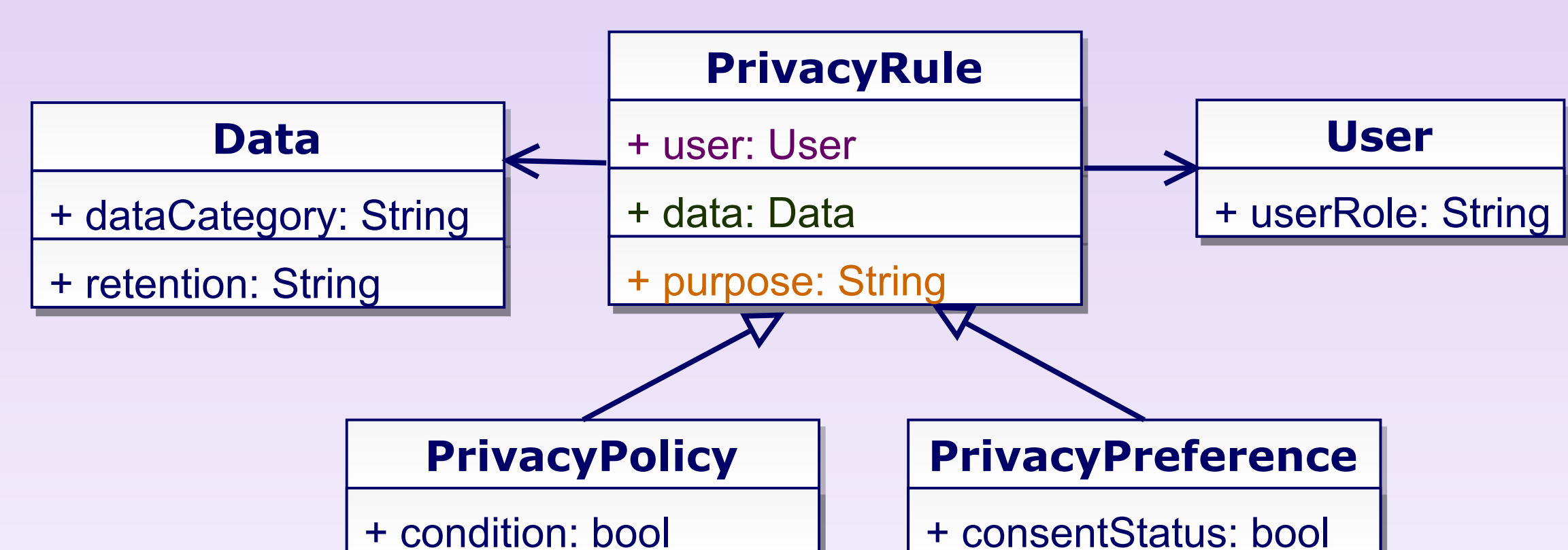
Approach



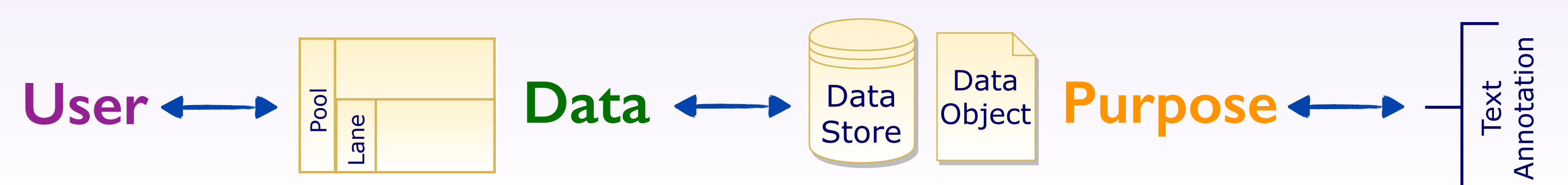
(I) Build Ontology

- generating the *Privacy Ontology* by examining **privacy principles, privacy policies, and privacy preferences**
- generating the *BPMN Ontology* by adapting the BPMN 2.0 Ontology¹ with new data-related concepts
- generating the *Clinical Ontology* by examining the clinical workflows
- mapping between *Privacy, BPMN, and Clinical Ontologies*
- creating Java Classes for each UML ontology class

Ontology for main components of privacy rules:



Mapping between privacy concepts and BPMN elements:



(2) Formalize Rules

- **Privacy Rules:** Natural language rules from **privacy policies and privacy preferences**
- generating **PrivacyRule** Java Instances from the **Privacy Rules** on top of the ontology

(3) Parse & Create BPMN Model

- parsing BPMN-based Clinical Workflow
- creating **BPMN Model** Java Instance on top of the ontology to prepare it for the privacy compliance check

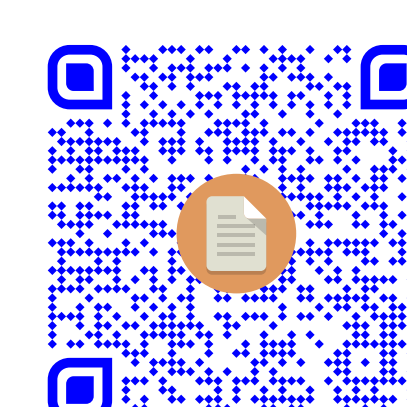
(4) Check Privacy Compliance

- creating rules with Drools Rule Language (DRL) for each **privacy principles** proposed
- implementing Rule Engine by Drools Business Rule Engine for the privacy compliance check



¹Natschläger, Christine. "Towards a BPMN 2.0 ontology." *Int. Workshop on Business Process Modeling Notation*. Springer, Berlin, Heidelberg, 2011.

Check out the Paper



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