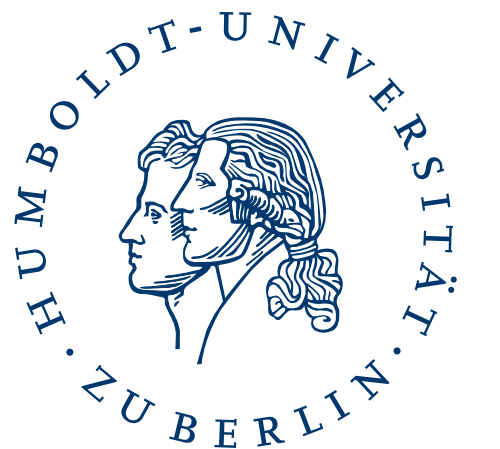


Ontology-Based Privacy Compliance Checking for Clinical Workflows

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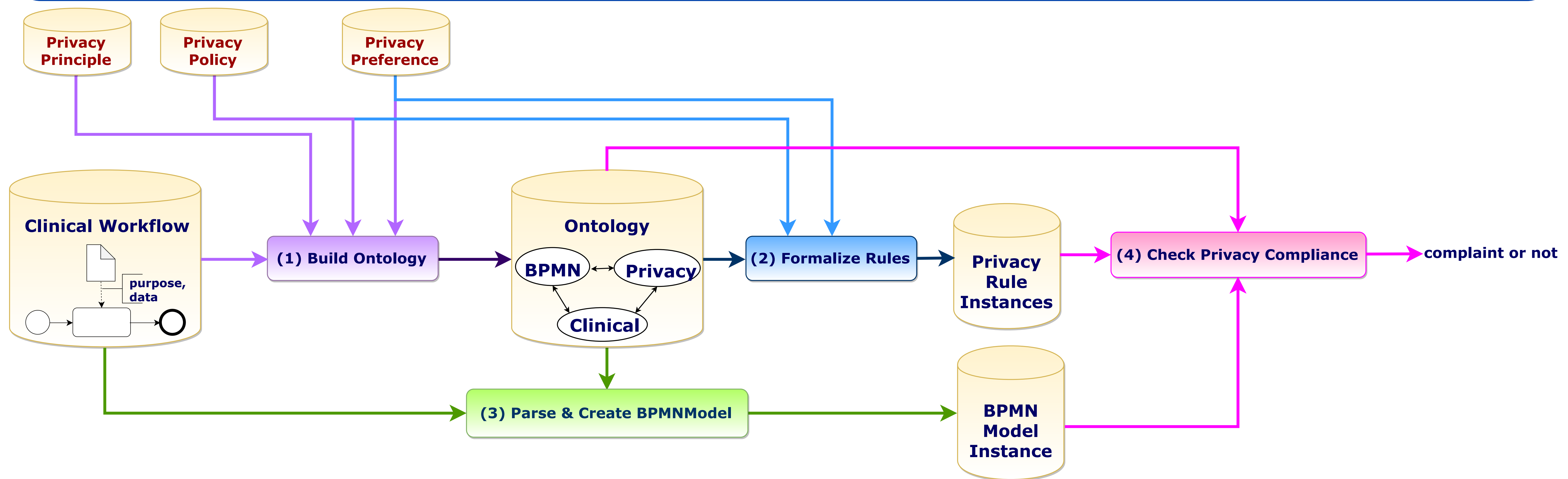
Problem Statement

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

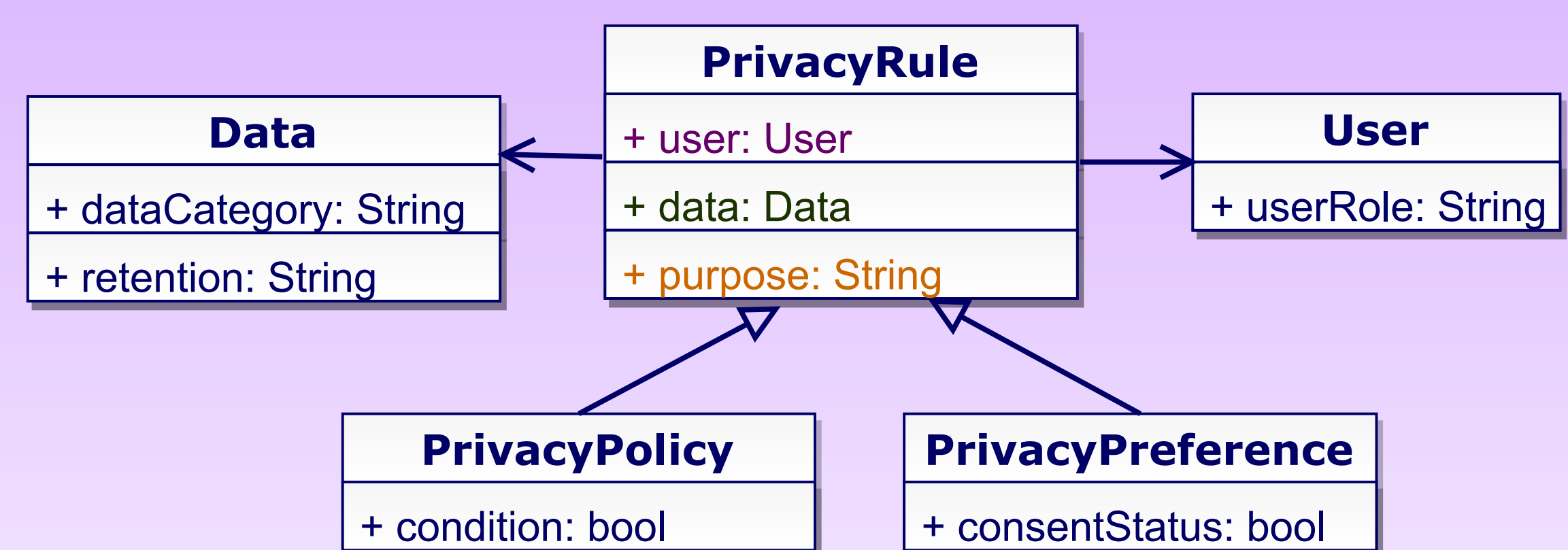
Approach



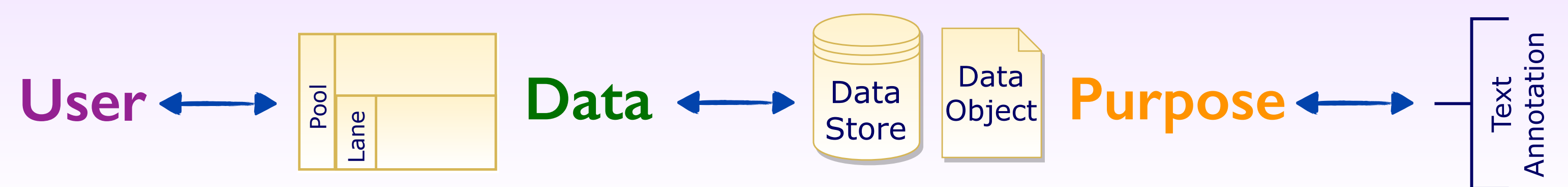
(I) Build Ontology

- 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 BPMNModel

- parsing **BPMN-based Clinical Workflow**
- creating **BPMNModel** 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
-  Drools
- implementing Rule Engine by Drools Business Rule Engine for the **privacy compliance check**



Drools

Check out
the Paper



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