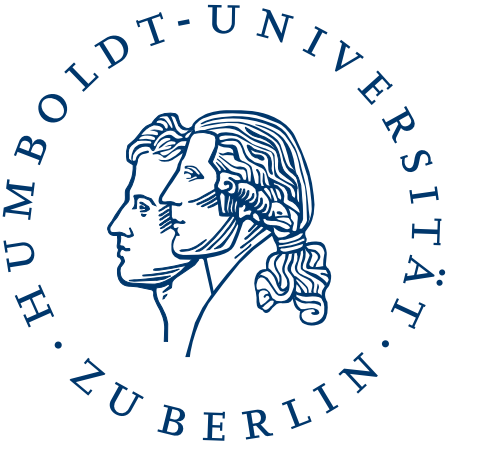


Ontology-Based Privacy Compliance Checking for Clinical Workflows

Saliha Irem Besik, Prof. Johann-Christoph Freytag, Ph.D.
Humboldt-Universität zu Berlin, Department of Computer Science
{besiksal, freytag}@informatik.hu-berlin.de



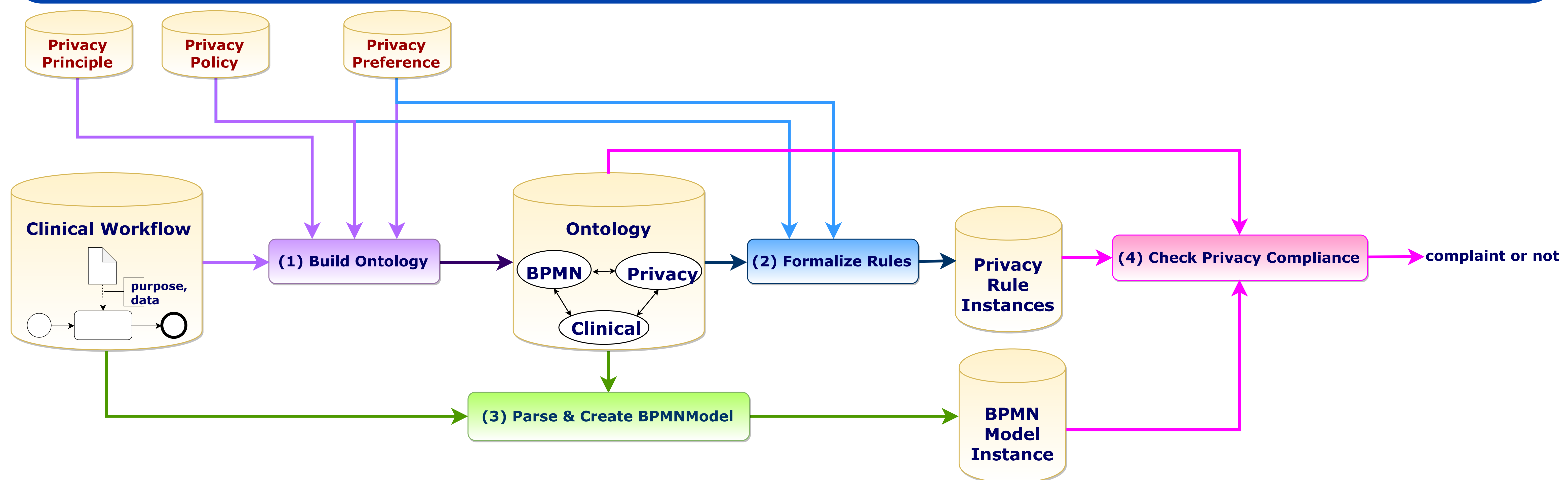
Problem Statement

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

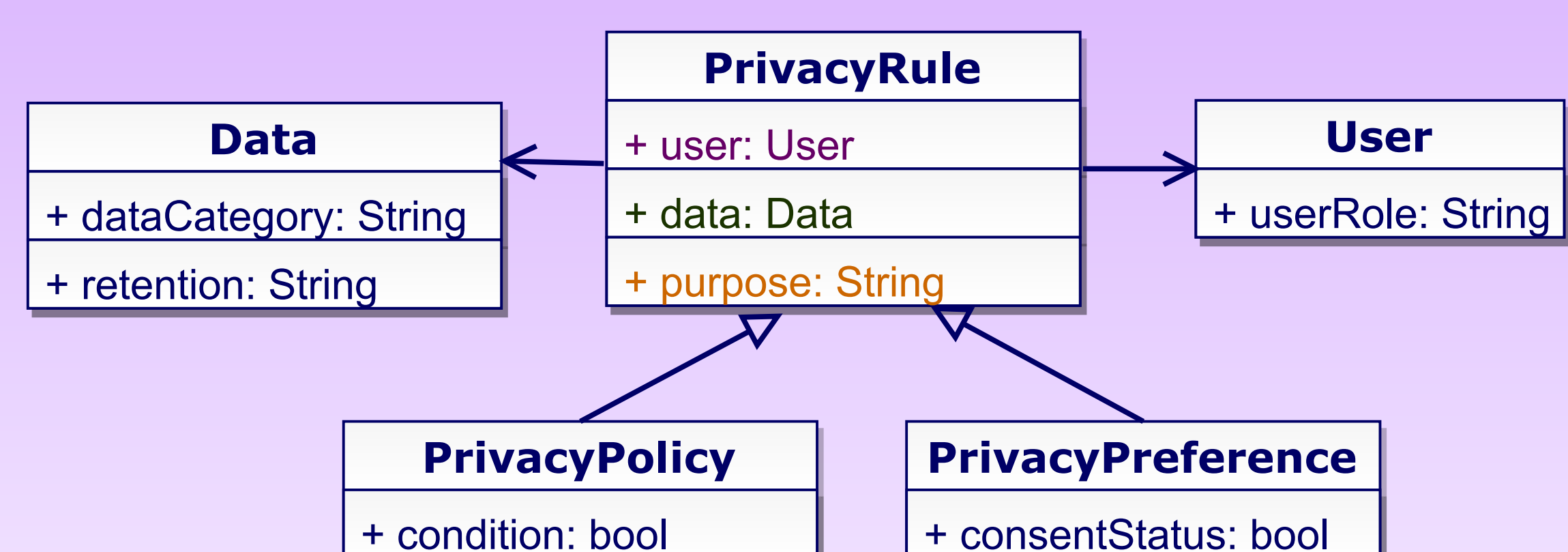
Approach



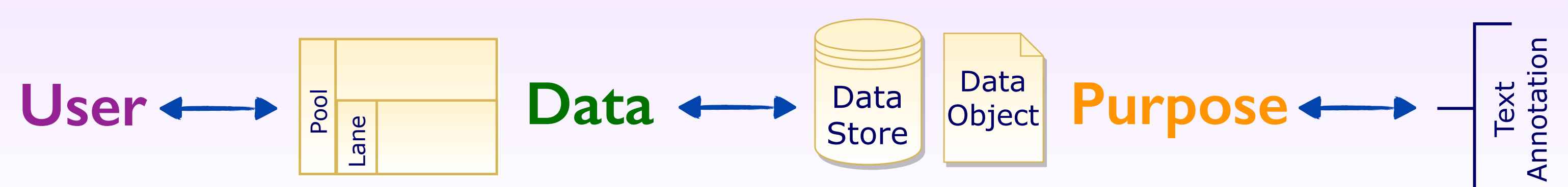
(I) Build Ontology

- 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

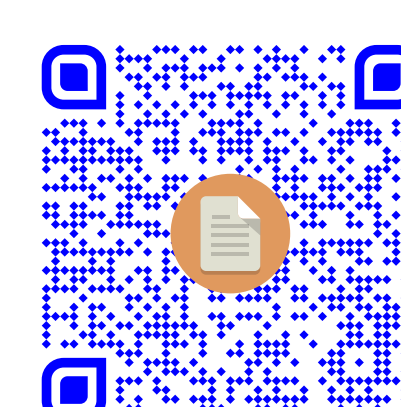
- parsing **BPMN-based Clinical Workflow**
- creating **BPMNModel** Java Instance on top of the ontology to prepare it for the privacy compliance check

(4) Check Privacy Compliance

- creating rules with Drools Rule Language (DRL) for each **privacy principles** proposed
 - implementing Rule Engine by Drools Business Rule Engine for the privacy compliance check
- 
- The Drools logo is located in the bottom right corner of the slide. It features a stylized red and blue icon resembling a brain or a network, followed by the word "Drools" in a grey, sans-serif font.

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

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