

Privacy-Awareness in Clinical Workflows

Problem

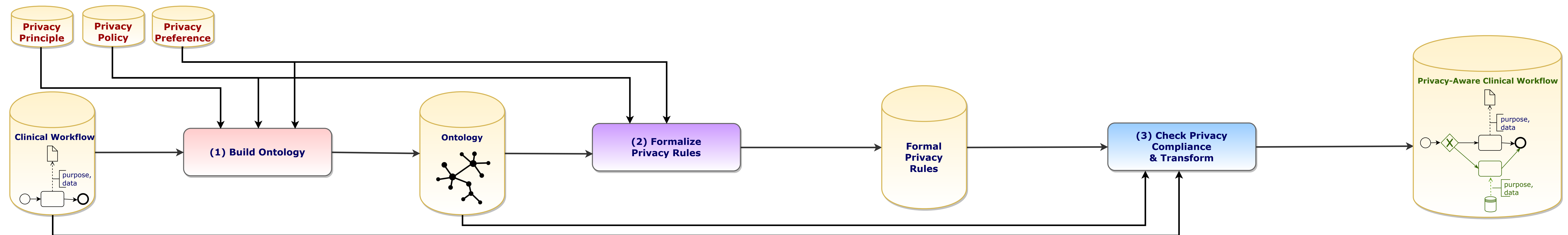
A clinical workflow might have privacy issues due to involving sensitive patient data and multiple healthcare providers.

Privacy-aware Workflows are compliant with:

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

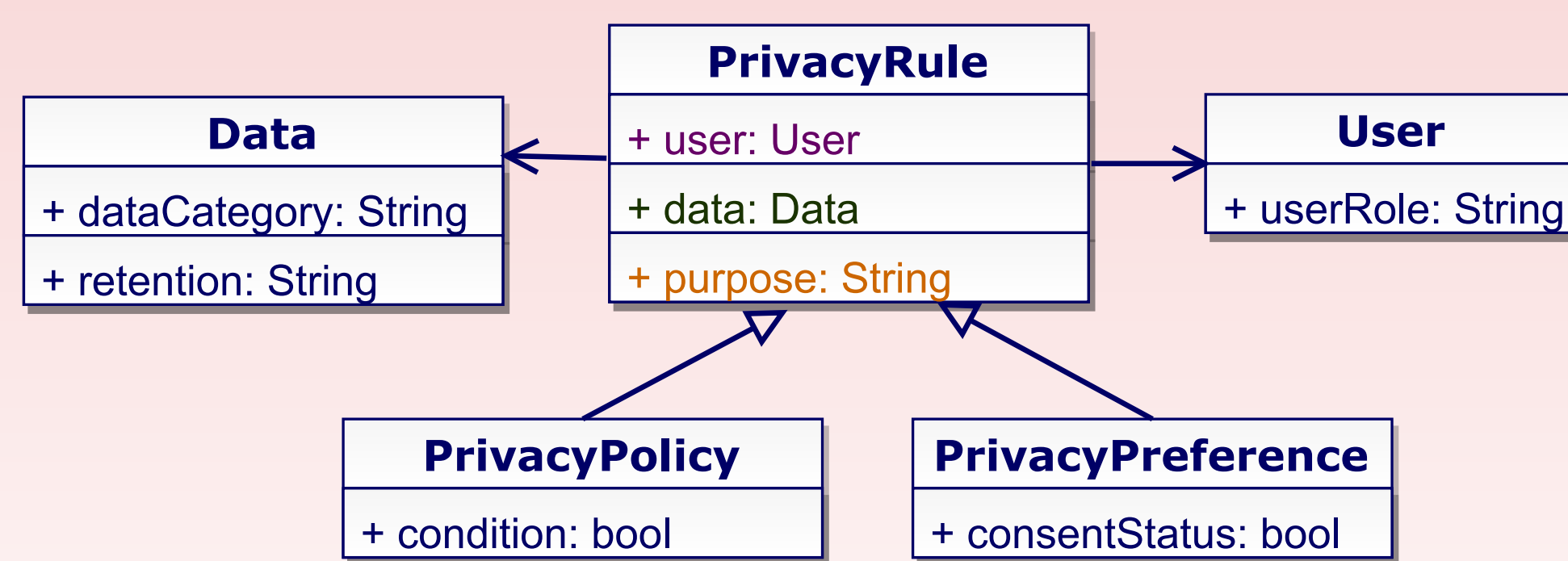
We aim to transform existing non-privacy-aware workflows into **privacy-aware** ones.

Solution

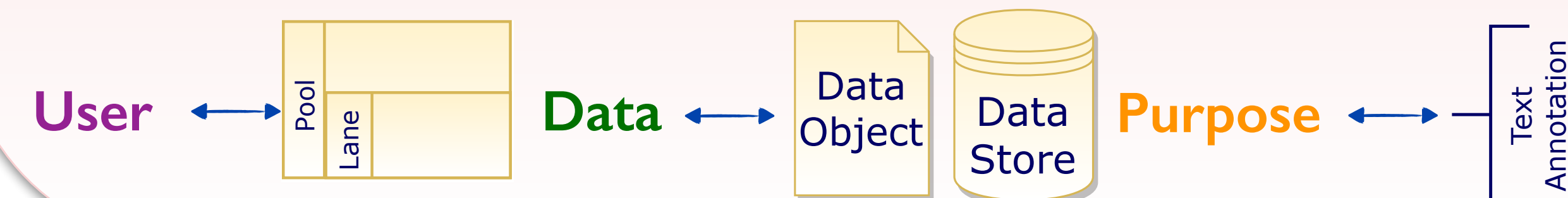


(1) Build Ontology

Ontology for main components of privacy rules:



Mapping between privacy concepts and BPMN elements:



(2) Formalize Privacy Rules

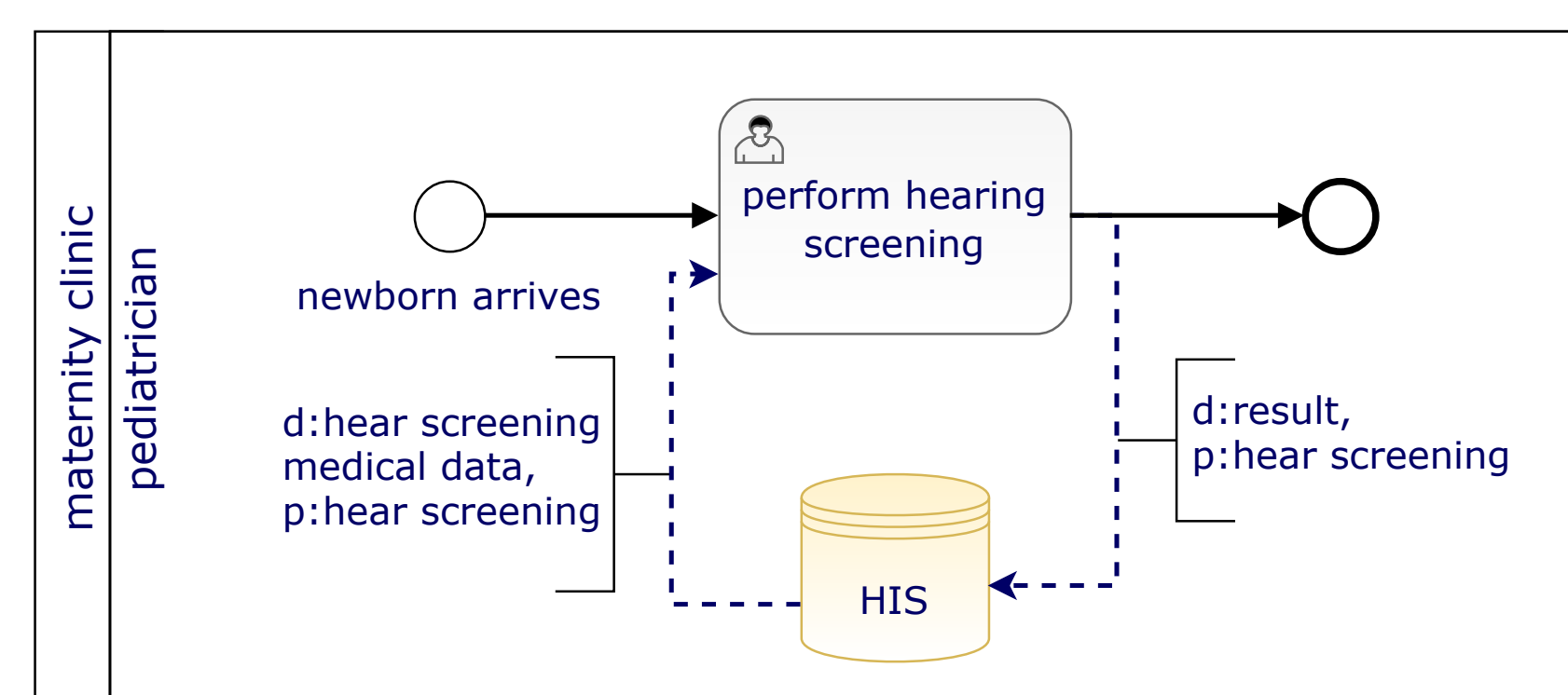
Example of Privacy Rule:

- **Informally:**
Alice gives consent that only pediatrician Bob can perform hearing screening for 6 months on March 21, 2019.
- **Formally:**
(Alice, **only Bob**, **hearing-screening**, **any**, 6months, 2019-03-21)
- **General Schema:**
(dataSubject, **user**, **purpose**, **data**, duration, entryDate)

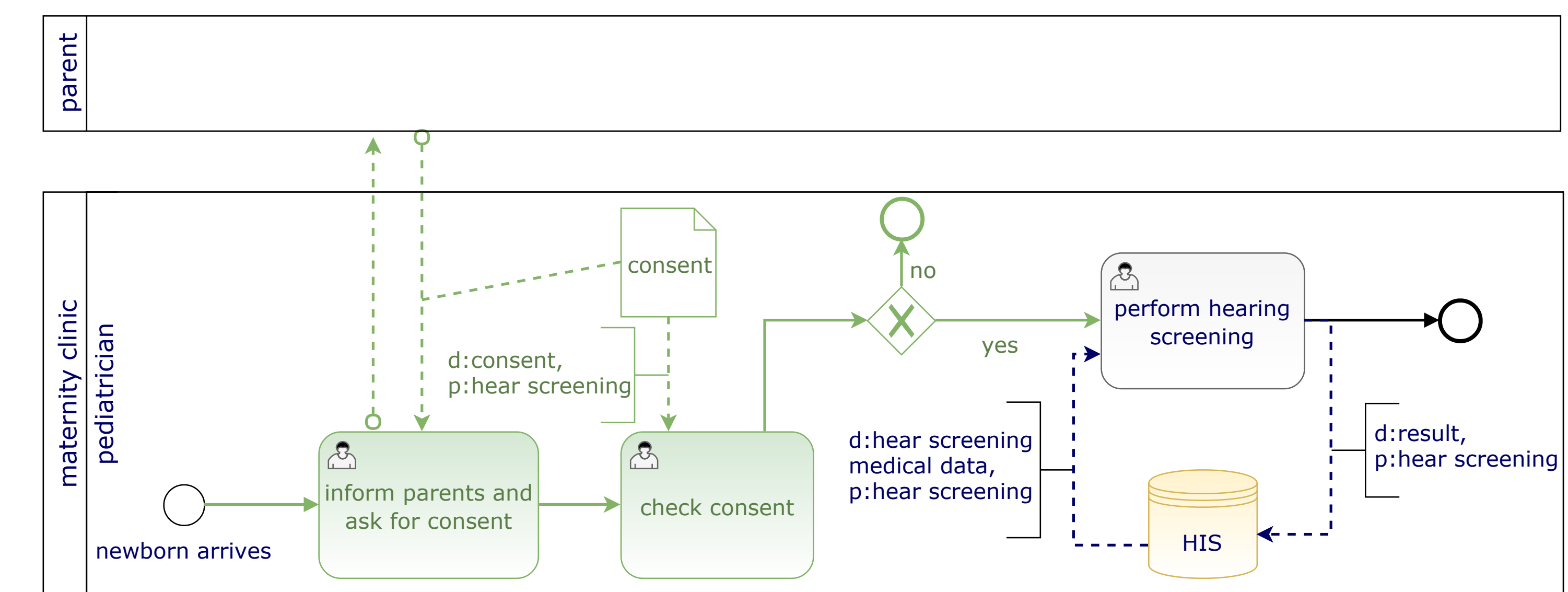
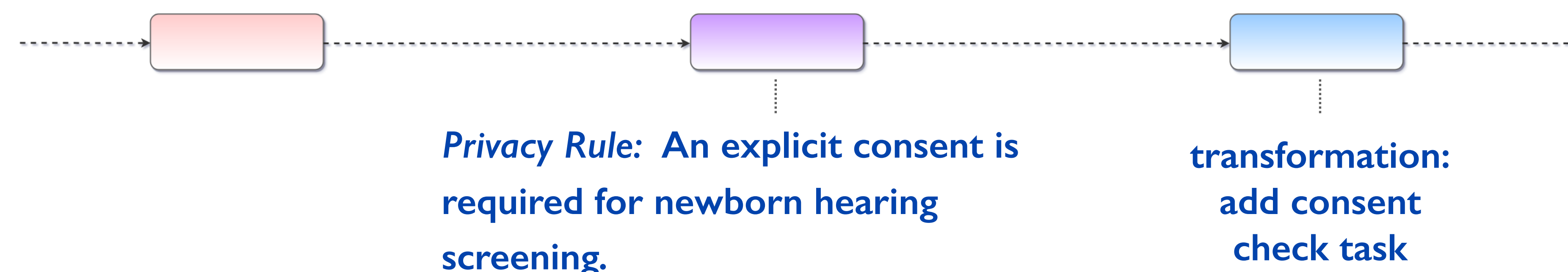
(3) Check Privacy Compliance & Transform

```
foreach data operation tasks with annotation [Data, purpose] do
    foreach privacy rules with purpose do
        if privacy violation then
            apply predefined transformation action
```

Use Case: Newborn Screening in Germany



Hearing Procedure Clinical Workflow



Hearing Procedure Privacy-Aware Clinical Workflow