Logic and Constraint Programming

6- Drools

A.A. 2021/2022

Lorenzo Rossi

lorenzo.rossi@unicam.it

University of Camerino

jBoss Drools

DROOLS

- Alternative
  - OPS5, CLIPS, Jess, ILOG, Jrules, BizTalk, ...
- Reference:
  - JBoss Drools (`http://www.jboss.org/drools`)
- Why?
  - Open source, Java-based, integrated with Eclipse
- Integrated platforms


Drools Workbench (web UI for authoring and management)


Drools Expert (business rules engine)

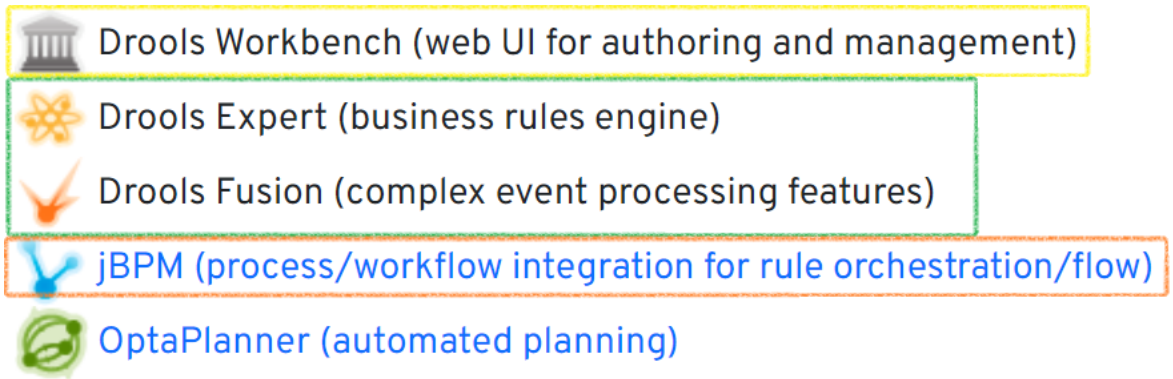

Drools Fusion (complex event processing features)


jBPM (process/workflow integration for rule orchestration/flow)


OptaPlanner (automated planning)

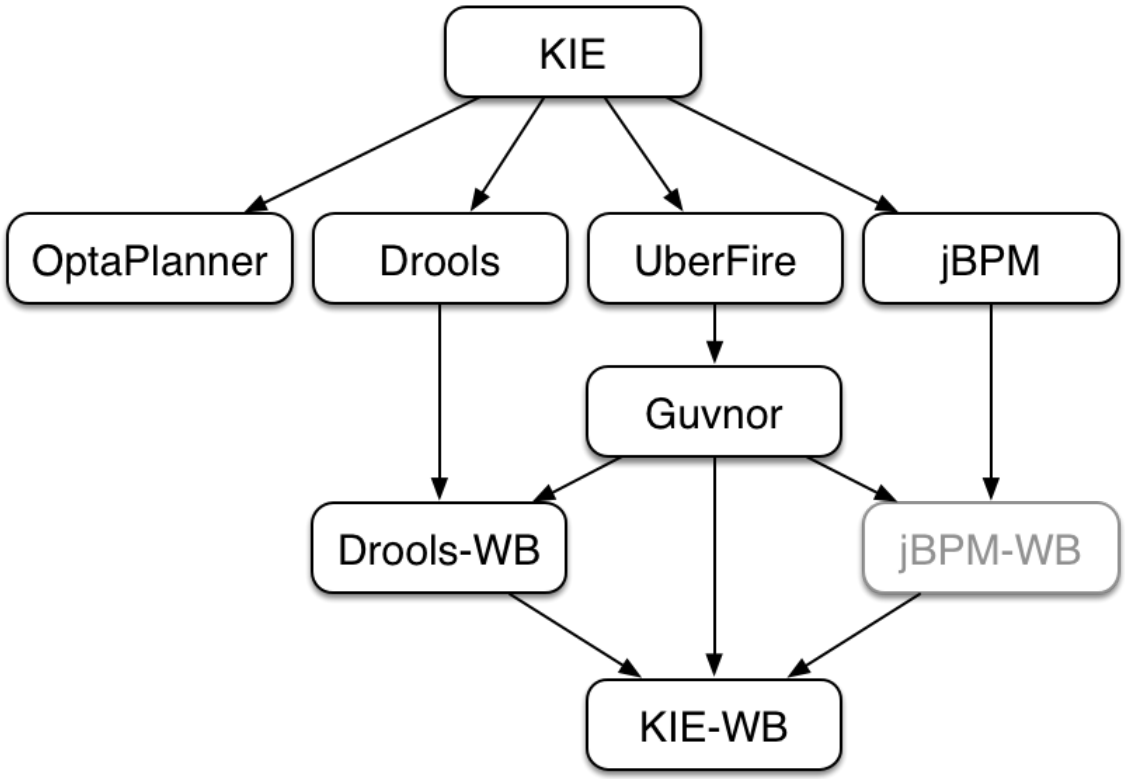
DROOLS

- Alternative
  - OPS5, CLIPS, Jess, ILOG, Jrules, BizTalk, ...
- Reference:
  - JBoss Drools (`http://www.jboss.org/drools`)
- Why?
  - Open source, Java-based, integrated with Eclipse
- Integrated platforms



KIE
≫Drools

KIE is the shared core for Drools and jBPM. It provides a unified methodology and programming model for building, deploying and utilizing resources



DROOLS
≫KIE SESSIONS

In Drools, a **KIE session** stores and executes runtime data

- A stateless KIE session does not use inference to make iterative changes to facts over time. In a stateless KIE session, data from a previous invocation of the KIE session (the previous session state) is discarded between session invocations,
- A stateful KIE session behaves similarly to a function in that the results that it produces are determined by the contents of the KIE base and by the data that is passed into the KIE session for execution at a specific point in time. The KIE session has no memory of any data that was passed into the KIE session previously

DROOLS
≫INSTALLATION

Step-by-Step:

- Open Eclipse
- Open the menu **Help**, menu item **Install new software...**
- Click on the button **Add...** and then **Local** to add a new software site
- Select the folder `./binaries/org.drools.updatesite`
- Check the box **Drools and jBPM**, then click the buttons **Next** and **Finish**

DROOLS
≫INSTALLATION

Step-by-Step:

- Go to `Window/Preferences/Drools/Installed Drools Runtimes`
- **Add...** and then **Browse** near the path field
- select the path to `./binaries`
- **Apply and Close**

DROOLS
≫INSTALLATION

Creating a test project:

- Go to **File, New, Other...**
- **Drools project**
- Middle option
- **Finish**
- Right mouse on **DroolsTest** class in source/main/java and **run as, java application**
- The following should be displayed on the console view:

SLF4J: Failed to load class ”org.slf4j.impl.StaticLoggerBinder”.

SLF4J: Defaulting to no-operation (NOP) logger implementation

SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.

Hello World

Goodbye cruel world

DROOLS
≫SYNTAX

Syntax of Drools language: rules

```
/** IMPLICATION */
rule "rule_id"
//attributes
/** premise */
when
    // pattern(s)
/** conclusion */
then
    // logical actions
    // side effects
end
```

DROOLS
≫SYNTAX

Syntax of Drools language: rules

```
/** IMPLICATION */
rule "Delete Bobs"
salience 5
/** premise */
when
    $p : Person ( name=="Bob" )
/** conclusion */
then
    retract($p);
    System.out.println($p);
end
```

Drools syntax

DROOLS
≫SYNTAX

Syntax of Drools language: queries

```
/** premise */
query "ID_query"
  // pattern
end
```

DROOLS
≫SYNTAX

Syntax of Drools language: queries

```
/** premise */
query "Find Bob"
  $p: Person ( name=="Bob" )
end
```

DROOLS
≫SYNTAX

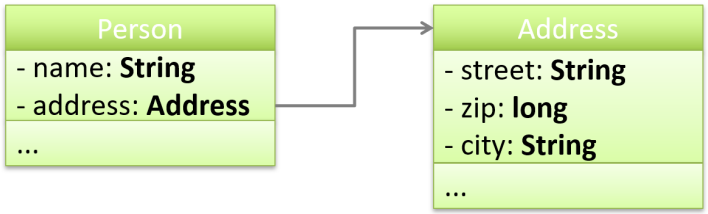
Syntax of Drools language: objects

```
/** declaration */
declare ID_Class
  // field declaration
  // field declaration
end
```

DROOLS
≫SYNTAX

Syntax of Drools language: objects

```
/** declaration */
declare Person
  name: String
  address: Address = new Address(...)
end
```



DROOLS
≫SYNTAX

Syntax of Drools language: events

```
/** declaration */
declare ID_Event
  // annotation
  // annotation
  // field declaration
  // field declaration
end
```

DROOLS
≫SYNTAX

Syntax of Drools language: events

```
/** declaration */
declare Alarm
  @role( event )
  @timestamp( time )
  message: String
  time: long
end
```