Drools Technical Document

Table of Contents

Last Published September 8, 2015

Purpose

Drools is a Business Rules Management Solution (BRMS) that serves as an alternative rules engine to Kuali Rules Management System (KRMS) for Circulation policies in OLE. This was necessitated owing to KRMS not being able to perform at optimal speeds as data scaled up. Also authoring circulation rules and updating them involved significant work and lacked ease in KRMS.

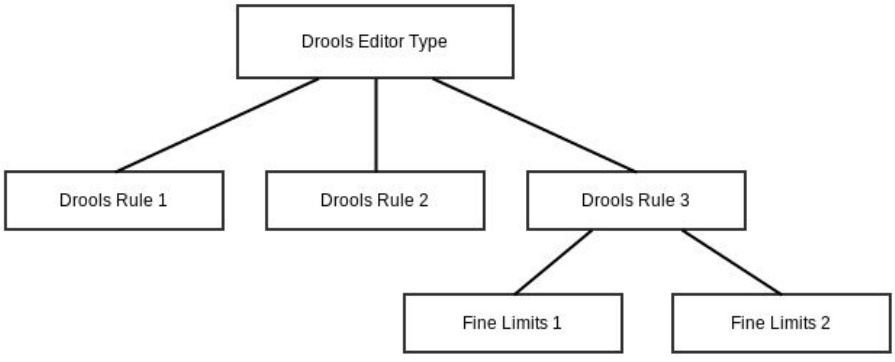
Drools, an open source BRMS, is expected to ease the process of authoring and updating circulation rules and deliver better performance than KRMS. While KRMS would still be available it will not be supported going forward.

Dependencies

The Drools BRMS, unlike the KRMS, doesn't use the database to store rules. However, a few tables are used by OLE to store and retrieve rule related information during the process of generating .drl files. They are listed below

ole_drl_editor_t	Drools Editor
ole_drl_rule_t	Drools Rule
ole_drl_fine_limits_t	Drools Fine Limits

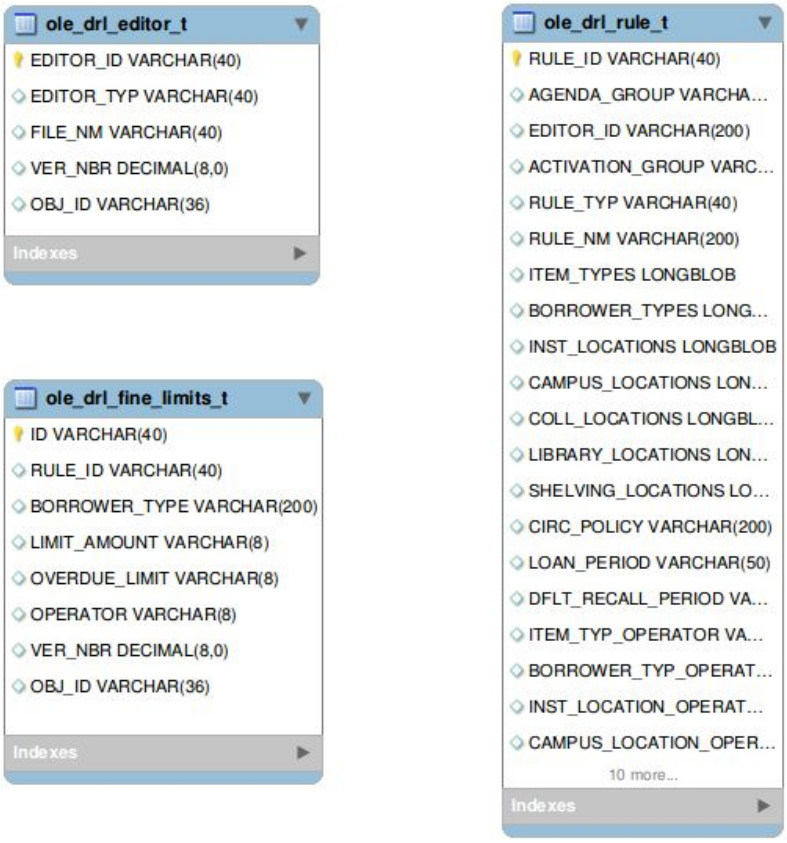
Logical Data Model



The Drools Editor Type table is at the top of the hierarchy and holds the Editor Types. Under each of the Editor Type, multiple rules can be added. Multiple fine limits can reside under a rule. The editor type contains fixed values. This can be equated to the *agenda* in KRMS. Under Editor are rules. Rules would contain various attributes and these attributes are used in making

conditions. Any number of rules can be added under Editor. Fine limits are specified under certain rules, especially, under check-in rules where fines are calculated based on library's overdue policies.

Physical Data Model



The *ole_drl_editor_t* table contains the editor related information. The Editor Type is restricted[1] in OLE to General Check, Check-out, Check-in, Renew, Request and Notice. The *ole_drl_rule_t* table contains rule related information. There can be multiple rules under an editor and there is no restriction on the number of rules that can reside under an editor. The EDITOR_ID field is a foreign key in *ole_drl_rule_t* table. Certain rules, such as those associated with Check-in operation, involve calculation of Fines. The fine related information is stored under the *ole_drl_fine_limits_t* table. RULE_ID field is a foreign key in *ole_drl_fine_limits_t* table.

[1] Drools implementation is ongoing and may incorporate more Editor Types. This needs to be updated appropriately.

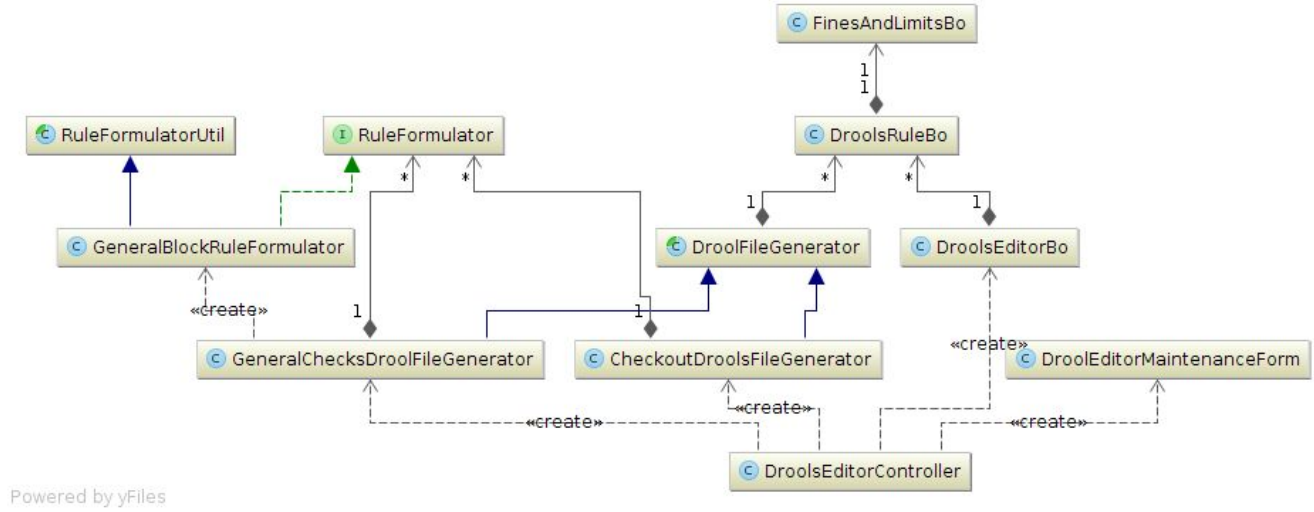
Service Interface Design

Generating a Drools Rule File

Drools BRMS uses a native rule file with a *.drl* extension. Each DRL file can have multiple rules, queries and functions. Apart from this it also holds imports, globals and attributes that are assigned and used by the rules. A typical DRL file follows the below structure

```
package

imports

globals

functions

queries

rules
	rule "<rule-name>"
	when
		<something>
	then
		<something>
	end
```

However, to ease the process of creating the DRL files, OLE, provides the end user with a Graphical User Interface (GUI) where the circulation related policies are fed. This is stored in the database tables and are used to generate DRL files in the background for use by the Drools engine.



The *DroolsEditorController* class controls the whole generation of the DRL file. It uses the *DroolEditorMaintenanceForm* class to collect the rule information from the GUI. This information is used by the *DroolFileGenerator* class which is the abstract class that helps in generating DRL file. The *CheckoutDroolsFileGenerator* and *GeneralChecksDroolFileGenerator* classes use the

RuleFormulator to generate rules[2]. The *DroolsRuleBo, DroolsEditorBo and FinesAndLimitsBo* are the Business Object classes. The Object Relational Mapping to the Database tables is done in *ojb-deliver.xml* file.

The *RuleFormulator* is an interface and each rule in Drools has a Rule Formulator class which extends *RuleFormulatorUtil* and implements *RuleFormulator.* Each Rule Formulator class has a template which sometimes have placeholders which will be populated with data from the User Interface.

Loading functions as part of the Drools Rule File

As already detailed, a DRL file also allows functions and queries other than rules. Since functions are fairly standard across institutions and typically aren't subject to customizations, they reside in the template files which are used by the Rule Formulator classes. For example, the function *today*() resides in the *patron-expiration-date.txt* file used by the Rule Formulator class, *PatronExpiredRuleFormulator.*

NOTE:

- While the DRL file is the most important file for the Drools Engine to work, without data in the database tables, there is no way OLE can pull DRL data for modifications later in GUI.
- Implementers would be better off inserting data both into the database tables and creating DRL files, simultaneously. To maintain data integrity it is advised to use the GUI to load all circulation rules.
- Another alternate way is to enter data into database tables and submitting them from the GUI which would generate DRL files.

Loading the Drools Rules

The *DroolsKieEngine* class takes care of loading the rules from the DRL files. The *initKnowledgeBase* method of the *DroolsKieEngine* class is called from the *OLEInitializeListener* class. This fires up the *populateKnowledgeBase* method where the system parameter, LOAD_CIRC_POLICIES_IND, is checked.

This parameter needs to be set to 'Y' if OLE is expected to ingest the circulation policies. Once the rules are read from the files, the parameter is updated to 'N'. Not just during implementation, whenever the institution makes changes to the rules and wants it to be reloaded, the parameter will need to be set to 'Y'. Whenever a KIESession is established using the *getSession* method, the *populateKnowledgeBase* method is called and the rules are reloaded depending on the parameter.

[2] As Drools evolves more such File Generators would be used as required.

The location in which the DRL files are kept is configured in the *olefs-config-defaults.xml* file under the *rules.directory* parameter. This is usually a folder named rules. It may contain .drl files or subfolder with the .drl files.

```
<!--Drools rule file directory-->
  <param name="rules.directory">${project.home}/rules</param>
```

The *loadRules* method of the *DroolsKieEngine* class looks for files with DRL extension (.drl) in the directory and loads the rules. Following this *readRules* method creates a new KIEContainer. The *updateParameter* method is then called to update the parameter to 'N' to prevent repeated loading of circulation rules.
When the rules are to be fired, a KIESession is created from the KIEContainer and a *fireAllRules* method is called.

Service Interface Design (REST/SOAP)

Not applicable.

User Interface Design

The Drools Editor uses KRAD's UIF (User Interface Framework). A very good guide on this can be found here.

Data Importing

Drools doesn't use the database, hence data importing is not applicable. However, OLE maintains tables to hold circulation rules related data for generating DRL files. This is held in a RDBMS and can be loaded through SQL or other batch uploads supported by the database. However, to generate DRL files, the data from the database needs to be retrieved through the GUI and submitted.

Data Exporting

The circulation policy rules are maintained as DRLs. However, OLE maintains the rules in database tables which can be exported through SQL queries.

Workflow

Not applicable.

Last Published September 8, 2015

System Parameters

Namespace Code	Parameter Name	Description
OLE-DLVR	LOAD_CIRC_POLICIES_IND	The parameter value is set to 'Y' to have OLE ingest the default circulation policies upon next policy evaluation.

Roles and Permissions

Not applicable.