Annotation Processing: um dos segredos dos projetos Java Open Source

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```
@Entity
@Table(name = "stock_daily_record", catalog = “ederign",
uniqueConstraints = @UniqueConstraint(columnNames = "DATE"))
public class StockDailyRecord implements java.io.Serializable {

    @Id
    @GeneratedValue(strategy = IDENTITY)
    @Column(name = "RECORD_ID", unique = true, nullable = false)
    public Integer getRecordId() {
        return this.recordId;
    }

    @ManyToOne(fetch = FetchType.LAZY)
    @JoinColumn(name = "STOCK_ID", nullable = false)
    public Stock getStock() {
        return this.stock;
    }

    @Column(name = "PRICE_CHANGE", precision = 6)
    public Float getPriceChange() {
        return this.priceChange;
    }


}
```

```java
@Target({ElementType.TYPE})
@Retention(RetentionPolicy.RUNTIME)
public @interface Entity {
    String name() default "";
}
```

Annotations

- Metadados
- Tooling
- Geração de Código
- Eliminar Boilerplate

Annotations

Runtime

Compile time

```java
@Target({ElementType.TYPE})
@Retention(RetentionPolicy.RUNTIME)
public @interface Entity {
    String name() default "";
}
```

JDora UnitTest Framework


DEMO GODS
PLEASE LET THESE DEMOS WORK
memegenerator.net

Annotations

Runtime


NBC
SNL
hulu

Annotations

Compile Time

Annotation Processing

Annotation Processing

Parte da compilação

Escaneia os fontes por anotações

Criar novos arquivos

Capturar erros em compilação

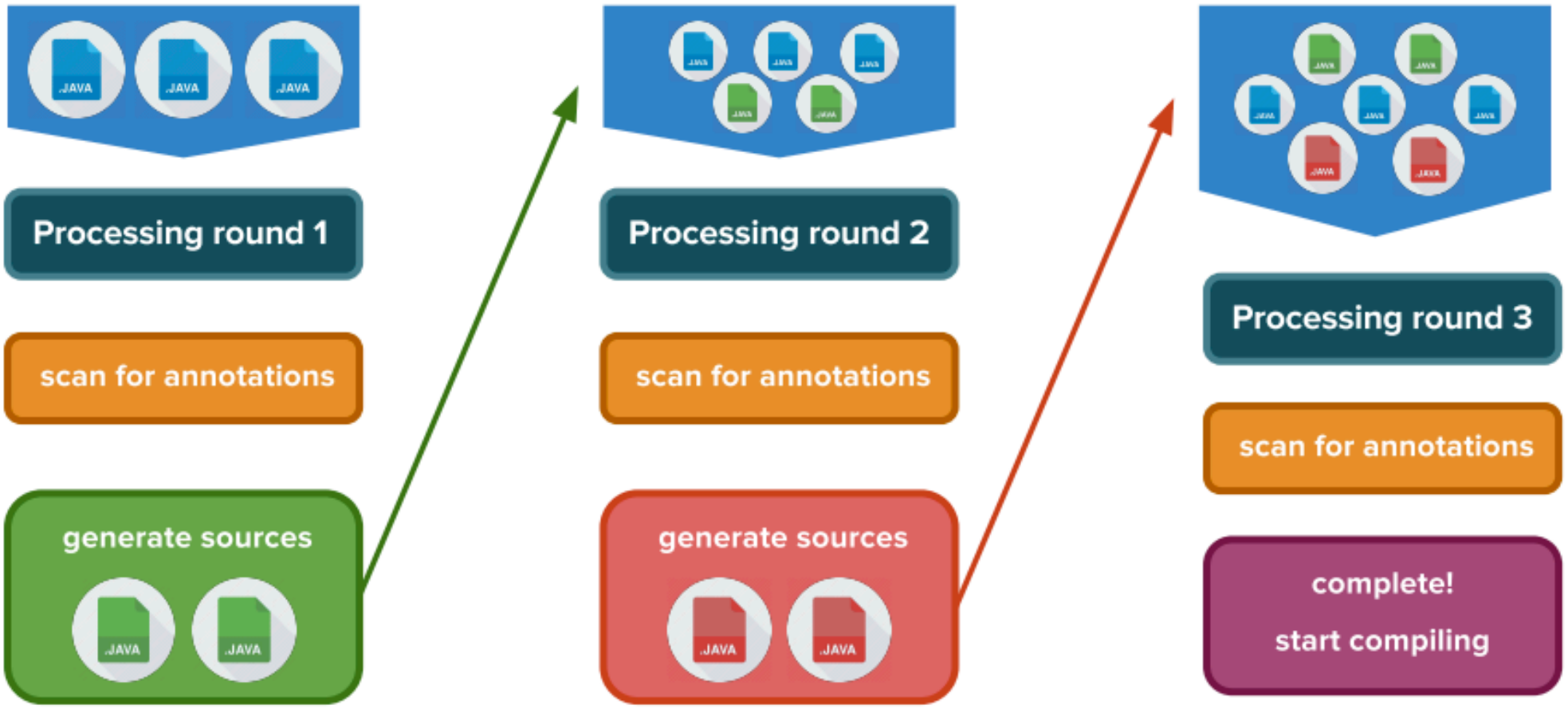
Eliminar boilerplate <3

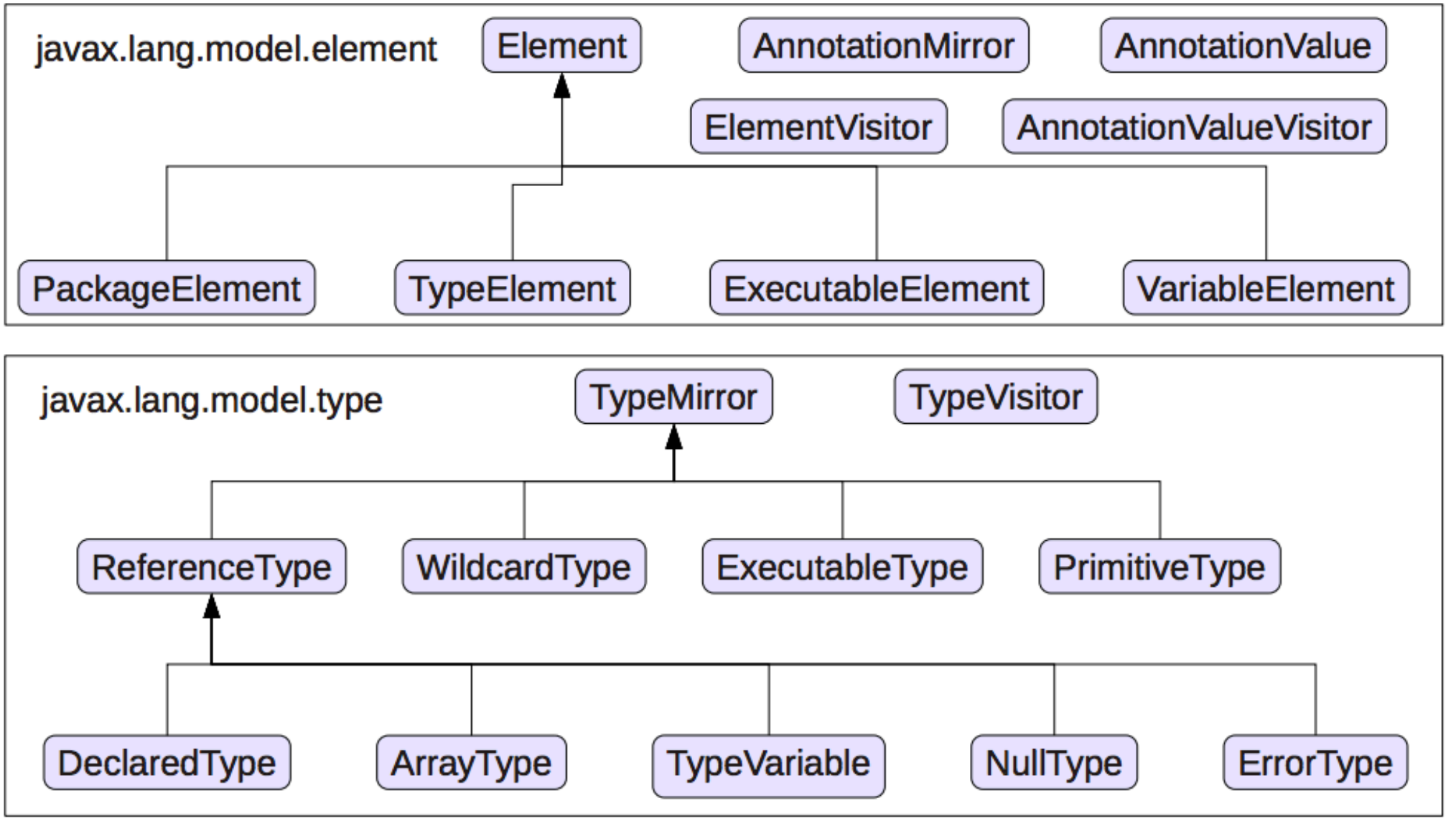
Annotation Processing

Não faz:

Injetar código

Modificar os fontes


.JAVA
.JAVA
.JAVA
Processing round 1
scan for annotations
generate sources
.JAVA
.JAVA
Processing round 2
scan for annotations
generate sources
.JAVA
.JAVA
Processing round 3
scan for annotations
complete!
start compiling


javax.lang.model.element
Element
AnnotationMirror
AnnotationValue
ElementVisitor
AnnotationValueVisitor
PackageElement
TypeElement
ExecutableElement
VariableElement
javax.lang.model.type
TypeMirror
TypeVisitor
ReferenceType
WildcardType
ExecutableType
PrimitiveType
DeclaredType
ArrayType
TypeVariable
NullType
ErrorType

```java
package com.example;    // PackageElement

public class Foo {          // TypeElement

    private int a;          // VariableElement
    private Foo other;       // VariableElement

    public Foo () {}     // ExecutableElement

    public void setA ()      // ExecutableElement

}
```

```java
//@SupportedAnnotationTypes(
        {"javax.persistence.Entity", "javax.persistence.OneToMany"})
@SupportedSourceVersion(SourceVersion.RELEASE_7)
public class JpaProcessor extends AbstractProcessor {

    @Override
    public void init(ProcessingEnvironment env) {
        super.init(env);
    }

    @Override
    public Set<String> getSupportedAnnotationTypes() {
        return new HashSet<String>() {{
            add(PrintMe.class.getCanonicalName());
        }};
    }

    @Override
    public boolean process(
            Set<? extends TypeElement> annotations,
            RoundEnvironment roundEnv) {
        //seu processamento
        return false; // continua processando?
    }
}
```

Annotations

Compile Time

E na prática?

KIE Group

Open source projects for business systems automation and management.

Drools

Drools 5 introduces the **Business Logic integration Platform** which provides a unified and integrated platform for **Rules, Workflow** and **Event Processing**. It's been designed from the ground up so that each aspect is a first class citizen, with no compromises.

Drools team

jBPM

jBPM is a flexible Business Process Management (BPM) Suite. A business process allows you to model your business goals by describing the steps that need to be executed to achieve those goals, and the order of those goals are depicted using a flow chart...

jBPM team

OptaPlanner

OptaPlanner optimizes business resource usage. Every organization faces planning problems: provide products or services with a limited set of constrained resources. OptaPlanner optimizes such planning to do more business with less resources...

Optaplanner team

UberFire

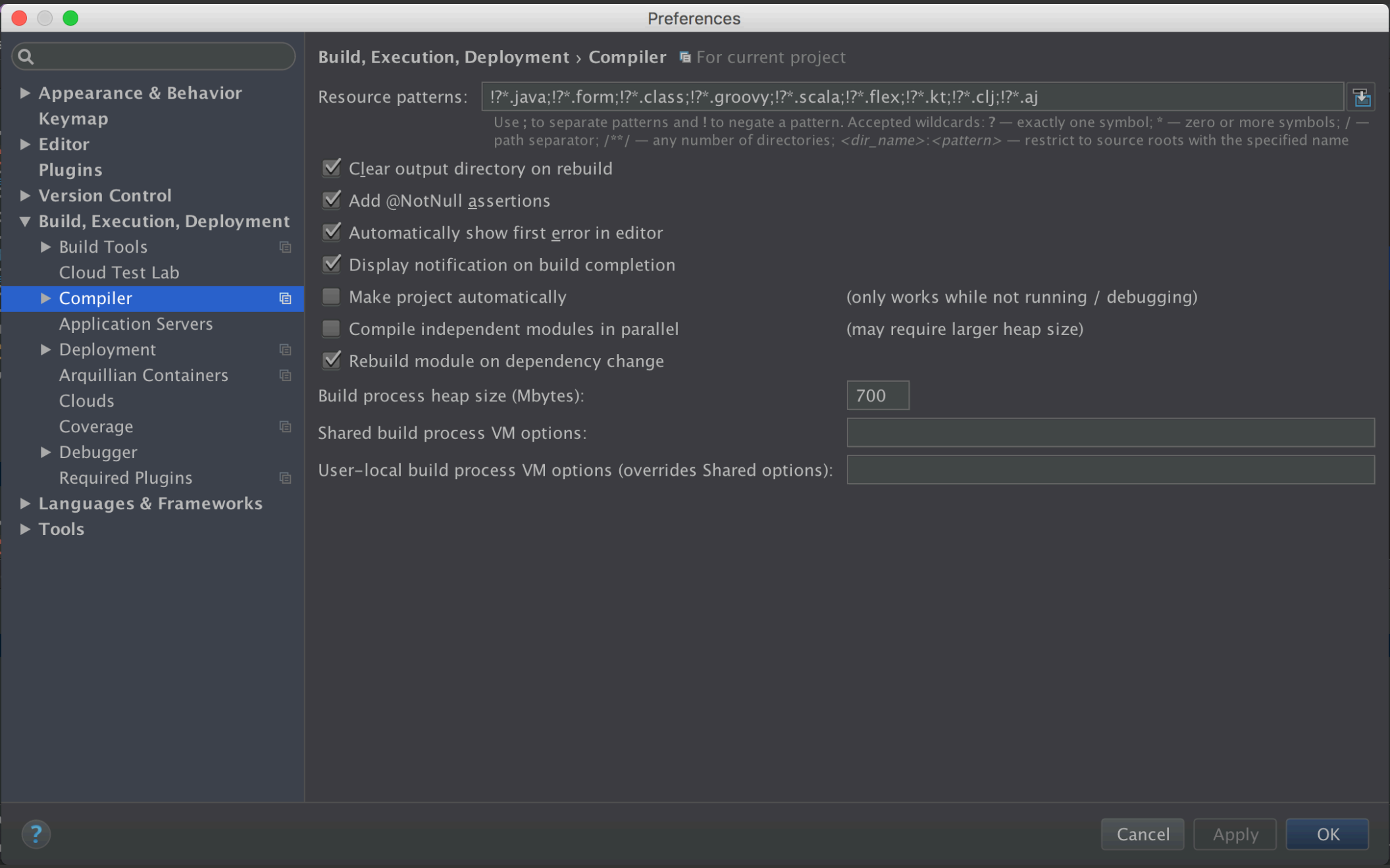
UberFire is a web based workbench framework inspired by Eclipse Rich Client Platform. This is a very strategic project for Drools & jBPM team, once this is the base technology for our next generation of web tooling.

Dashbuilder

Dashbuilder is a full featured web application for the visual composition of custom business dashboards. Data comes from heterogeneous sources of information such as JDBC databases or regular text files and can be displayed using different charting libraries.

uberfire

Preferences Framework


Preferences
Appearance & Behavior
Keymap
Editor
Plugins
Version Control
Build, Execution, Deployment
Build Tools
Cloud Test Lab
Compiler
Application Servers
Deployment
Arquillian Containers
Clouds
Coverage
Debugger
Required Plugins
Languages & Frameworks
Tools
Build, Execution, Deployment › Compiler
For current project
Resource patterns:
!?*.java;!?*.form;!?*.class;!?*.groovy;!?*.scala;!?*.flex;!?*.kt;!?*.clj;!?*.aj
Use ; to separate patterns and ! to negate a pattern. Accepted wildcards: ? — exactly one symbol; * — zero or more symbols; / — path separator; /**/ — any number of directories; <dir_name>:<pattern> — restrict to source roots with the specified name
Clear output directory on rebuild
Add @NotNull assertions
Automatically show first error in editor
Display notification on build completion
Make project automatically
(only works while not running / debugging)
Compile independent modules in parallel
(may require larger heap size)
Rebuild module on dependency change
Build process heap size (Mbytes):
700
Shared build process VM options:
User-local build process VM options (overrides Shared options):
Cancel
Apply
OK

Wires Admin Tools

Users

1

Permissions

Application Map

System

My Preferences

Shared Preferences

```java
@WorkbenchPreference(identifier = "MyPreference",
        bundleKey = "MyPreference.Label")
public class MyPreference implements BasePreference<MyPreference> {

    @Property(bundleKey = "MyPreference.Text",
            helpBundleKey = "MyPreference.Text.Help",
            validators = NotEmptyValidator.class,
            formOptions = PropertyFormOptions.DISABLED)
    String text;

    @Property(formType = PropertyFormType.BOOLEAN, bundleKey = "MyPreference.SendReports")
    boolean sendReports;

    @Property(formType = PropertyFormType.COLOR, bundleKey = "MyPreference.BackgroundColor")
    String backgroundColor;

    @Property(formType = PropertyFormType.NATURAL_NUMBER, bundleKey = "MyPreference.Age")
    int age;

    @Property(formType = PropertyFormType.SECRET_TEXT, bundleKey = "MyPreference.Password")
    String password;

    @Property(bundleKey = "MyPreference.MyInnerPreference")
    MyInnerPreference myInnerPreference;

    @Property(shared = true, bundleKey = "MyPreference.MySharedPreference")
    MySharedPreference mySharedPreference;

    @Override
    public MyPreference defaultValue(final MyPreference defaultValue) {
        defaultValue.text = "text";
        defaultValue.sendReports = true;
        defaultValue.backgroundColor = "ABCDEF";
        defaultValue.age = 27;
        defaultValue.password = "password";
        defaultValue.myInnerPreference.text = "text";

        return defaultValue;
    }
}
```

```
public class MyServerBean {

    @Inject
    private MyPreference myPreference;

    public void load() {
        // Loads the preference content from the file system
        myPreference.load();

        myPreference.text = "text";
        myPreference.sendReports = true;
        myPreference.backgroundColor = "ABCDEF";
        myPreference.age = 27;
        myPreference.password = "password";
        myPreference.myInnerPreference.text = "text";
        myPreference.myInheritedPreference.text = "text";
        myPreference.myInheritedPreference.myInnerPreference2.text = "text";
        myPreference.myInheritedPreference.myInnerPreference2.myInheritedPreference2.text =
"text";

        // Saves the modified preference content.
        myPreference.save();
    }
}
```

Wires Admin Tools

Users

1

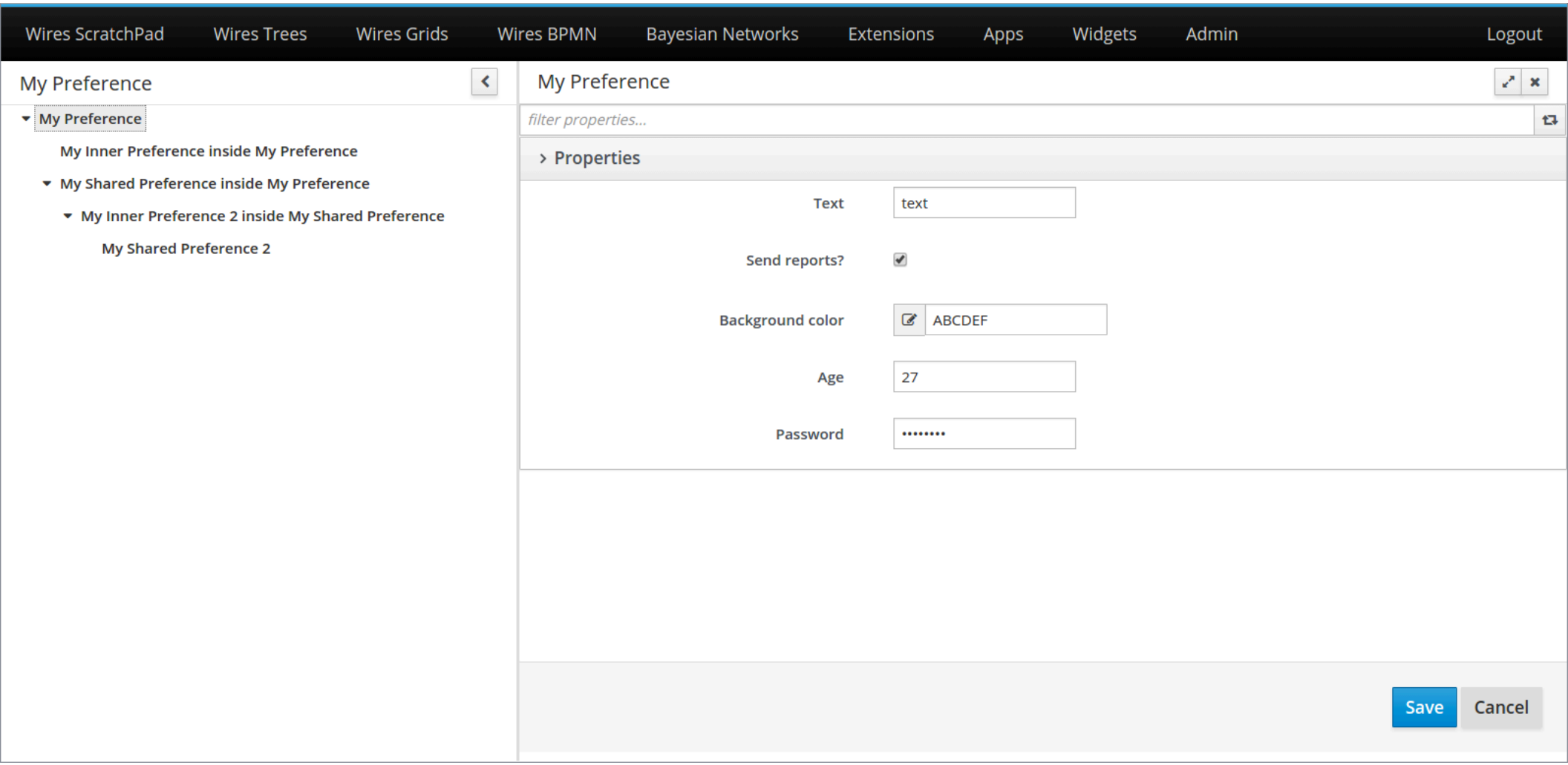
Permissions

Application Map

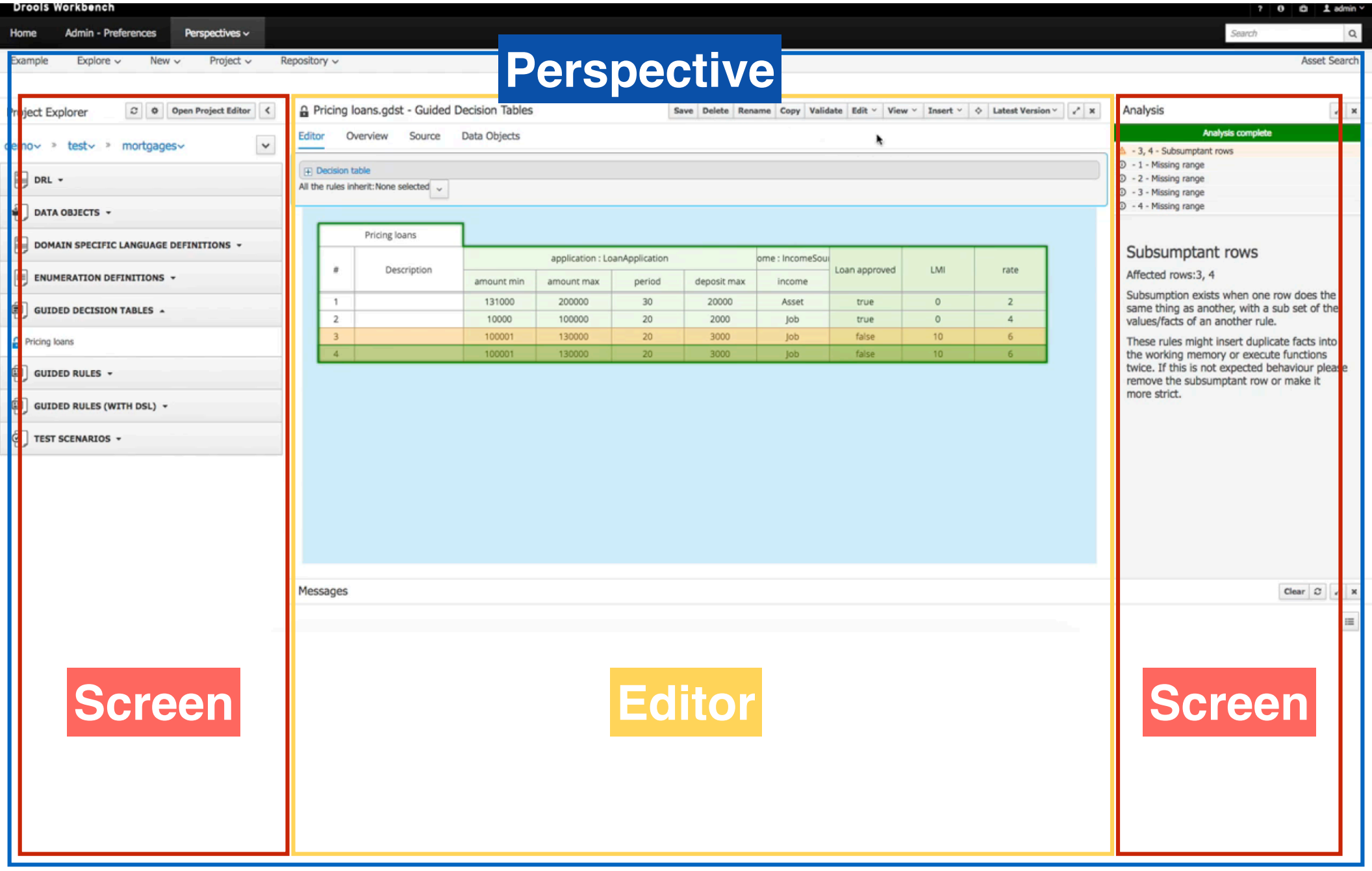
System

My Preferences

Shared Preferences


Wires ScratchPad
Wires Trees
Wires Grids
Wires BPMN
Bayesian Networks
Extensions
Apps
Widgets
Admin
Logout
My Preference
My Preference
My Preference
My Inner Preference inside My Preference
My Shared Preference inside My Preference
My Inner Preference 2 inside My Shared Preference
My Shared Preference 2
My Preference
filter properties...
Properties
Text
text
Send reports?
Background color
ABCDEF
Age
27
Password
Save
Cancel

Uberfire UI Components


Drools Workbench
Home
Admin - Preferences
Perspectives
Search
Example
Explore
New
Project
Repository
Asset Search
Perspective
Project Explorer
Open Project Editor
demo
test
mortgages
DRL
DATA OBJECTS
DOMAIN SPECIFIC LANGUAGE DEFINITIONS
ENUMERATION DEFINITIONS
GUIDED DECISION TABLES
Pricing loans
GUIDED RULES
GUIDED RULES (WITH DSL)
TEST SCENARIOS
Pricing loans.gdst - Guided Decision Tables
Save
Delete
Rename
Copy
Validate
Edit
View
Insert
Latest Version
Editor
Overview
Source
Data Objects
Decision table
All the rules inherit:None selected
Pricing loans
| Description | application : LoanApplication | | | | ome : IncomeSou | Loan approved | LMI | rate
amount min | amount max | period | deposit max | income
1 | | 131000 | 200000 | 30 | 20000 | Asset | true | 0 | 2
2 | | 10000 | 100000 | 20 | 2000 | Job | true | 0 | 4
3 | | 100001 | 130000 | 20 | 3000 | Job | false | 10 | 6
4 | | 100001 | 130000 | 20 | 3000 | Job | false | 10 | 6
Messages
Analysis
Analysis complete
- 3, 4 - Subsumptant rows
- 1 - Missing range
- 2 - Missing range
- 3 - Missing range
- 4 - Missing range
Subsumptant rows
Affected rows:3, 4
Subsumption exists when one row does the same thing as another, with a sub set of the values/facts of an another rule.
These rules might insert duplicate facts into the working memory or execute functions twice. If this is not expected behaviour please remove the subsumptant row or make it more strict.
Clear
Screen
Editor
Screen

Baseado em Contratos

Screen -> Interface WorkbenchScreenActivity

Editor -> Interface WorkbenchEditorActivity

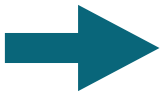
Perspective -> Interface PerspectiveActivity

```java
@WorkbenchPerspective(identifier = “HomePerspective", isDefault
= true)
@Templated
public class HomePerspective implements IsElement {

    @Inject
    @DataField
    @WorkbenchPanel(parts = "MoodScreen?uber=fire&uber1=fire1")
    Div moodScreen;

    @Inject
    @DataField
    @WorkbenchPanel(parts = "HomeScreen?uber=fire")
    Div homeScreen;

    @Inject
    @DataField
    @WorkbenchPanel(parts = "AnotherScreen")
    Div anotherScreen;
}
```



```java
@JsType
public interface PerspectiveActivity{

    PerspectiveDefinition
getDefaultPerspectiveLayout();

    @Override
    default String getName() {
        return
getDefaultPerspectiveLayout().getName();
    }

    boolean isDefault();

    Menus getMenus();

    ToolBar getToolBar();
}
```

Annotations

Reflection

Annotation Processors

Open Source

Obrigado! <3

Eder Ignatowicz
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redhat