Business Rules Management System:

Gerenciando Regras de Negócio

Edson Tirelli

Sr. Software Engineer

Sistemas Corporativos

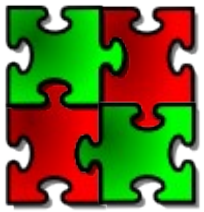
Sistema Corporativo

Décadas de 50-60: sistemas monolíticos

Sistemas Corporativos

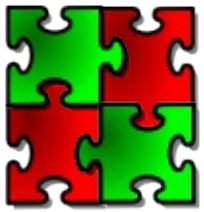
Décadas de 60-70: separação dos dados

Sistemas Corporativos



Décadas de 70-80: procedimentos reutilizáveis

Sistemas Corporativos

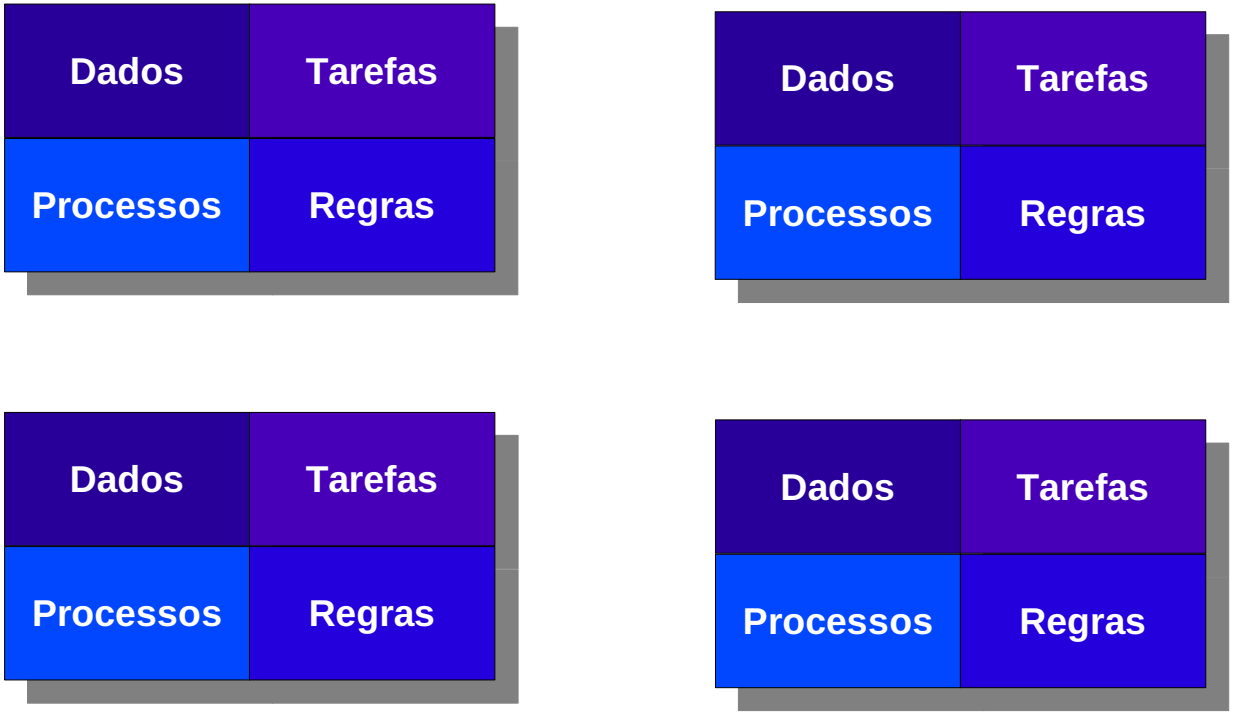


A partir de 90: separação dos processos e regras

Sistemas Corporativos

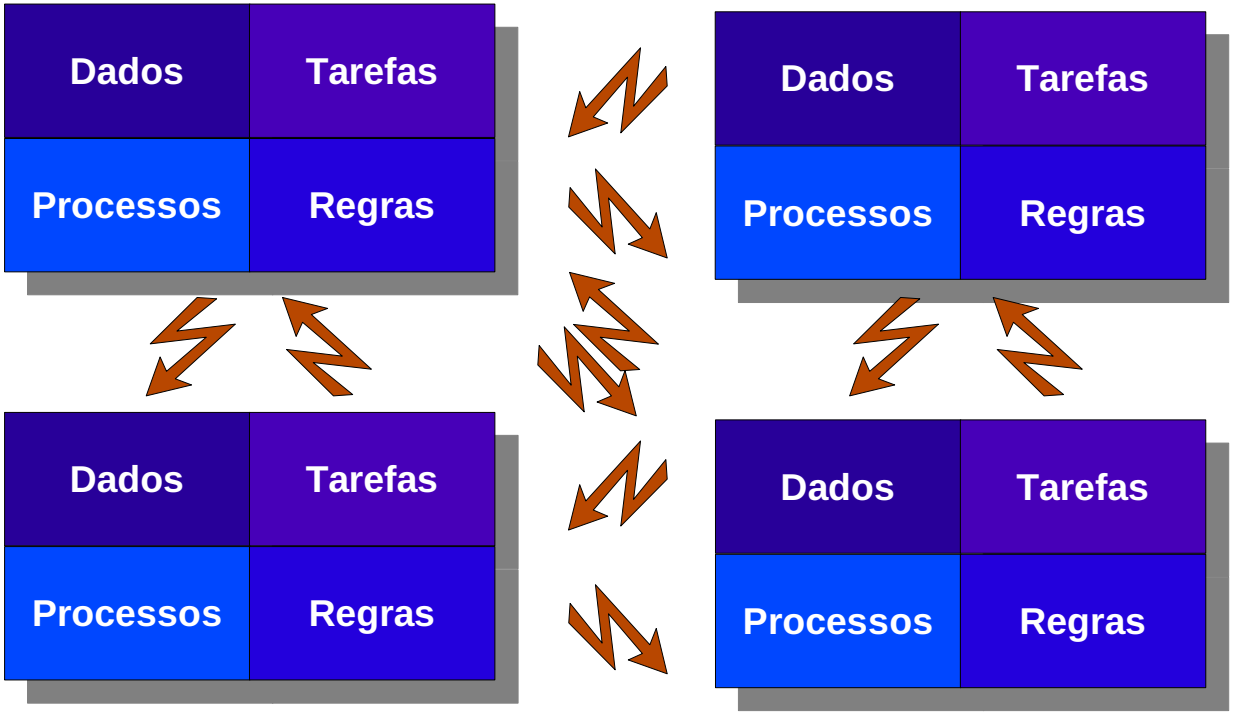
A partir de 90: separação dos processos e regras

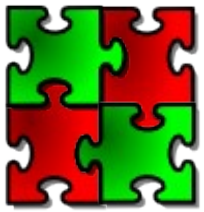
Ambiente Corporativo



Sistemas Isolados = custo

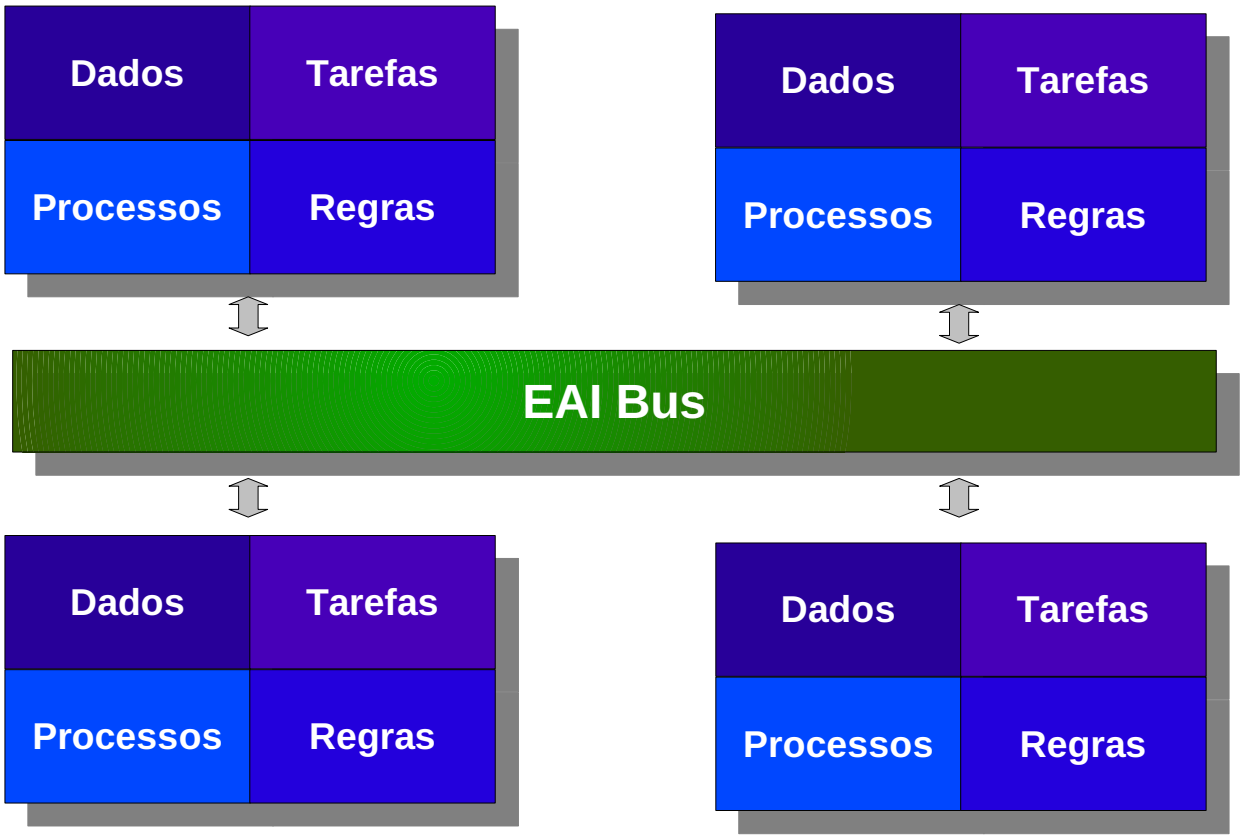
Ambiente Corporativo





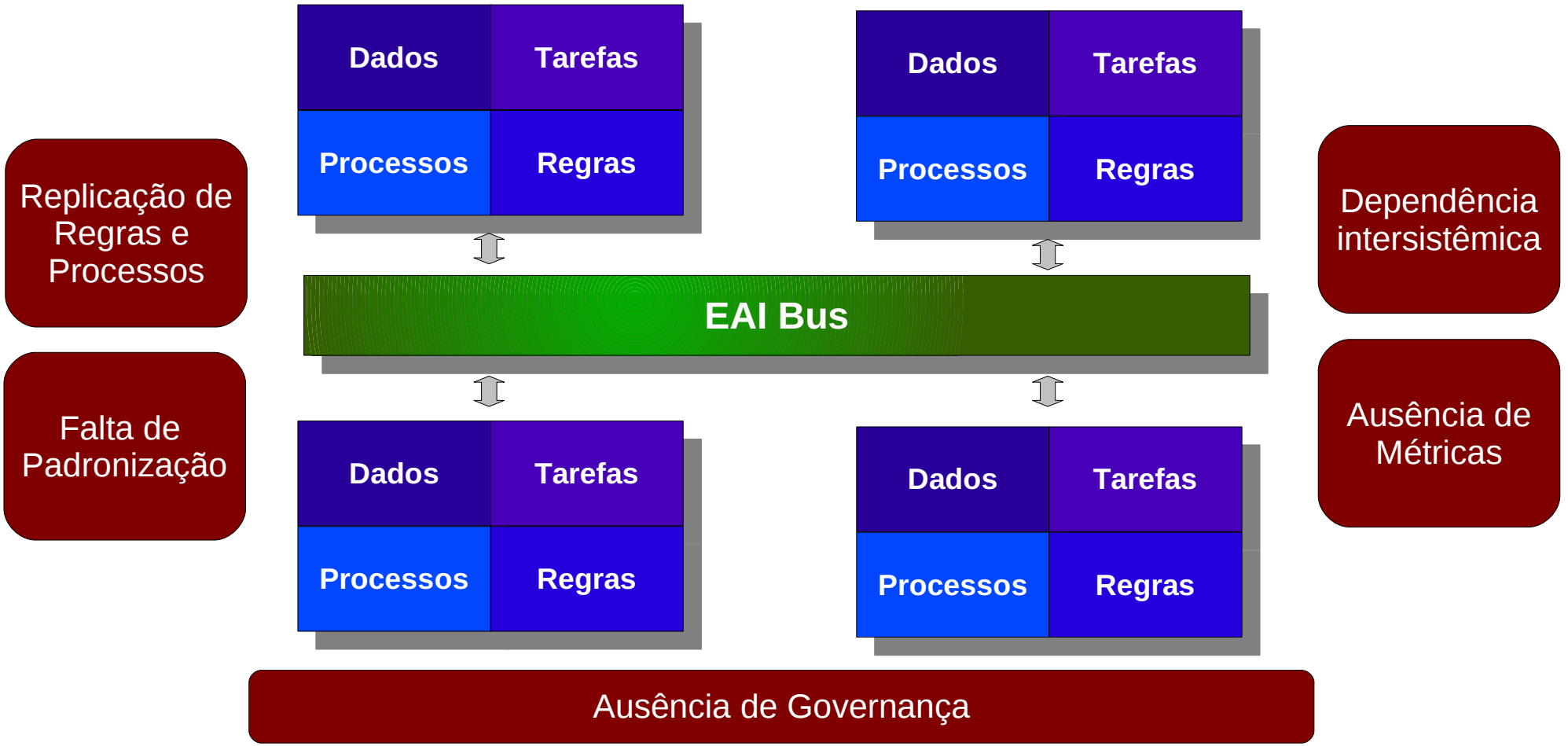
Integração ponto-a-ponto = mais custos

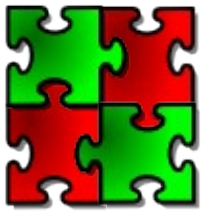
Ambiente Corporativo



EAI: Solução?

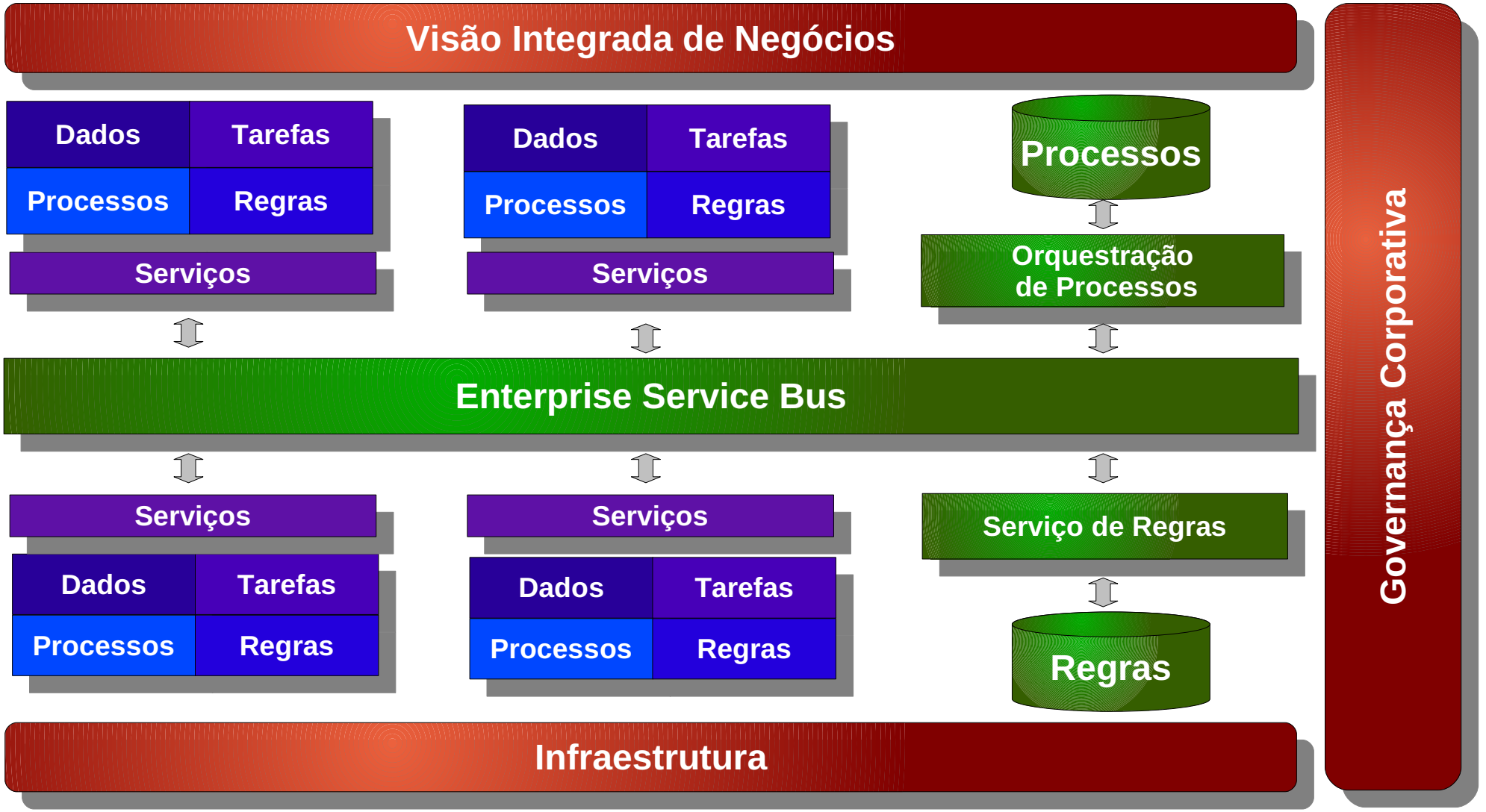
Ambiente Corporativo





EAI: Solução? Não exatamente

Arquitetura SOA



Maximizando o reuso e a integração

Drools | Conceitos

- **Regra:**
  - Conjunto de **condições** a serem avaliadas e uma lista de **ações** a serem executadas (consequência) caso as condições sejam verdadeiras.

- **Fatos:**
  - **Dados** sobre os quais as regras são aplicadas.

- **Origens das regras:**
  - **Regulamentação legal:** "**Se** o tempo de uma chamada telefônica celular for inferior a 30 segundos, **então** cobre 30 segundos."
  - **Políticas da empresa:** "**Se** a compra for acima de R$ 100,00, **então** aplique 10% de desconto."
  - **Conhecimento de especialistas:** "**Se** a pressão da caldeira estiver acima de 'n' vezes a temperatura, **então** inicie o procedimento de despressurização."

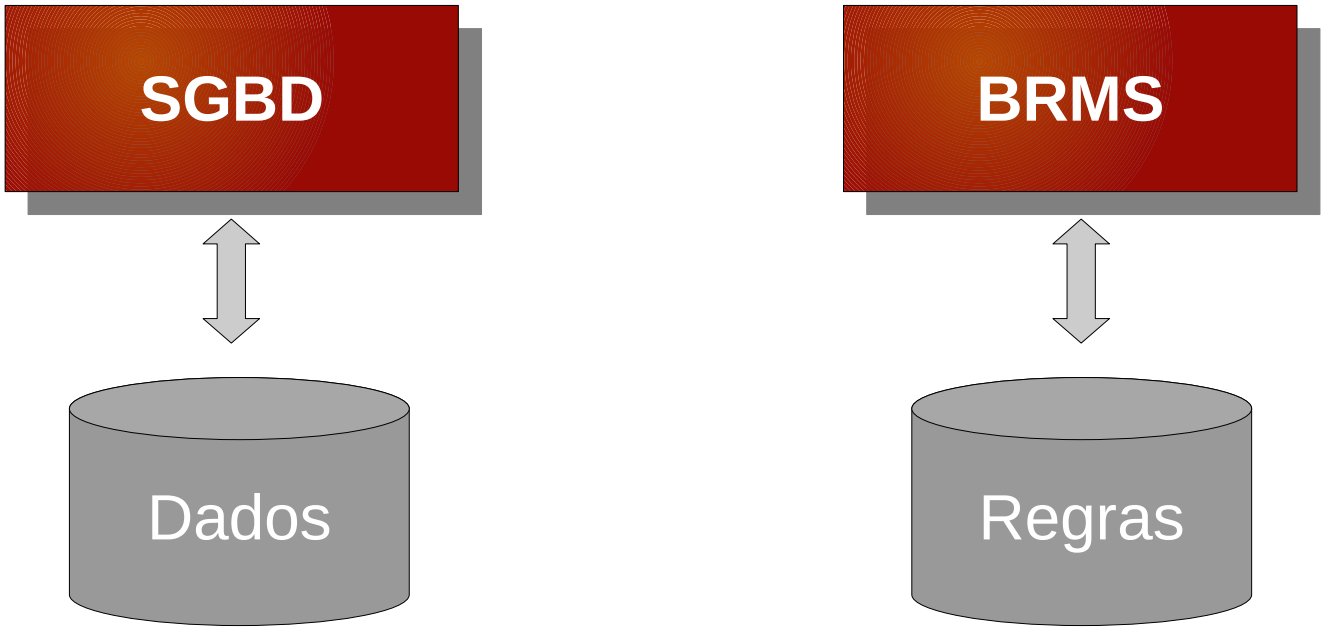
Ferramentas

- **Dados:**
  - DBMS: Sistemas de Bancos de Dados (Relacional, OO, Hierárquico, etc)
- **Tarefas:**
  - Linguagens Imperativas (C/C++, Java, C#, Python, etc)
- **Processos:**
  - BPMS: Engines de Processos (jBPM, WS Process Server, WLI, etc)
- **Regras:**
  - BRMS: Engines de Regras (Drools, CLIPS, iLOG JRules, Jess, etc)

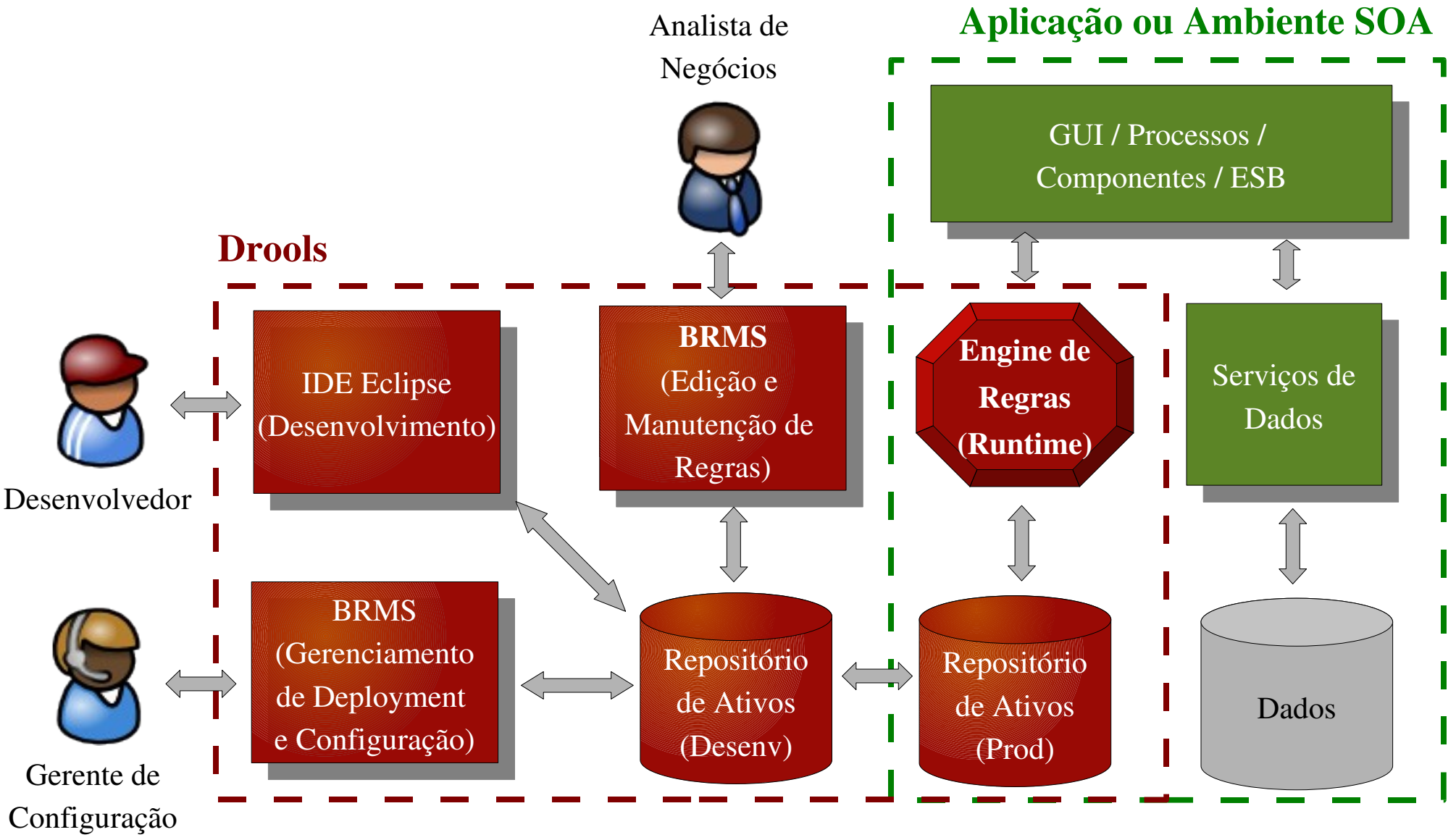
BRMS: Engine de Regras

- Componente de software especializado no gerenciamento e processamento de regras.

- Um BRMS está para as regras como um SGBD está para os dados.



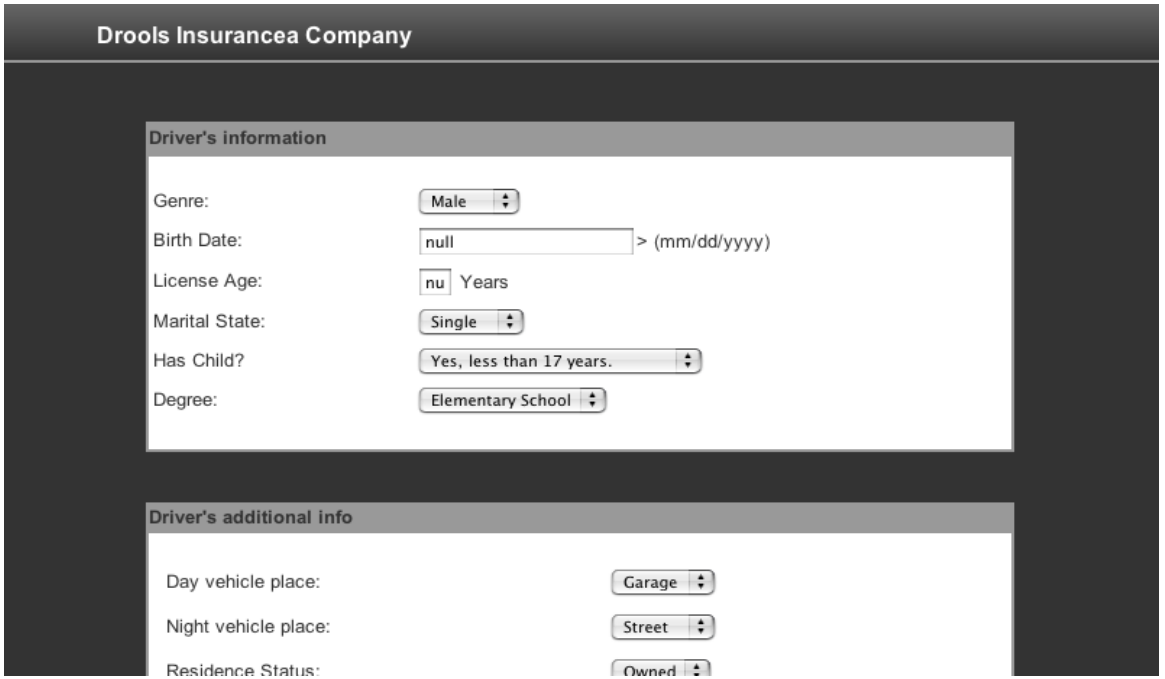
BRMS: Macro Arquitetura

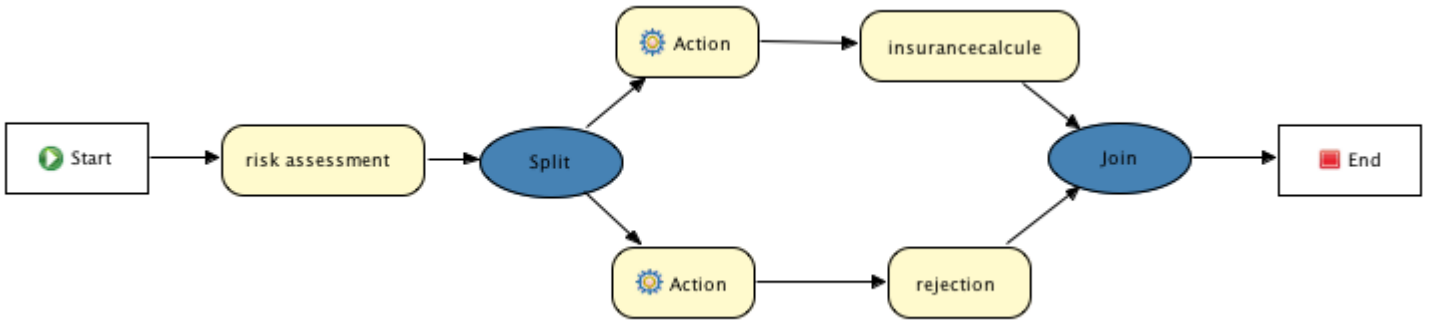


BRMS: Funcionalidades

- **Repositório de Ativos de Conhecimento**
  - Regras
  - Modelos
  - Fluxos
  - DSLs
- **Categorização e versionamento de ativos**
- **Gerenciamento de ciclo de vida**
- **Editores de Regras amigáveis para não técnicos**

Demo: Análise de Risco





Cenários de Uso Comuns

- **Telecom**
  - Qualificação de chamadas
  - Tarifação de chamadas
  - Detecção de fraudes
- **Seguros**
  - Classificação de Risco
  - Cálculo do Prêmio
- **Mercado Financeiro**
  - Asset Management: Compliance
  - Autorização de crédito
- **Segurança**
  - Controle e autorização de acesso
  - Policy enforcement
- **Sistemas especialistas**
  - Construção civil
  - Medicina

Drools: Características

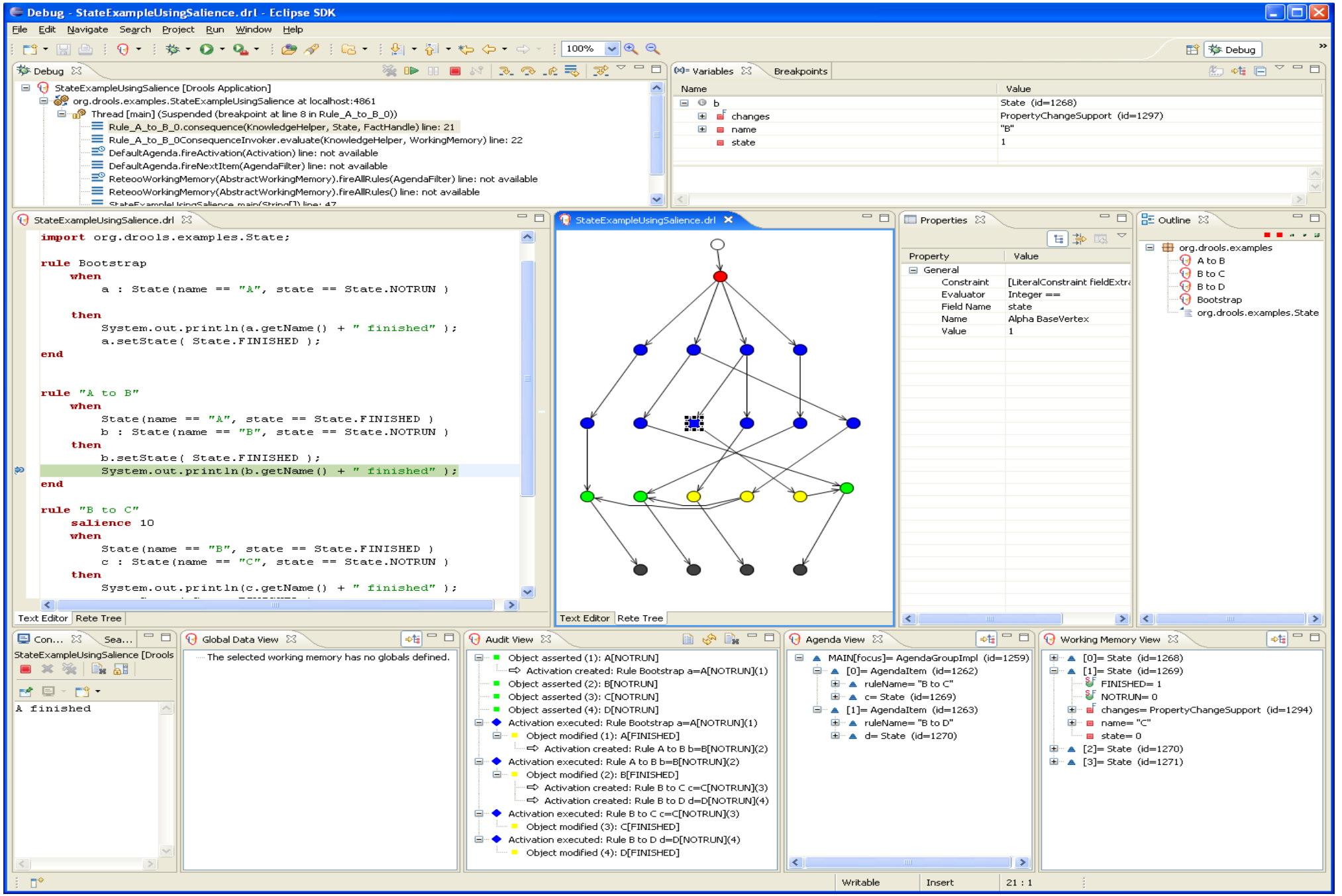
- **Engine de Regras:**
  - Forward Chaining
  - Algoritmo ReteOO
  - Otimizações: indexação de memórias Beta, hashing de nós Alfa, etc
  - In-memory working memory

- **Arquitetura e Integração**
  - 100% Java, roda tanto em JSE quanto JEE
  - Acesso transparente e direto ao modelo de domínio POJO
  - Ferramenta de middleware, integrável à containers JEE, Aplicações Web, WebServices, jBPM, Seam, LDAP
  - JSR94 compliant

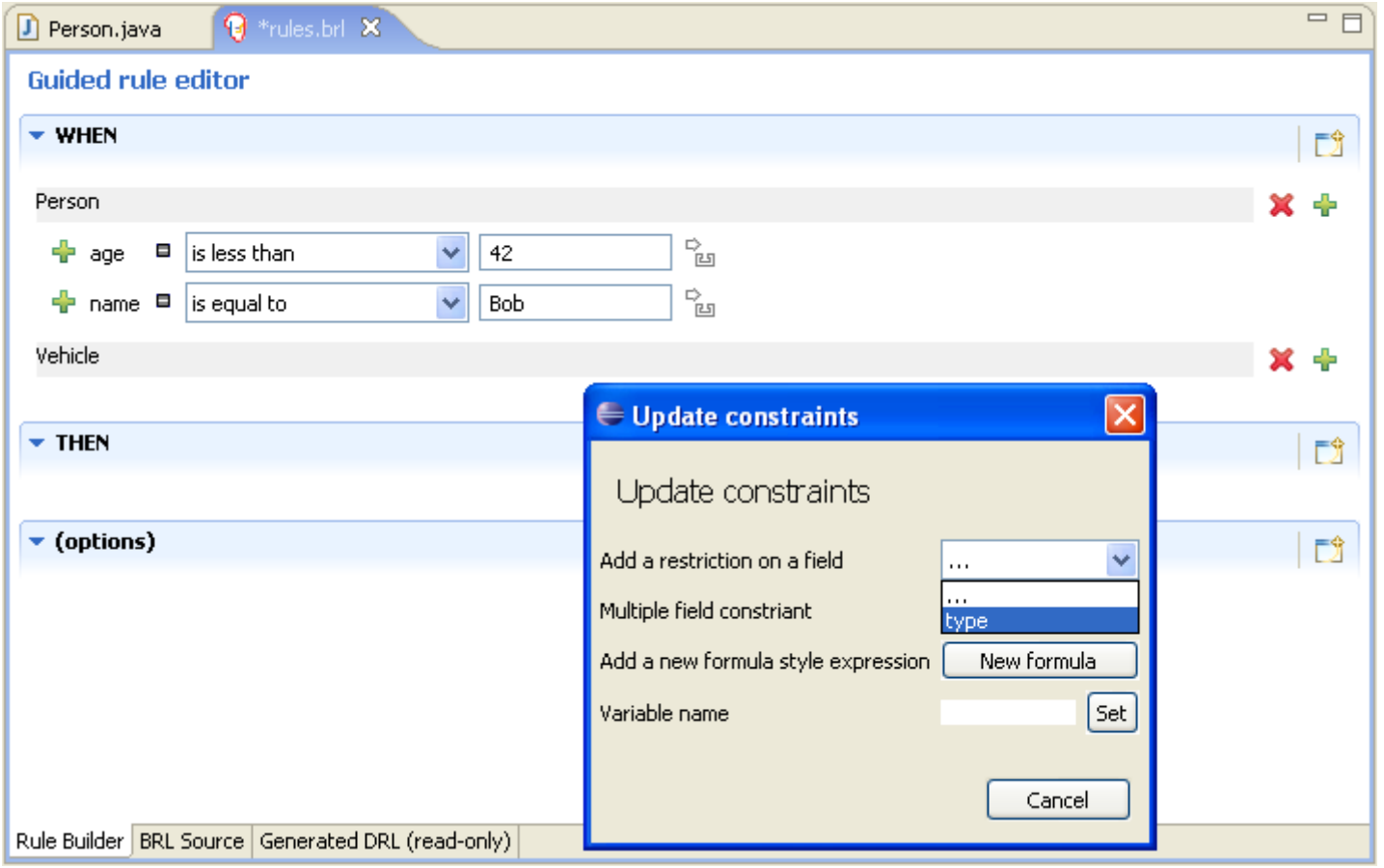
Características

- **Implementação das regras:**
  - Implementação declarativa
  - Evita que as regras fiquem embutidas no código
  - Regras podem ser alteradas sem a necessidade de recompilação
  - Otimiza a execução de conjuntos de regras altamente complexos
- **Formas de definição das regras:**
  - DRL (Drools Rule Language): linguagem “nativa” similar ao java
  - DSL (Domain Specific Language): linguagem de alto nível específica ao domínio
  - BRX: Guided Editors (Eclipse e Web)
  - Excel / OpenOffice: planilhas de tabelas de decisão
  - XML: documentos XML com a declaração das regras
  - API: para acesso direto via código Java

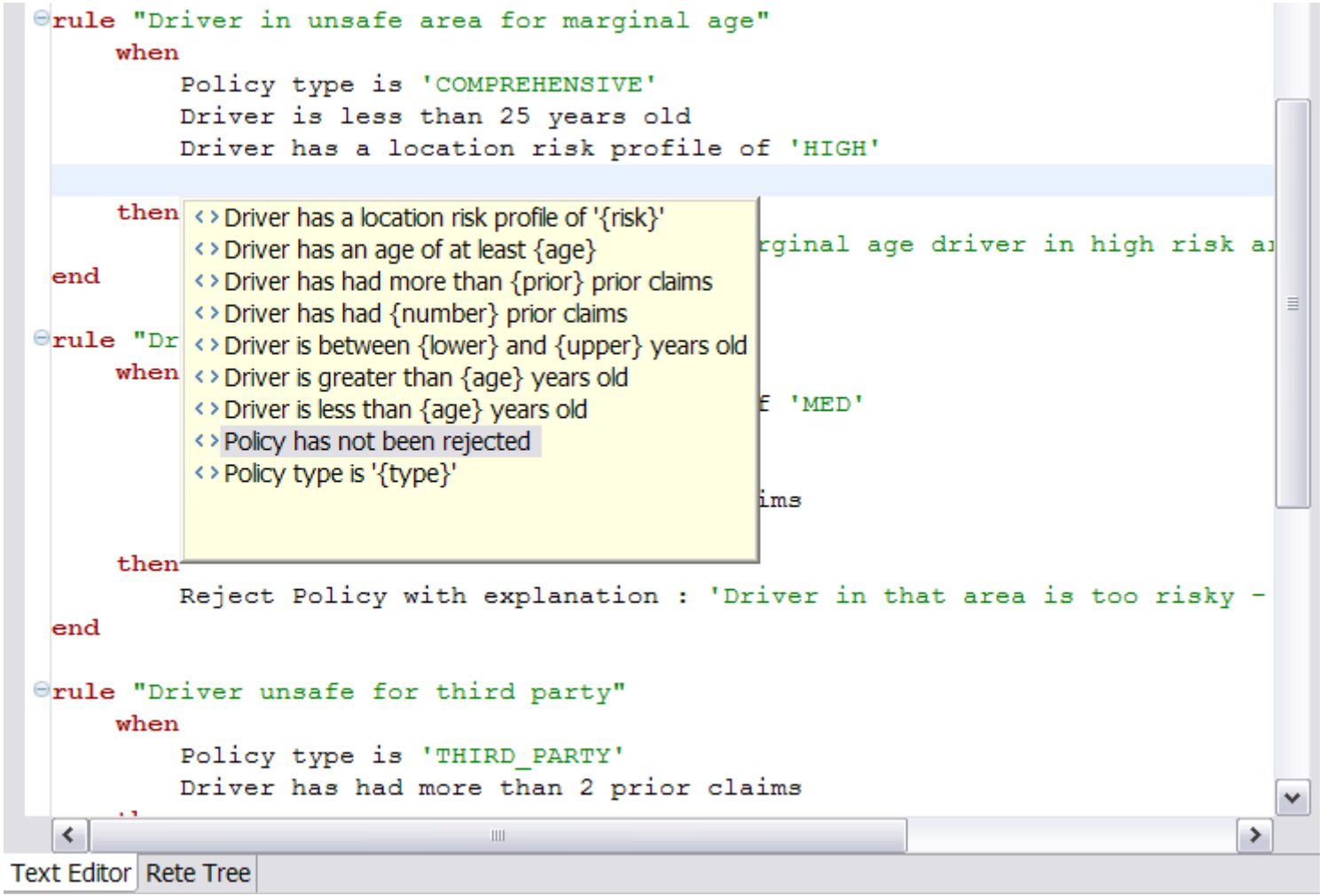
Drools IDE


Debug - StateExampleUsingSalience.drl - Eclipse SDK
File Edit Navigate Search Project Run Window Help
Debug
StateExampleUsingSalience [Drools Application]
org.drools.examples.StateExampleUsingSalience at localhost:4861
Thread [main] (Suspended (breakpoint at line 8 in Rule_A_to_B_0))
Rule_A_to_B_0.consequence(KnowledgeHelper, State, FactHandle) line: 21
Rule_A_to_B_0ConsequenceInvoker.evaluate(KnowledgeHelper, WorkingMemory) line: 22
DefaultAgenda.fireActivation(Activation) line: not available
DefaultAgenda.fireNextItem(AgendaFilter) line: not available
ReteooWorkingMemory(AbstractWorkingMemory).fireAllRules(AgendaFilter) line: not available
ReteooWorkingMemory(AbstractWorkingMemory).fireAllRules() line: not available
Variables
Breakpoints
Name
Value
b
State (id=1268)
changes
PropertyChangeSupport (id=1297)
name
"B"
state
1
StateExampleUsingSalience.drl
import org.drools.examples.State;
rule Bootstrap
when
a : State(name == "A", state == State.NOTRUN)
then
System.out.println(a.getName() + " finished");
a.setState(State.FINISHED);
end
rule "A to B"
when
State(name == "A", state == State.FINISHED)
b : State(name == "B", state == State.NOTRUN)
then
b.setState(State.FINISHED);
System.out.println(b.getName() + " finished");
end
rule "B to C"
salience 10
when
State(name == "B", state == State.FINISHED)
c : State(name == "C", state == State.NOTRUN)
then
System.out.println(c.getName() + " finished");
Text Editor
Rete Tree
StateExampleUsingSalience.drl
Text Editor
Rete Tree
Properties
Property
Value
General
Constraint
[LiteralConstraint fieldExtra
Evaluator
Integer ==
Field Name
state
Name
Alpha BaseVertex
Value
1
Outline
org.drools.examples
A to B
B to C
B to D
Bootstrap
org.drools.examples.State
Con...
Sea...
StateExampleUsingSalience [Drools
A finished
Global Data View
The selected working memory has no globals defined.
Audit View
Object asserted (1): A[NOTRUN]
Activation created: Rule Bootstrap a=A[NOTRUN](1)
Object asserted (2): B[NOTRUN]
Object asserted (3): C[NOTRUN]
Object asserted (4): D[NOTRUN]
Activation executed: Rule Bootstrap a=A[NOTRUN](1)
Object modified (1): A[FINISHED]
Activation created: Rule A to B b=B[NOTRUN](2)
Activation executed: Rule A to B b=B[NOTRUN](2)
Object modified (2): B[FINISHED]
Activation created: Rule B to C c=C[NOTRUN](3)
Activation created: Rule B to D d=D[NOTRUN](4)
Activation executed: Rule B to C c=C[NOTRUN](3)
Object modified (3): C[FINISHED]
Activation executed: Rule B to D d=D[NOTRUN](4)
Object modified (4): D[FINISHED]
Agenda View
MAIN[focus]= AgendaGroupImpl (id=1259)
[0]= AgendaItem (id=1262)
ruleName= "B to C"
c= State (id=1269)
[1]= AgendaItem (id=1263)
ruleName= "B to D"
d= State (id=1270)
Working Memory View
[0]= State (id=1268)
[1]= State (id=1269)
FINISHED= 1
NOTRUN= 0
changes= PropertyChangeSupport (id=1294)
name= "C"
state= 0
[2]= State (id=1270)
[3]= State (id=1271)
Writable
Insert
21 : 1

Guided Editor (Eclipse)



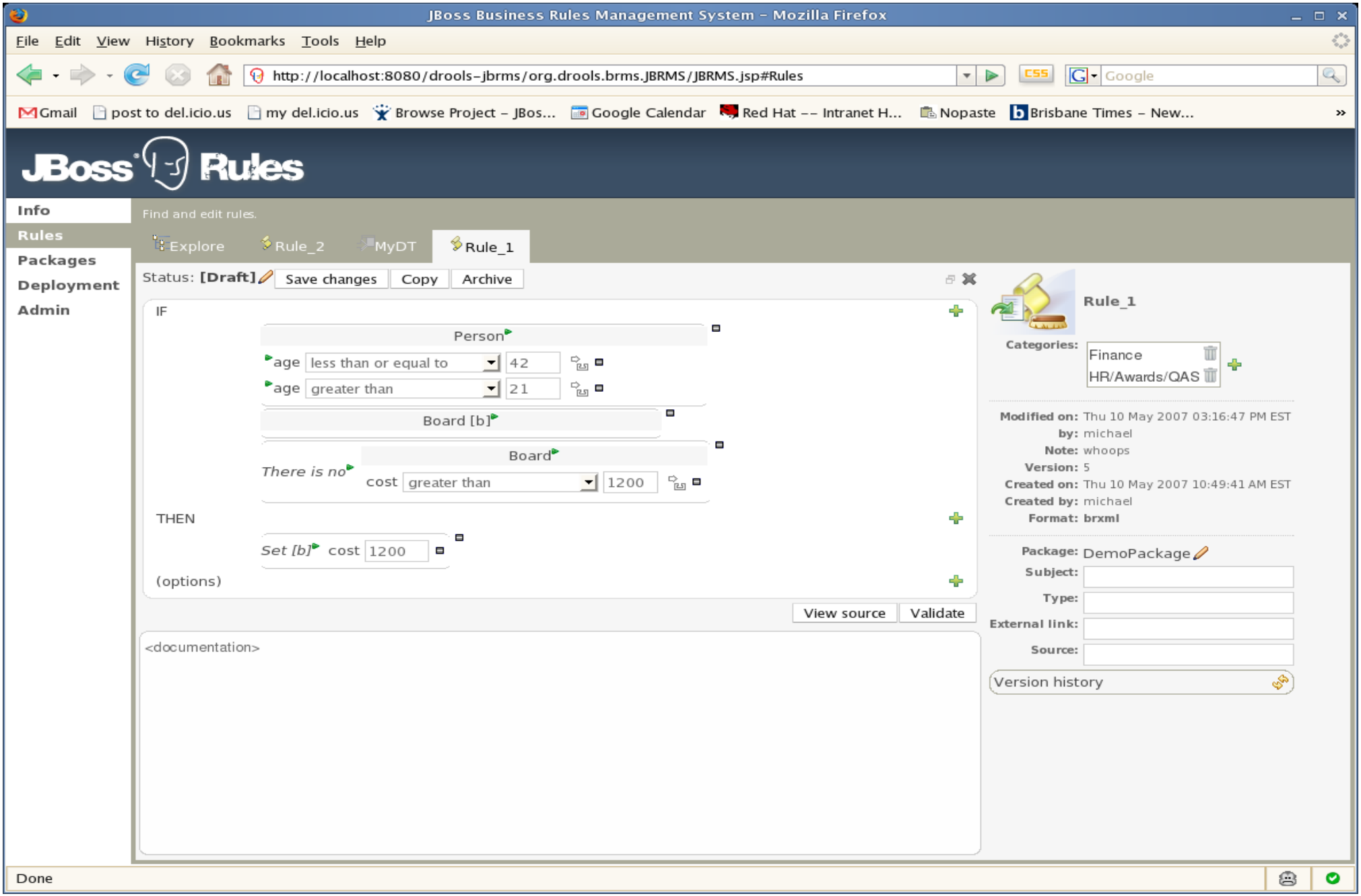
DSL Editor (Eclipse)



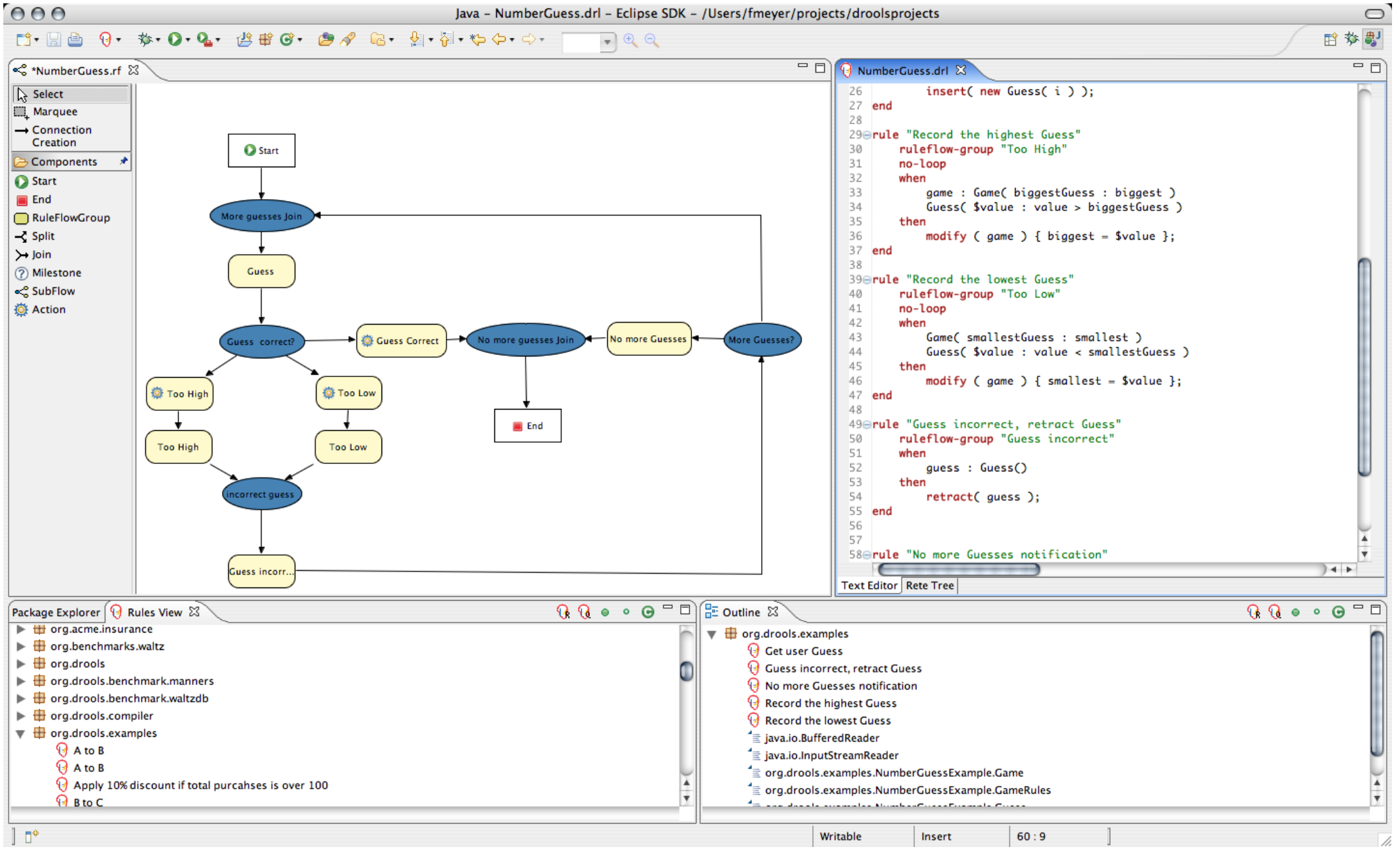
Decision Tables (Excel/OpenOffice)

	B	C	D	E	F	G	H
1							
4							
9	**Base pricing rules**	**Age Bracket**	**Location risk profile**	**Number of prior claims**	**Policy type applying for**	**Base $ AUD**	**Record Reason**
10	Young safe package	18, 24	LOW	1	COMPREHENSIVE	450	
11			MED		FIRE_THEFT	200	Priors not relevant
12			MED	0	COMPREHENSIVE	300	
13			LOW		FIRE_THEFT	150	
14			LOW	0	COMPREHENSIVE	150	Safe driver discount
15	Young risk	18,24	MED	1	COMPREHENSIVE	700	
16		18,24	HIGH	0	COMPREHENSIVE	700	Location risk
17		18,24	HIGH		FIRE_THEFT	550	Location risk
18	Mature drivers	25,30		0	COMPREHENSIVE	120	Cheapest possible
19		25,30		1	COMPREHENSIVE	300	
20		25,30		2	COMPREHENSIVE	590	
21		25,35		3	THIRD_PARTY	800	High risk

BRMS: Guided Editor



RuleFlow Editor (Eclipse)



Auditoria

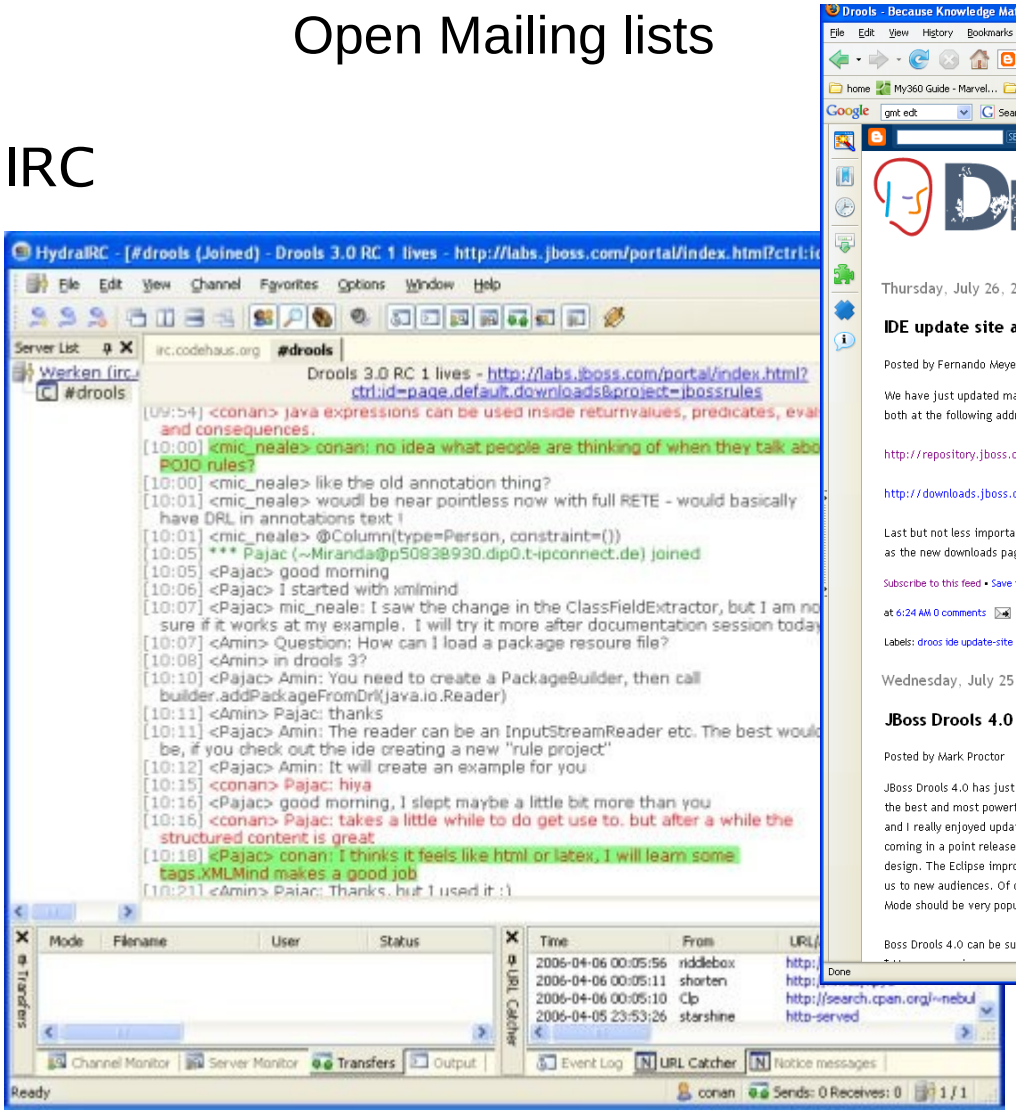
- Activation executed: Rule Start Clinical Pathway X if diagnosed d=Diagnose: Diagnose disease X: Type unknown(2)
  - Object removed (2): Diagnose: Diagnose disease X: Type unknown
    - Activation cancelled: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-16-17
    - Activation cancelled: Rule Remove old diagnose d=Diagnose: Diagnose disease X: Type unknown(2)
    - Activation cancelled: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-12
  - RuleFlowGroup activated: Examinations[size=2]
  - RuleFlow started: ClinicalPathwayX[org.drools.examples.cdss.ClinicalPathwayX]
- Activation executed: Rule Examination1
- Activation executed: Rule Examination2
- RuleFlowGroup deactivated: Examinations[size=0]
- RuleFlowGroup activated: AdditionalExaminations[size=2]
- Object inserted (2): Diagnose: Diagnose disease X: Type unknown
  - Activation created: Rule Start Clinical Pathway X if diagnosed d=Diagnose: Diagnose disease X: Type unknown(2)
  - Activation created: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-16-17
  - Activation created: Rule Remove old diagnose d=Diagnose: Diagnose disease X: Type unknown(2)
  - Activation created: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-12
- Activation executed: Rule Remove old diagnose d=Diagnose: Diagnose disease X: Type unknown(2)
  - Object removed (2): Diagnose: Diagnose disease X: Type unknown
    - Activation cancelled: Rule Start Clinical Pathway X if diagnosed d=Diagnose: Diagnose disease X: Type unknown(2)
    - Activation cancelled: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-16-17
    - Activation cancelled: Rule RuleFlow-org.drools.examples.cdss.ClinicalPathwayX-12
- Activation executed: Rule Examination3
- RuleFlowGroup deactivated: AdditionalExaminations[size=0]
- RuleFlow completed: TreatmentY[org.drools.examples.cdss.TreatmentY]
- RuleFlow started: TreatmentY[org.drools.examples.cdss.TreatmentY]
- RuleFlow completed: ClinicalPathwayX[org.drools.examples.cdss.ClinicalPathwayX]
- Object inserted (2): Diagnose: Diagnose disease X: Type 2

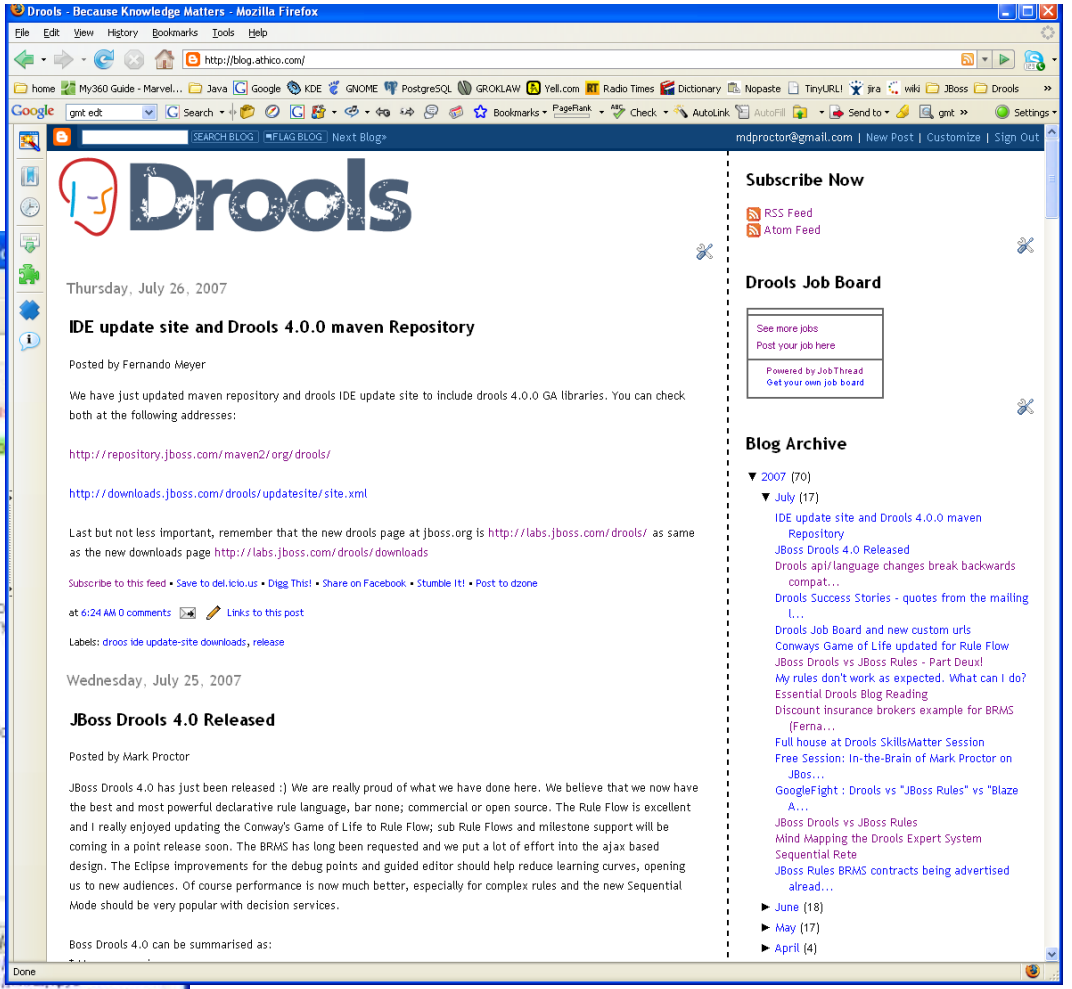
Drools | Comunidade

Comprehensive Blog

Open Mailing lists

IRC





Questions?

- Dave Bowman: All right, HAL; I'll go in through the emergency airlock.
- HAL: Without your space helmet, Dave, you're going to find that rather difficult.
- Dave Bowman: HAL, I won't argue with you anymore! Open the doors!
- HAL: Dave, this conversation can serve no purpose anymore. Goodbye.

Joshua: **Greetings, Professor Falken.**
Stephen Falken: **Hello, Joshua.**
Joshua: **A strange game. The only winning move is not to play. How about a nice game of chess?**

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