



Changing the rules of business™



## ILOG JRules를 이용한 차세대 금융 시스템 구축

2003. 5. 31

KSTEC 구 교 연

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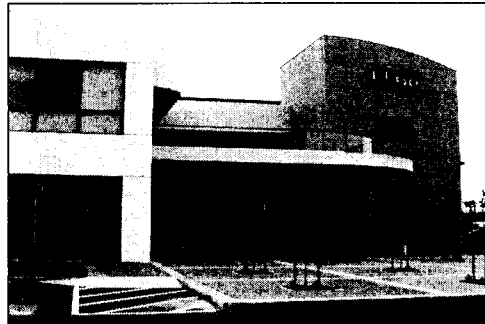
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## ILOG Corporate Overview



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- World leader in enterprise-class software components
- Founded in 1987
- Publicly traded
- Over 2000 customers
- Present in over 30 countries in North America, Europe and Asia



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## ILOG 평가



### •AMR Research



- ILOG사에서 전문적으로 제공하고있는 분야의 S/W 컴포넌트를 찾고 있는 기관이나 기업들은 반드시 ILOG 제품은 신중하게 고려 해보아야 합니다.
- ILOG 제품은 효과적인 마케팅 전략 갖고 있고 이와 더불어 기술적으로 강력하고 매우 지능적입니다.
- 최적화와 에이전트 제품(Optimization and Agent products)은 경쟁자가 없을 정도로 다른 것과는 차별성을 갖고 있습니다.

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## ILOG 평가



### •Intelligent Dozen 선정

- 첨단 기술을 주도하며 전 세계의 IT 부분에 영향력 있는 12대 기업으로 2001년, 2003년 연속 선정

the Intelligent  
**dozen**  
2003



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# 금융산업의 패러다임 변화



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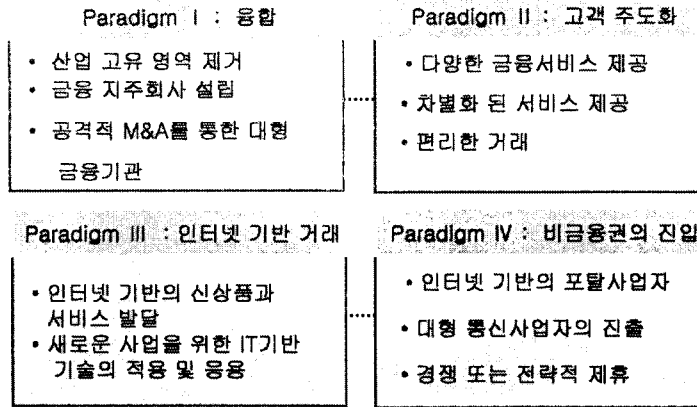


Figure 2 : Paradigm Conversion In Finance Industry

( Hewlett Packard Consulting Dept.Analysis, 2002 )

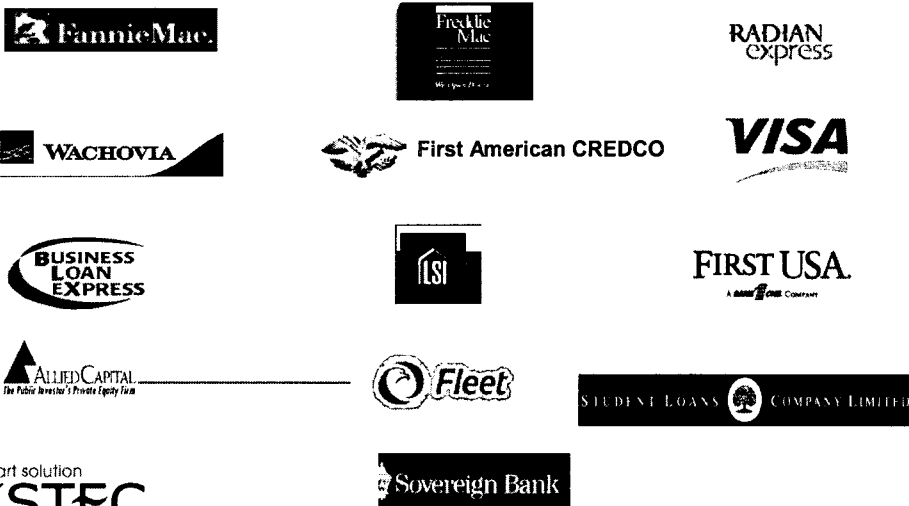
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# Mortgage and Financial Services



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# Securities and Capital Markets



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Merrill Lynch  
 Fidelity Investments  
 LEHMAN BROTHERS  
*Where vision gets built.™*  
 MORGAN STANLEY DEAN WITTER  
 Charles Schwab  
 UBS PaineWebber  
 JPMorgan  
 OppenheimerFunds  
 CREDIT SUISSE GROUP  
 Fraser & Neave  
 SALOMON SMITH BARNEY ACCESS  
 PIONEER Investments  
 BEAR STEARNS  
 financial engines  
 Deutsche Bank  
 Bank of America  
 Dresdner Bank  
*Adress you can bank on*  
 citistreet  
*A State Street and Citigroup Company*  
 CREDIT LYONNAIS  
 ING BARINGS  
 GENERALE  
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# Insurance



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Providence Washington Insurance Companies  
 MetLife®  
 ZURICH  
 HUMANA.  
 BlueCross BlueShield of Illinois  
 21st CENTURY INSURANCE  
 i21.com 1-800-211-SAVE  
 CIGNA FINANCIAL CORPORATION  
 VSP  
 CNP  
 Prim Solutions  
*Architecte de solutions de distribution d'assurance*  
 assurland.com  
 Swiss Re  
 Meloche Monnex  
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## Partners and ISVs



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**SIEBEL**



**NISYS**



**ORACLE**



*Leading suppliers to the financial services industry*

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## ILOG software at a glance....



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# ILOG in the Financial Services Industry



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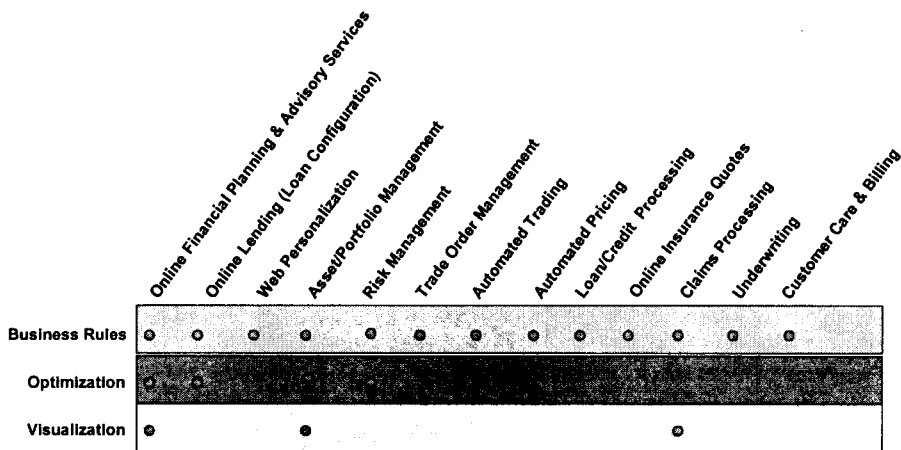


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# Financial Applications Powered by ILOG



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## 5 Reasons why Financial Institutions are choosing ILOG...



- Company Stability
- Track-record in powering strategic software and applications
  - Proven customer ROI
- Blue Chip References
- Unique Complementary Business Rules offering
- Performance and Standards
  - W3C, JSR-94 Java Rule Engine API Expert Group

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# Business Rules

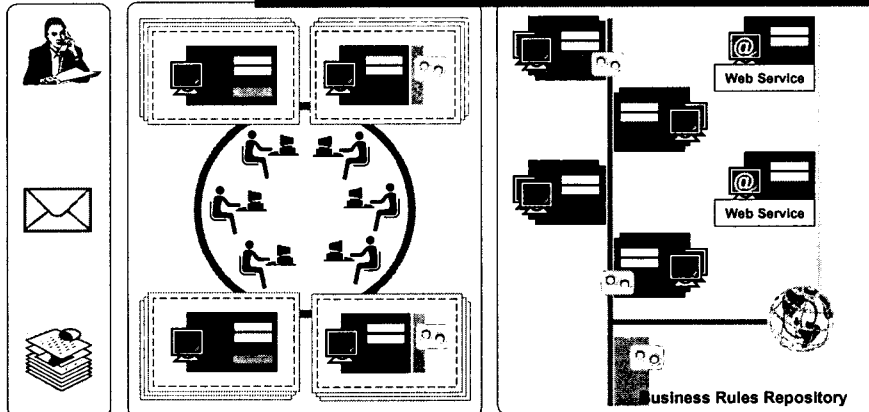
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## Business Rules moving to the Enterprise Level



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**Manual Processing**

**Silos of Automation**  
Rules automate an application

**Whole Process Automation**  
Rules across applications  
Rules orchestrate Web services

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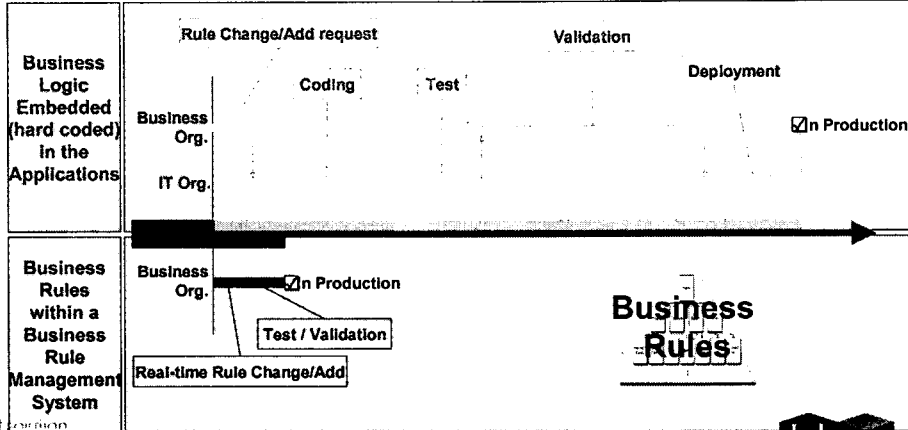


# Business Agility: Organizations that Adapt to Changes Quickly



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## Toward "Zero" Time to Market



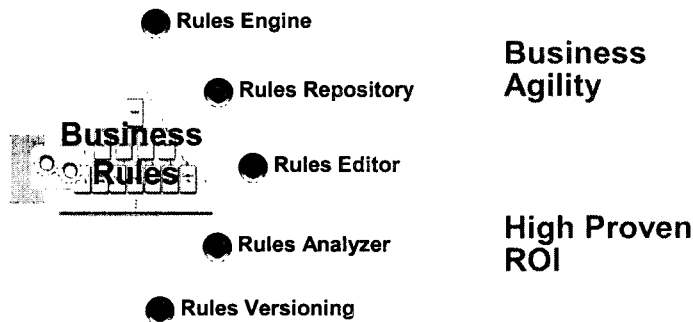
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# Business Rules Management System



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# Business Rules Management System



## Business Agility: Organizations that Adapt to Changes Quickly



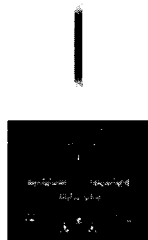
Directly accessible to the Business User

- ▶ Easy to use Business Language
- ▶ Instant / Real-time Change
- ▶ Consistent Change across the Enterprise

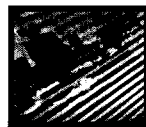
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## Business Agility: Organizations that Adapt to Changes Quickly



Internal



Competition



Market



Regulatory



Unpredictable

**Drivers for Change**

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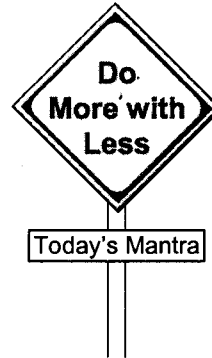
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# Business Rules Management System



## The ROI Checklist

- Reduced Time to Market
  - Simplified Implementation Cycle
  - Reduced Human Intervention
- ↓
- Higher Customer Satisfaction
  - Improved Business Processes
  - Exploration of New Strategies

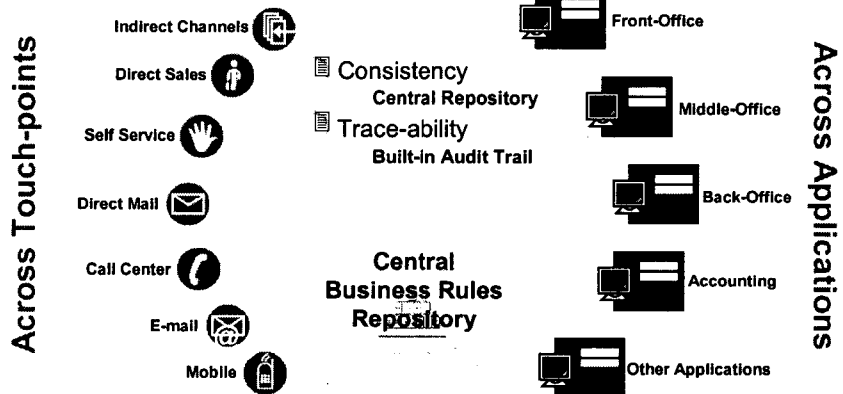


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# The ROI Checklist - Improved Business Processes



## Improved Business Processes



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# ILOG Rules 기능

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## ILOG JRules 평가



### •Rule Management Tool 생산성 검증

- 12th SoftwareDevelopment's 2002 Productivity Awards
- 2002 Jolt Product Excellence and Productivity Awards 수상
- MS .NET, SUN Microsystems의 J2EE와 공동 수상
- Libraries, Frameworks and Components' 부문 수상
  - 전 세계 상용화된 700여개의 소프트웨어 중 우수제품 선정
  - 수상 이유
    - 다른 어느 제품보다 더 쉽고, 빨리, 효과적으로 복잡 다양한 업무 처리 능력 우수

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# ILOG JRules 평가



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•Crossroads A-List Awards 수상 : 2002년



- 어플리케이션 개발을 위한 총 비용 감소
- 다양한 e-Business 어플리케이션 구축을 위한 지렛대 역할
- 어플리케이션 개발을 위한 위험요소 감소

•Gartner사 Magic Quadrant 선정 : 2003년

**ILOG was positioned in the leadership quadrant of the report by Gartner based on its ability to execute and its vision. ILOG is differentiated by its unique approach to business rule technology being the only vendor to provide business rule management solutions that include business management tools, modeling capability, a centralized rule repository and multiple decision engines that can be employed depending on the complexity of the problem.**

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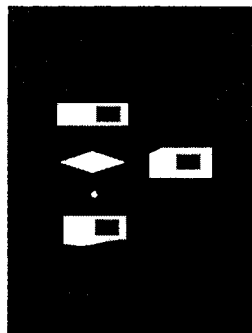
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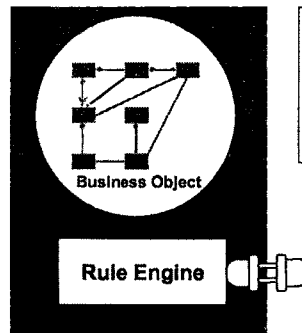
# Rule Engine Concept



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Standard Application



Rule based Application

**Business Rules**

WHEN FREQUENT FLYER MILES > 50000  
THEN OFFER GOLD MEMBERSHIP

WHEN CERTIFICATE TYPE IS FIRST  
CLASS UPGRADE  
AND FIRST CLASS SEATS AVAILABLE > 0  
THEN UPGRADE TO FIRST



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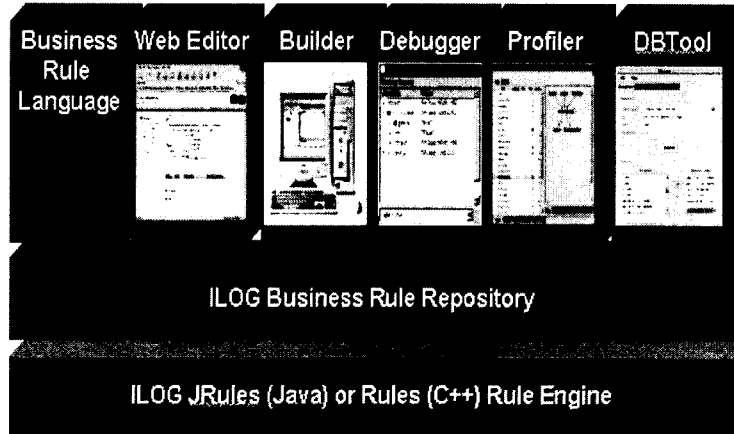
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# ILOG JRules 구성도



## ILOG Rule Kit



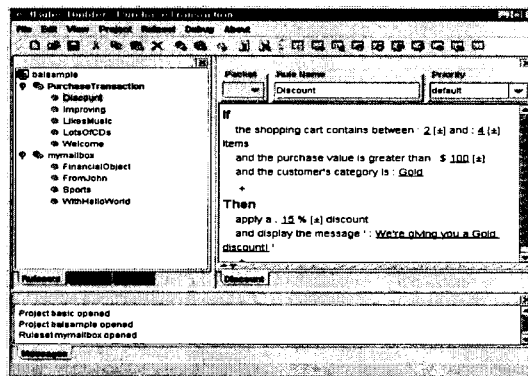
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# The Builder



- Create and Manage Projects
- Editors for Rules, Functions & Classes
- Connect with multiple engines
- Execute remotely or in the Application's Process
- Highly Configurable: look&feel, rule language, etc.



**Graphical Environment to Develop and Debug Rule Sets**

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# Debugging Tools



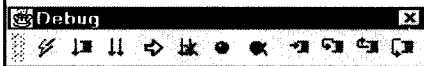
- Debugging Panels
  - Working Memory
  - Agenda
  - Bindings
  - Trace
  - Output
- Setting Breakpoints
  - Rule
  - Class
  - Object

JRules Builder

Name	Value	Type
Discount		
priority	0	int
balsample.Sho...	balsample.Shopping...	balsample.Shopping...
java.lang.O... {...}		java.lang.Object
getValue()	119.5	double
isFull()	false	boolean
balsample.Cus...	balsample.Custome...	balsample.Customer

balsample

Name	Type
ARUM Customer	
the age of the customer	int
the customer is a first time customer	boolean
the customer of	
the customer's	
the customer's	
the customer is older than {<age>}	boolean
the customer is younger than {<age>}	boolean
the customer lives in {<country>}	boolean
the customer's category	String
Item type	
Session object	
Shopping cart	



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# Profiling Tools



- Display Rule Execution Statistics
  - instantiated
  - executed
  - elapsed time
- Navigate Rule Flow
- Visualize runtime relationships between rules and objects

ILG Rule Builder

Rule	Instance	Runs	Total	Average
<code>	0	0	0.00	0.00
calculateFib1	0	1	0.00	0.01
calculateFib2	0	1	0.01	0.01
computeValue	0	1	0.00	0.00
makeRecursiveG...	0	1	0.00	0.00
setResult	0	1	0.01	0.01

```

    graph TD
      code["<code>"] --> makeRecursiveGoal["makeRecursiveGoal"]
      makeRecursiveGoal --> calculateFib1["calculateFib1"]
      makeRecursiveGoal --> calculateFib2["calculateFib2"]
  
```

Graphical Component for Visualizing Rule Execution

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## DBTool: Map your RDB data into Java objects readable by JRules

### Relational DB

Customers		
I	Name	Address
d		
1	Smith	Paris
...	...	...

### Java application

```
Customer
int getId()
String getName()
void
setName(String)
String getAddress()
void setAddress()
```

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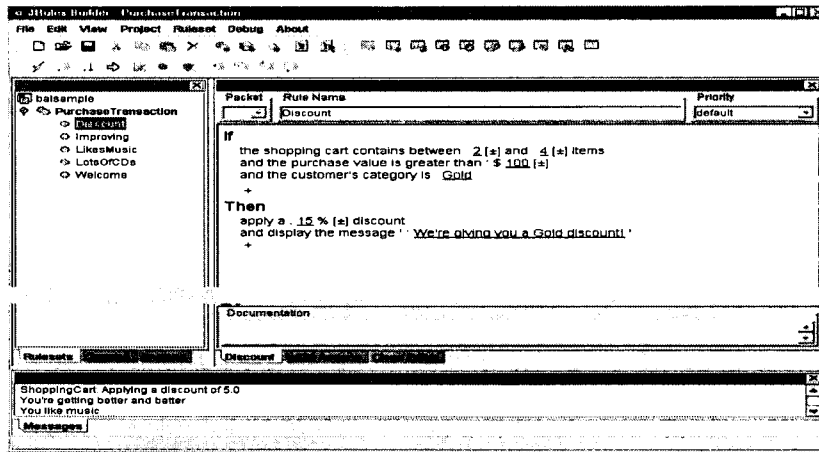
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# Business Rule Editor



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Integrates into the Builder, or can be embedded in the application GUI.

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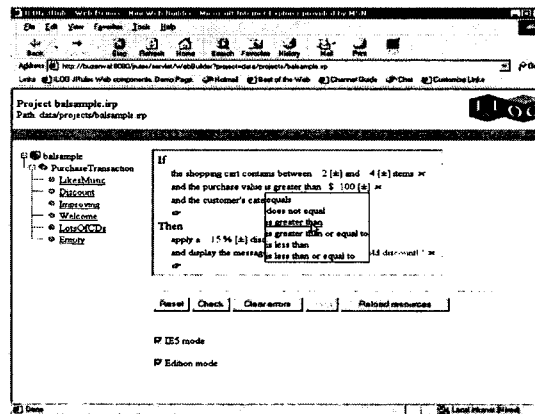
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# Web-based Business Rule Editor



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- Deploy in servlet or JSP page
- Based on an advanced framework for writing and using server-side web-based components
  - Swing-like API
- Works with any browser that supports JavaScript
  - NN3 to IE6.0



Extends Business Rule edition capabilities to web application users

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# Decision Tables



File

Age	Revenues	Category	Discount	Mail offers	User Club	Gift
< 18	1KE	Silver	10	<input type="checkbox"/>	<input type="checkbox"/>	puppet
		Gold Hyper Special	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	puppet
	10KE	Silver	18	<input type="checkbox"/>	<input type="checkbox"/>	puppet
		Gold Hyper Special	21	<input type="checkbox"/>	<input checked="" type="checkbox"/>	teddybear
	100KE	Silver	20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moet et Chandon
		Gold Hyper Special	20	<input type="checkbox"/>	<input type="checkbox"/>	Moet et Chandon
18..40	1KE	Silver	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	puppet
		Gold Hyper Special	0	<input type="checkbox"/>	<input type="checkbox"/>	Moet et Chandon
	10KE	Silver	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	teddybear
		Gold Hyper Special	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	puppet
	100KE	Silver	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moet et Chandon
		Gold Hyper Special	18	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	puppet
> 40	1KE	Silver	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Moet et Chandon
		Gold Hyper Special	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	teddybear
	10KE	Silver	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	puppet
		Gold Hyper Special	6	<input type="checkbox"/>	<input type="checkbox"/>	teddybear
	100KE	Silver	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	teddybear
		Gold Hyper Special	18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	teddybear

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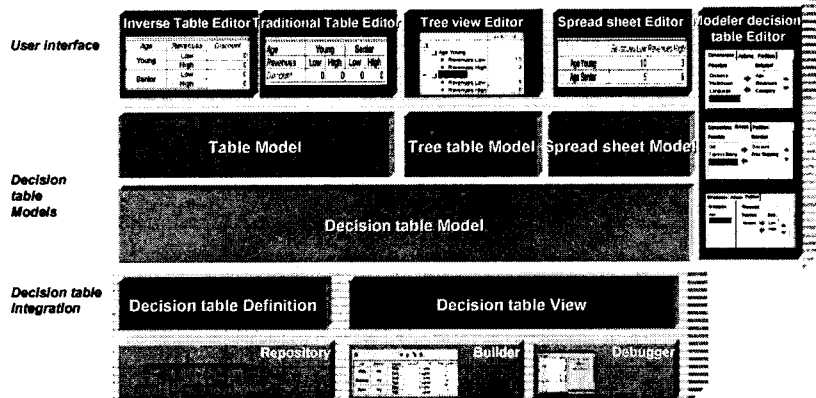
Inversed View

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# Decision Table Definition



## Architecture



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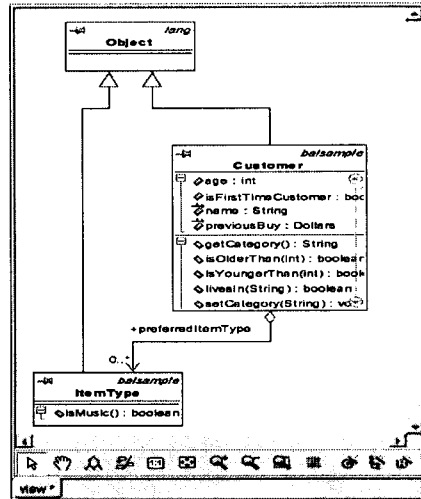
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# Graphical Business Object Model Editor



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- **Class diagram**
  - UML-based Look & Feel
  - Multiple view support
- **Visual editing**
  - Create Classes
  - Define Generalizations
  - Define Associations



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# Business Action Language Extensions



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- **If / Then / Else Rules**
  - If the age of the customer is greater than 21
  - Then maximum credit is \$1000
  - Else maximum credit is \$750
- **Nested And-Or Statements**
  - If the customer category is: Gold and
  - (the customer is older than 60
  - or the customer is younger than 21)
- **Negative Condition Test**
  - “the shopping cart is full” “it is not true that the shopping cart is full”

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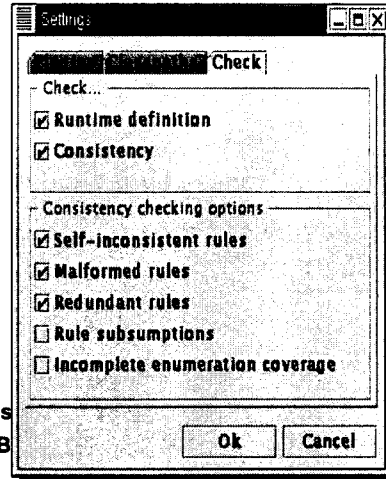
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# Consistency Checking



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- **Self-inconsistent rules**
  - age < 20 && age > 40
- **Malformed rules**
  - No conditions, no actions
  - Incomplete rules
- **Redundant rules**
  - Rule A and Rule B have identical conditions
  - Rule A actions are a subset of Rule B actions
- **Subsumed rules**
  - Rule A and Rule B have identical actions
  - Rule A conditions are a subset of Rule B actions



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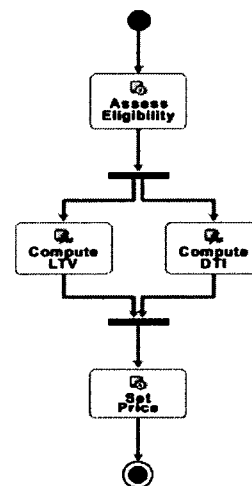
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# RuleFlow



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- **Language extensions for modeling and controlling execution sequence**
- **Code and graphical views**
  - UML Activity Diagram notation
- **Composed of tasks**
  - Rule-based
  - Function-based
  - Flow-based (for flow decomposition)
- **Multiple control nodes**
  - Join, Fork, If, While, Switch



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# RuleFlow



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## Graphical View

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# Enhanced Query Facility



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- Query Editor
  - Select, Create, Delete, Execute
- Facility Panel
  - Create new Query Template
  - Modify Query BOM
  - Create Multi-rule Queries

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# Point-and-Click Deployment



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- Minimizes manual coding
  - ANT, Java, ILR, XOM automatically generated
- Includes current and new deployment options
  - Java, J2EE / J2SE interfaces
  - Web Service, JSR94 interface
- Leverages new components
  - Rule Service
  - EJB Session Objects (stateful and stateless)

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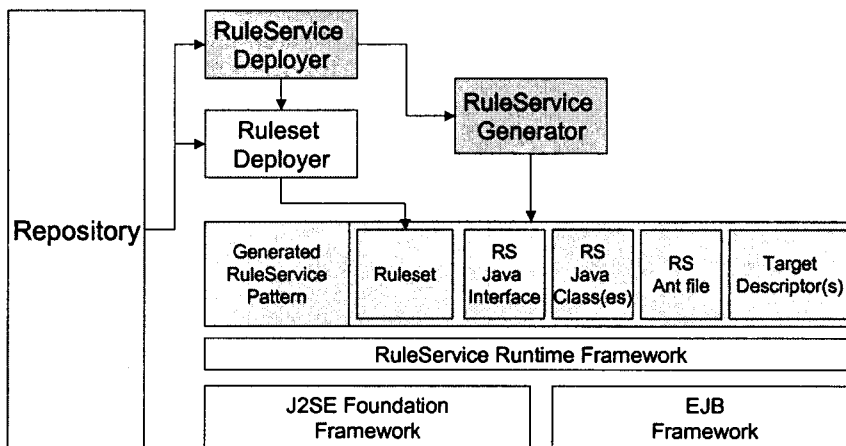
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# Rule Service



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## Architecture



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## Bytecode Generation



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- For any rule
  - Accelerates Rete Network
  - Controlled by engine configuration parameters
  - Performance similar to rule compilation
- For simple, homogeneous rules
  - Bypasses Rete Network
  - Produces Java-like bytecode
  - Very high performance

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## Mortgage and Financial Services



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**Case Studies**

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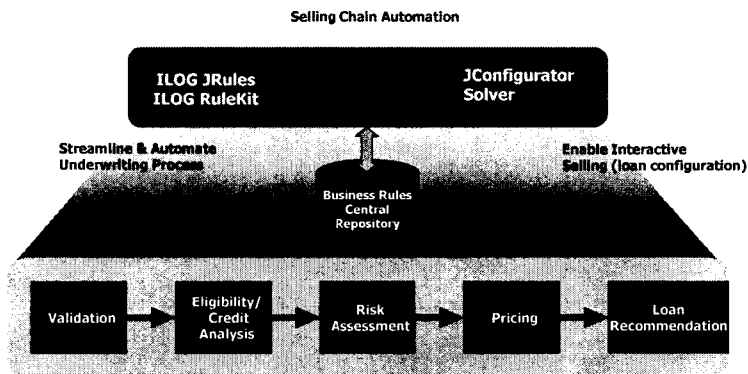
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# Underwriting



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## ILOG in Loan Underwriting



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### Desktop Underwriter

- Underwrites over 55,000 loans per day
- Rules throughout DU from determining eligibility to providing credit decisioning

### Benefits:

- Loan underwriting process reduced dramatically
- Better standardized decision making
- Shorter time to implement policy and capitalize on market changes
- Savings of up to 40% in loan underwriting costs

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- Pricing (plus other applications – enterprise wide)
  - Validate data and determine relevant fees to apply once loan is priced (during purchasing and loan servicing)
  
- Benefits:
  - Ease of integration in a J2EE environment and with Weblogic
  - High performance rule engine (fire 1000s of rules per sec.)
  - Manage rules in real-time (extend capability to business users)

- Pricing (plus other applications – enterprise wide)
  - Validate applications, determine eligibility and appropriate pricing model and rate
  
- Benefits:
  - High performance rule engine and central rule repository
    - Process approx. 1 million applications per mth, thousands of rules
  - Ease of integration with Weblogic

*"We selected ILOG JRules because of its rich user interface, and its business approach that puts the power of the customization in the user's hands. The performance and scalability of JRules were other key reasons."*

Case Studies **Allied Capital – Business Loan Express**  Changing the rules of business™


- Loan Processing**
  - Validate and qualify online loan requests
  - Perform credit analysis and identify loan product
- Benefits:**
  - Improve filtering to generate solid loan prospects
  - Update credit analysis and validation rules in real-time

*“Ease of use is critical at Business Loan Express and so is performance. ILOG JRules consistently out-performs other business rule software on the market.”*

Nick Ramsing  
Project Manager

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Case Studies **First American Credco**  Changing the rules of business™

- Credit Processing**
  - Validate credit information and identify missing data for completing credit analysis
- Benefits:**
  - Credit analysis process reduced from days to less than 24 hrs
  - Provide customized and higher quality analysis to clients
  - Introduce new products faster and implement policy changes in real-time

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AnyTime Lender

- ASP platform used by over 160 financial institutions
- Validate loan requests and provide credit decisioning (for all products – credit cards, personal loans, car loans, etc.)

Benefits:

- Incorporate each financial institution's underwriting criteria (better customization)
- Able to roll out products faster
- Whole credit decisioning process reduced to 20 secs. from 30+ secs. (rules executed in milli-secs.)



**Case Studies** **Barclays**  Changing the rules of business™


**Crossing**

- Match millions of stocks from over 1,500 internally-managed funds tracking
- Matching occurs at midpoint

**Benefits:**

- CPLEX maximize number of shares crossed
- \$500 million saved in transactions costs

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**Case Studies** **Major securities firm**  Changing the rules of business™

**Wealth Management**

- Monitors over 200 portfolios in real-time for high wealth clients
- Buy/sell of orders to match current state of a portfolio with the target
- Orders can be generated automatically if necessary
- Rules could relate to investment compliance, regulatory compliance or client's mandate

**Benefits:**

- Evaluate rules on the fly
- System that will warn the managers of rule violations before the fact

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Automated Pricing

- Evaluate characteristics of a municipal bond
- Create a price which would 'mirror' what a trader would price by hand

Benefits:

- 8-10 million securities priced per sec.
- Rules fired in real-time

Program Trading

- Real-time arbitrage on options market
- Detect the best combinations of options (one to be sold, one to be bought) in order to get the best risk coverage at any time

Benefits:

- 8-10 million options comparison per second
- Rules fired in real-time
- Orders issued directly to the market
- No human surveillance

**Case Studies Bank of America**

**ILOG**  
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- Derivatives Trading System**
  - Evaluate and process trades and cash settlements
    - Identify when a trade is ready to be processed
    - Evaluate which particular settlement instruction should be used for a particular payment by analyzing complex trade information
- Benefits:**
  - Rules fired in real-time
  - Ease of integration with existing architecture

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**Case Studies Fidelity Investments**

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- Portfolio Optimization (Global Equities Trading)**
  - Recommend the best trades to make
  - Validate trades made by portfolio managers
  - Allocate assets optimally
- Benefits:**
  - Able to solve complex optimization problems
  - Able to process more trades faster

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**Case Studies Financial Engines**

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Changing the rules of business™


- Online Financial Planning & Advisory Services**
  - Optimize portfolios against various objectives**
    - Diversified investments
    - Minimize taxes and transaction costs
    - Reduce portfolio turnover
- Benefits:**
  - Deliver customized and optimal investment advice in real-time to over 2 million users**
  - Flexible optimization framework that provides enhanced ability to create intuitive and actionable advice**

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**Insurance**

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**Case Studies**

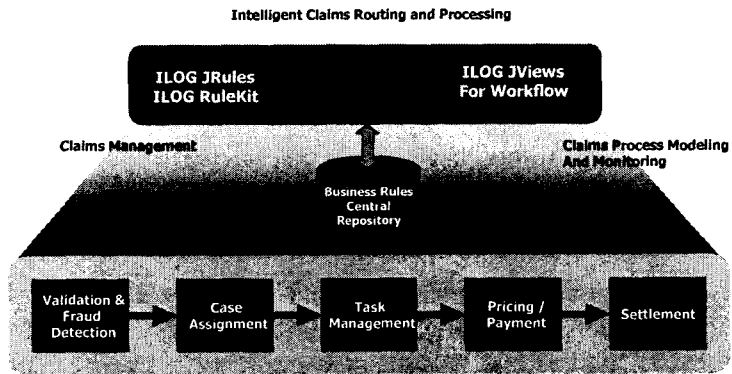
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# Claims Processing



## ILOG in Claims Processing



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### Claims Processing

#### Task Management

- Establish 'best practices' for claims handling

#### Case Assignment

- Identify and assign claims to adjusters

#### Dynamic Privacy

- Determine info. an adjuster can access based on role and regulations

### Benefits:

- Savings of \$30 million USD
- High performance rule engine (process 225,000+ claims per day)
- Full EJB integration and OS/390 certification

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## Claims Processing

- Streamline and automate claims processing with business rules
  - Validate claims
  - Route approved claims to a pricing engine

## Benefits:

- Process 1 millions claims per month
- Improve productivity (developers do not have to constantly modify the hard coded rules)
- Ease of integration with Websphere and EJB

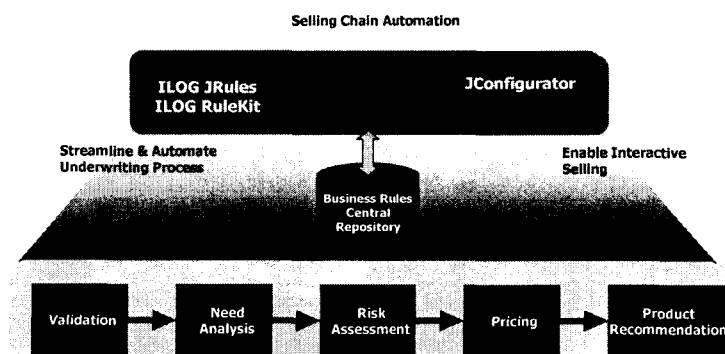
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## Underwriting


### ILOG in Underwriting



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Case Studies **Providence Washington**  Changing the rules of business™

- Online Insurance Quotes (for agents)**
  - JRules used to automate underwriting process
    - Validation/determine product eligibility, risk acceptability, pricing and policy recommendation
- Benefits:**
  - Reduce a highly intensive paper process from 6 weeks to minutes
  - Enable agents to receive responses faster
  - Implement rate changes and manage rules in real-time
  - Enable straight-through-processing

*"ILOG's continued commitment to research and development will ensure that we remain at the forefront of business rule technology."*

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Case Studies **Fannie Mae**  Changing the rules of business™

- Desktop Underwriter**
  - Underwrite over 55,000 loans per day
  - Use Rules to provide eligibility and credit decisioning
- Benefits:**
  - Loan underwriting process reduced dramatically
  - Increased loan approval rates
  - Better standardized decision making
  - Ability to offer wider range of products
  - Savings of up to 40% in loan underwriting costs

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**Underwriting**

- Validate applications and provide credit decisioning

**Benefits:**

- Ease of integration within a Java/J2EE environment
- High performance rule engine
- Ease of use: able to manage rules in real-time