



Business Rules for Architects

Chris Backhouse
CBackhouse@uk.ibm.com
IBM

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Session Number 9081



Agenda



- 1 The case for a Business Rule Management Systems
- 2 WebSphere ILOG BRMS
- 3 Integration Patterns
- 4 Rule Discovery



Agenda



- 1** The case for a Business Rule Management Systems
- 2** WebSphere ILOG BRMS
- 3** Integration Patterns
- 4** Rule Discovery



Business Decisions are Everywhere...



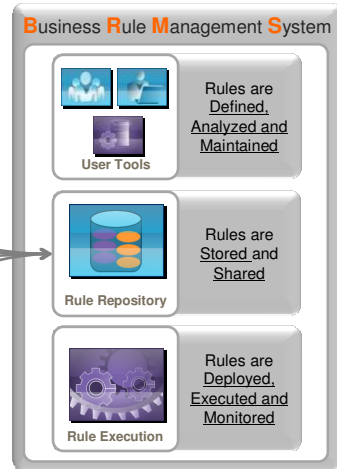
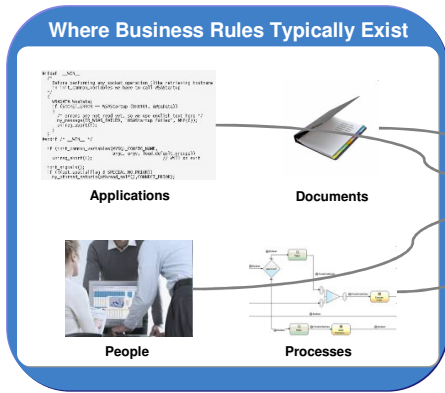
Insurance	Banking	Healthcare	Government	Energy/Utility
<ul style="list-style-type: none"> • Claim <ul style="list-style-type: none"> • Validation • STP approval • Exception routing • Policy/Underwriting <ul style="list-style-type: none"> • Eligibility • Risk • Pricing • Annuity <ul style="list-style-type: none"> • Recommendation • Commissioning • Payout calc. 	<ul style="list-style-type: none"> • Loan <ul style="list-style-type: none"> • Eligibility • Risk • Pricing • Account <ul style="list-style-type: none"> • Cross-sell • Fraud/Alerts • Credit Card <ul style="list-style-type: none"> • Mkg Offers • Fraud • Credit limit 	<ul style="list-style-type: none"> • Patient Care <ul style="list-style-type: none"> • Drug interaction risk warnings • Follow-up alerts • Member <ul style="list-style-type: none"> • Services recommendation • Eligibility • Benefit calculation • Provider <ul style="list-style-type: none"> • Patient eligibility for services 	<ul style="list-style-type: none"> • Benefits <ul style="list-style-type: none"> • Eligibility • Calculations • Tax Payer <ul style="list-style-type: none"> • Classification • Audit flagging • Citizen <ul style="list-style-type: none"> • Program(s) recommendation 	<ul style="list-style-type: none"> • Land/Permits <ul style="list-style-type: none"> • Conveyance processing • Contract compliance • Service Mgmt <ul style="list-style-type: none"> • Service prioritization • SLA alerts • Maintenance alerts • Order configuration



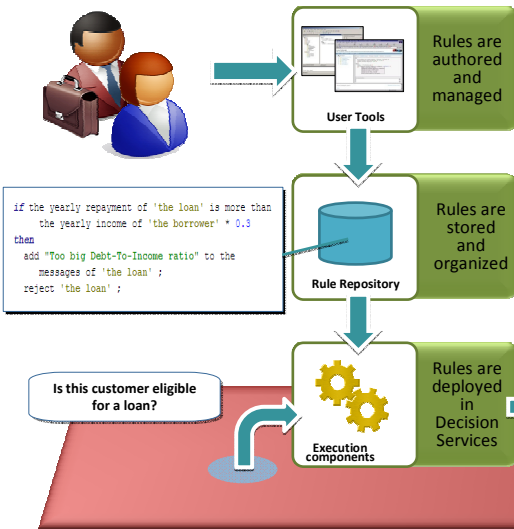
Manage and Automate Decision Logic with BRMS



- Make decision logic accessible to Business and IT
- Reduce maintenance time & cost
- Increase decision automation
- Eliminate decision silos - drive consistency
- Create an audit trail for decisions & decision logic



A Business Rule Management System

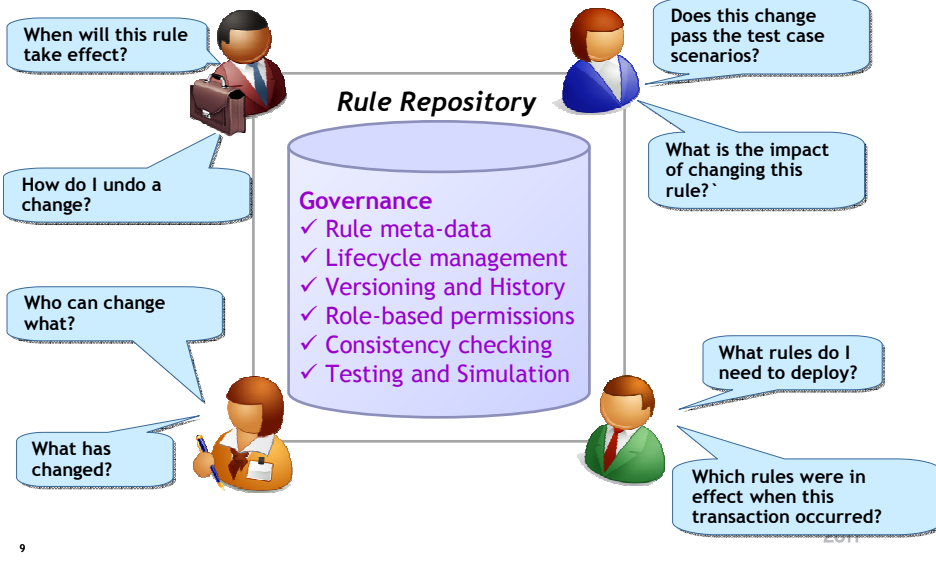


A technology for creating, maintaining and deploying rule based business decision

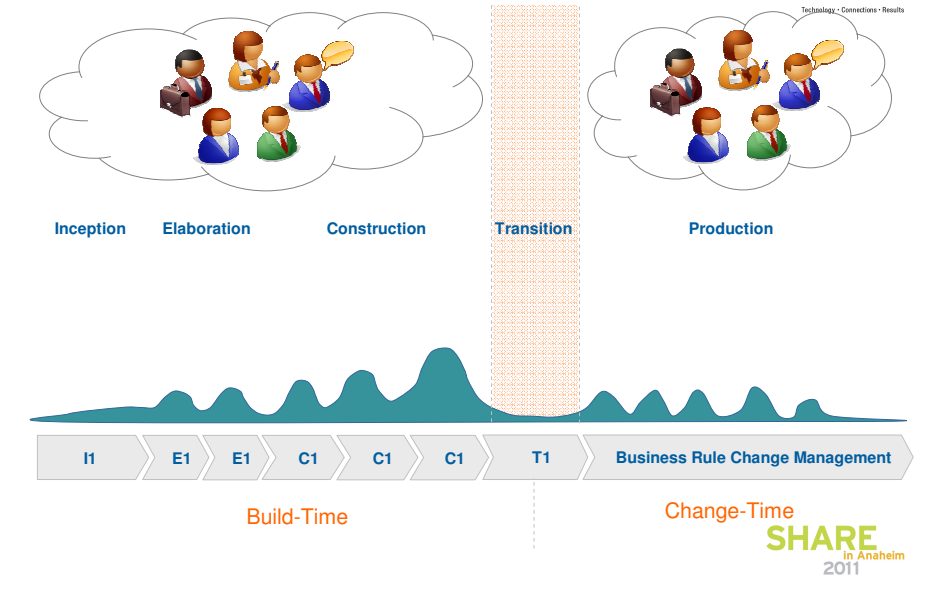
- Reduces the time to deploy changes
- Improves the understanding of how decisions are made
- Increases opportunities for logic automation
- Favors the reuse of business logic



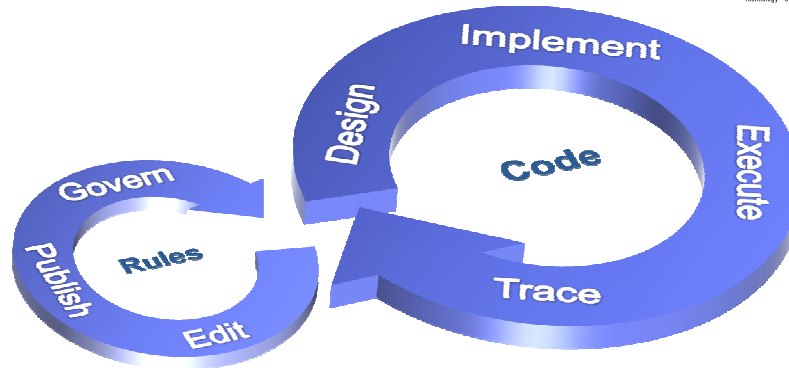
Comprehensive Rule Governance



BRMS Software Lifecycle – Collaborative Working



Redefined Application Change Cycle



Business - IT
Decisions / Policies
Days / Weeks

Developer
Functions / Tasks / Flow
Weeks / Months

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Key Interests for System z Customers.....



Sharing Rules across Platform/Running Parallel

- Author rules in JRules...verify which rules will move them into the future
- Rules can now be shared across applications and across platforms

COBOL Maintenance Projects

- Projects that are change rules ... why not upgrade to a BRMS and make rules available to Business Users
- Faster changes Decrease future maintenance costs and time



Consolidation and/or maintenance of COBOL applications

- Author once, Manage Centrally, Deploy anywhere

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A Top 5 North American Bank



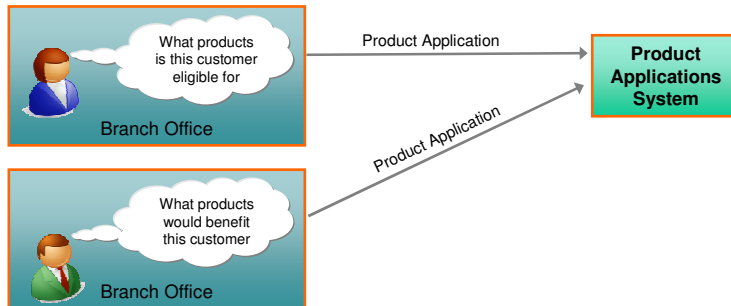
- ▶ One of the largest financial service providers in the world
- ▶ Over 18 million clients worldwide
- ▶ Nearly ¼ million mortgages
- ▶ Nearly ½ million loan products
- ▶ Prioritizes branch office networks to build personal ties with its clients

Large opportunity for the bank to cross sell / up sell financial products to existing customers

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A Top 5 North American Bank

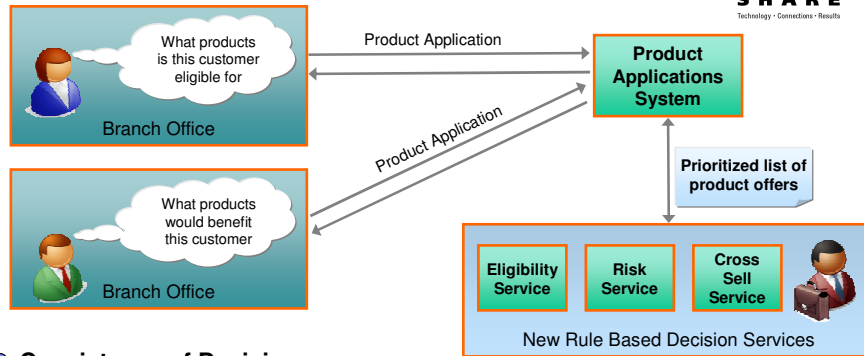


- ▶ **Poor customer experience**
 - ▶ Difficult to determine or identify who to cross sell or up sell to
 - ▶ Branch staff would sometimes try to cross-sell to clients who did not qualify
- ▶ **Inefficient use of customer service representative time**
 - ▶ Assessment times were too long
 - ▶ Separate application in order to know if client qualifies for an additional product

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New Scenario



Consistency of Decisions

- Prioritized list of pre-approved product offers returned to customer service agent
- New BRMS based decision services provides consistent decisions across branches

Improved time to market

- New policies can be introduced & managed across the company more effectively

Flexible solution enables incremental modernization

- Low development risk as new functionality incrementally added to existing application as new services

15

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Benefits to Organization

- ▶ Employees equipped to make intelligent, consistent product recommendations in real time

\$14 million in new business in 2 ½ months

- ▶ Customer experience enhanced with pre-approved offers that better match customer needs

Offer acceptance increased from 3% to 20 – 30%

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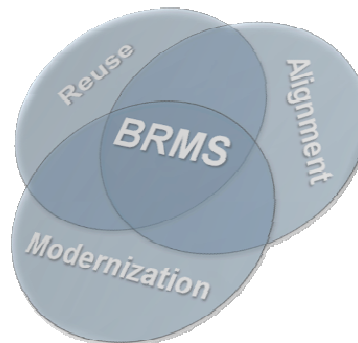
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Manage Rule-based Decisions



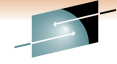
WebSphere ILOG BRMS is *the IBM technology* for creating, maintaining and implementing decision services...

- Allows for easy implementation and reuse of business rules
- Provides a convenient communication channel between IT and business teams
- Improved regulatory compliance
- Consistency in applying business decisions across applications

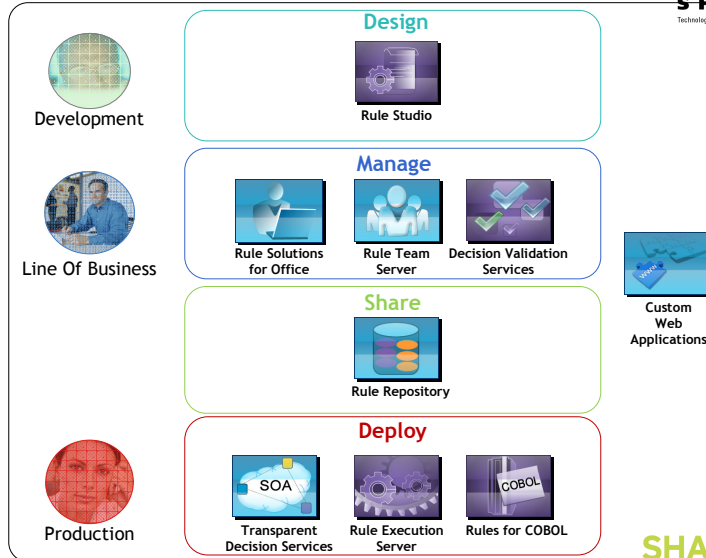


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WebSphere ILOG JRules 7.0 Components

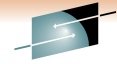


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Intuitive Rule Authoring Environments



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if the one way driving distance of the vehicle coverage request is more than 50 and the type of

then add a \$ 25

Labels: Operator

The screenshot shows a rule authoring interface with a decision table. The table lists various conditions (ADRs) and their corresponding scores and reason codes.

ADRs	Range	Weight(%)	Score	Reason Code
Monthly since last bankruptcy	1. Monthly since last bankruptcy < 3 2. Monthly since last bankruptcy < 6 3. Monthly since last bankruptcy < 9	100	0 20 40 100	ME0 ME1 ME2
Number of Bankruptcies	1. Number of Bankruptcies < 2 2. Number of Bankruptcies < 3 3. >= 3	30	0 100 150	ME0 ME1 ME2
Number of Foreclosures	1. Number of Foreclosures < 2 2. Number of Foreclosures < 3 3. >= 3	30	0 30 100	ME0 ME1 ME2
Number of 30 days Late Payments	1. Number of 30 days Late Payments < 2 2. Number of 30 days Late Payments < 3 3. >= 3	5	0 60 100	ME0 ME1 ME2
Number of 60 days Late Payments	1. Number of 60 days Late Payments < 2 2. Number of 60 days Late Payments < 3 3. >= 3	35	0 30 100	ME0 ME1 ME2

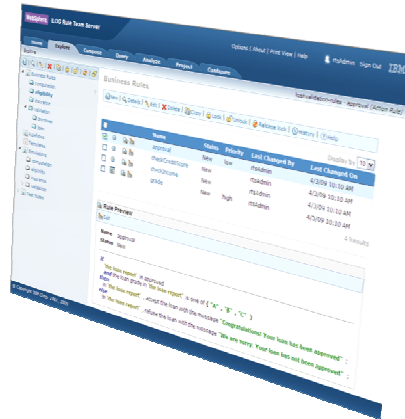
Decision Tables

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Web-based Console for Rule Management



- Take control of very large rulebases with Smart Views, easy search and reporting
- See where rules are used across projects using queries
- Access rule artifacts concurrently without conflict or delay
- Represent complex policies using rule overrides and hierarchies
- Get automatic notification of potential rule conflicts, redundancies
- Hot-deploy rule changes in minutes
- Secure: integrated with enterprise security facility including single sign-on



Rules Authoring Delivered to Business



The screenshot displays a Microsoft Office 2007 environment. On the left, a spreadsheet titled 'Eligibility.xlsx' contains a decision table with columns for City, Min, Max, and a description of the rule. The table data is as follows:

City	Min	Max	Description
New Hampshire	23	70	The customer's age is below the minimum for rent in New Hampshire.
Rhode Island	23	70	The customer's age is past the maximum for rent in Rhode Island.

On the right, the 'RuleDoc' window shows the authoring interface for a rule named 'Check Customer Age'. The rule logic is defined as follows:

```

Rule: Check Customer Age
Definitions...
IF
  all of the following conditions are true:
    the state of the pickup branch of the rental agreement is New Hampshire
    the last name of the customer starts with X
    the age of the customer of the rental agreement is between 23 and 70
Then
  set the rental agreement. accepted status to True
  display the message: The customer is eligible to rent in New Hampshire.
Else...
  
```

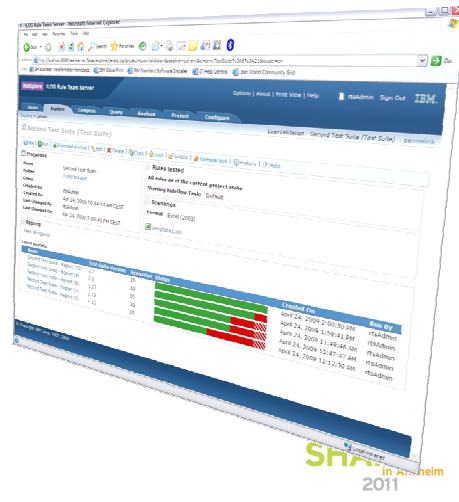
The 'RuleDoc Outline' window shows the structure of the rule, including sections for Definitions, Rule Properties, and Rule Logic. The 'Rule Properties' window shows the rule's name and other metadata.



Business-focused Testing and Simulation Capabilities



- Decision Validation Services extends Rule Team Server with:
 - Out-of-the-box ruleset testing
 - Business impact simulation
 - Detailed scenario reports
- Scenario configuration and customization in Rule Studio
- Audit - Decision Warehouse in Rule Execution Server



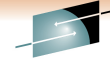
Business User Testing and Simulation



Detailed Scenario Reports

Name	Status	Message
Scenario 1	7 test(s) (1 failure(s) - 0 error(s))	
<ul style="list-style-type: none"> ✓ the application result of borrower equals the observed value Low Risk is the expected value ✓ the credit check report of borrower equals the observed value null is the expected value ✓ the credit check result of borrower equals the observed value Refused is the expected value ✓ the fraud probability of borrower equals the observed value 5 is the expected value ✓ the fraud report of borrower equals the observed value tarin from paris rej is the expected value ✓ the fraud result of borrower equals the observed value Low Risk is the expected value ✗ the execution duration in milliseconds is lower than or equals the observed value 78 is greater than 50 		
The list of rules fired rulePackage.businessRule The list of executed ruleflow tasks mainRuleflow mainRuleflow>rulePackage The duration (in ms) of execution 78		
Scenario 2	7 test(s) (2 failure(s) - 0 error(s))	
<ul style="list-style-type: none"> ✗ the application result of borrower equals the observed value Low Risk does not equal the expected value High risk ✓ the credit check report of borrower equals the observed value null is the expected value ✓ the credit check result of borrower equals the observed value Refused is the expected value ✓ the fraud probability of borrower equals the observed value 5 does not equal the expected value 6 ✓ the Fraud report of borrower equals the observed value tarin from paris rej is the expected value ✓ the fraud result of borrower equals the observed value Low Risk is the expected value ✓ the execution duration in milliseconds is lower than or equals the observed value 0 is not greater than 13 		
The list of rules fired rulePackage.businessRule The list of executed ruleflow tasks mainRuleflow mainRuleflow>rulePackage The duration (in ms) of execution 0		
Scenario 3	0 test(s) (0 failure(s) - 0 error(s))	
Scenario 4	0 test(s) (0 failure(s) - 0 error(s))	
Scenario 5	0 test(s) (0 failure(s) - 0 error(s))	
Scenario 6	0 test(s) (0 failure(s) - 0 error(s))	

Impact and What-if Analysis



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Technology - Connections - Results

WebSphere ILOG Rule Team Server Options | About | Print View | Help Adam Sign Out

Home Explore Compose Query Analyze Project Custom Impact Configure

Explore > Run > Report Eligibility

Impact View

Report: Last year history - all rules - Report

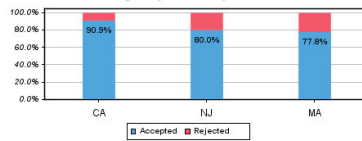
Run Date: Dec 15, 2009 3:01:35 PM CST
Run By: Adam
Number of Scenarios: 400
Success Rate: 100%

Global eligibility results



Accepted 82.5% Rejected 17.5%

Eligibility results by states



Report: Last year history - all rules - Report (2)

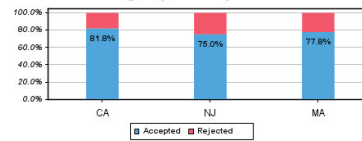
Run Date: Dec 15, 2009 4:08:26 PM CST
Run By: Adam
Number of Scenarios: 400
Success Rate: 100%

Global eligibility results



Accepted 77.5% Rejected 22.5%

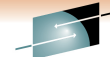
Eligibility results by states



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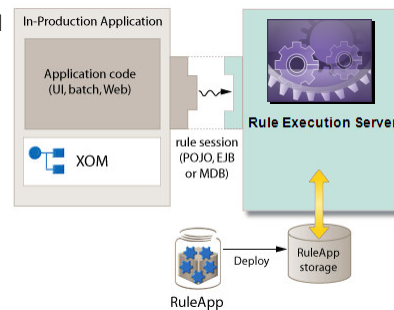
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Managed Execution Environment



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Technology - Connections - Results

- High performance and scalable rule execution
 - Support transactional and batch rule execution
 - Inference (forward-chaining) and sequential rule engine
 - Cluster enabled
- Integrate with Java, XML, WSDL
- Exposes rule services as:
 - Rule Session (POJO, EJB or MDB)
 - Transparent Decision Services (Web services)
- Rule services management & monitoring
 - Rule Persistence and Versioning
 - Rule Execution statistics & trace
 - JMX-based administration console



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Why Care About Patterns with ILOG BRMS?



- ▶ ILOG Business Rule Management Systems provides **automated decisions**
- ▶ Independent automated decisions services **encapsulate decision logic** for Applications and Processes - aligns well with SOA design principles
- ▶ **Different BRMS solution patterns** selected based on users
 - ▶ IT focused or both Business and IT focused
- ▶ **Different Decision patterns** selected based on required **output data structures** that are used
- ▶ **Different integration and deployment patterns**
 - ▶ Invoke the decisions based on the chosen integration architectures and performance requirements

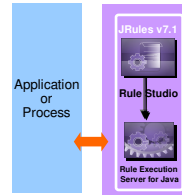
Choosing the most appropriate design patterns reduces effort & risk, improves design and agility for solutions requiring decisions & rules

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BRMS Solution Patterns – Pattern 1



IT uses BRMS to author, deploy & run business rules to complement Processes or Applications



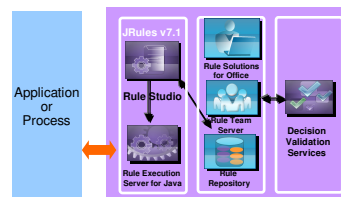
- Business teams provide IT with requirements to
 - Create new decisions
 - Author new business rules
 - Change business rules.
- Business teams have no requirements to view or change business rules
- Pattern Benefits
 - IT can change business rules independently of application or process increasing solution agility
 - IT has improved tooling to author business rules in a consistent way to improve reuse and increase productivity
 - IT can improve time to market for business changes



BRMS Solution Patterns – Pattern 2



BRMS used to Improve Business Collaboration & Agility



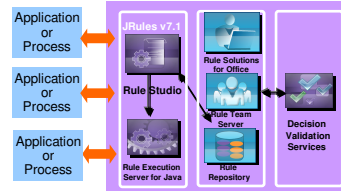
- Enables Business Team to view, author, change and test business rules in business focussed tools
- IT are still essential for creating new decisions and interfaces and authoring and testing brand new rules
- Pattern Benefits
 - Authoring tools enable business rules to be understood by both business & IT teams
 - Business teams when enabled by IT have access to change, extend and test business rules independently for existing decisions enabling faster time to market for changes in the business



BRMS Solution Patterns – Pattern 3



Central Authoring and Management of Business Rules



- This pattern is used by many experienced users of BRMS when they have done
- Use BRMS as central tool and Repository of choice for all solutions with Business Rules
- Multiple projects across multiple Applications with BRMS
- BRMS is an independent solution component and is not just an extension of an Application
- Pattern Benefits
 - Single tooling for cross Enterprise Rule management
 - Improved Rule re-use across Enterprise
 - Change business rules once and corresponding decisions updated from multiple processes or applications



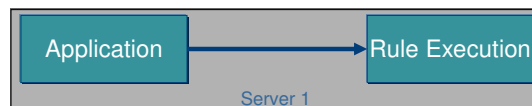
Integration and Deployment Patterns



- Identify technology patterns for integrating with ILOG BRMS
- Technology patterns fall into two categories:



- The rule processing is performed in a centralised Rule Execution Server.
 - Applications make remote call out to central server
 - All data required for rule execution passed across
 - Results returned back to calling application



- The rule processing is run as close to the existing application as possible
 - Applications are co-hosted with rule execution



Considerations for Deployment Patterns



Centralised Rule Execution Server

- JEE environment provides full capabilities
- Rules can be modified, tested and deployed into production by business analysts without requiring any code changes to the applications, or involvement by the IT department.
- Only single environment needs to be managed and maintained.
- Rules can be accessed from different applications, providing consistency across the enterprise.
- Ruleset refresh synchronized across all applications simultaneously
- Performance cost associated with making the call out of the existing application to the Rule Execution Server.

Execution close to applications

- Manage application and rules together may simplify solution
- There is a potential for better performance as no remote call needs to be made.
- If multiple applications use the same rulesets, they may not always start using new versions of rulesets from the same point in time.
- Some features of the Rule Execution Server may not be available, for example when running the Rule Execution Server in a J2SE environment, hot deployment of new rules may not be possible.



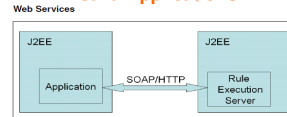
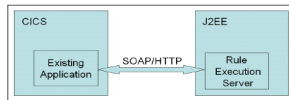
Integration Methods

Integration Method

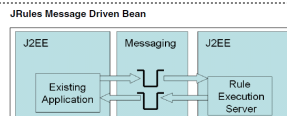
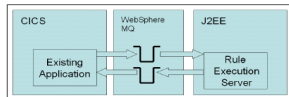
Non Java Applications

Java Applications

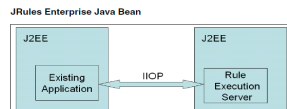
Web Services



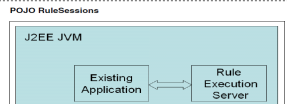
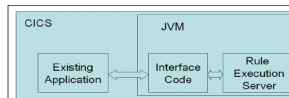
Messaging



EJB



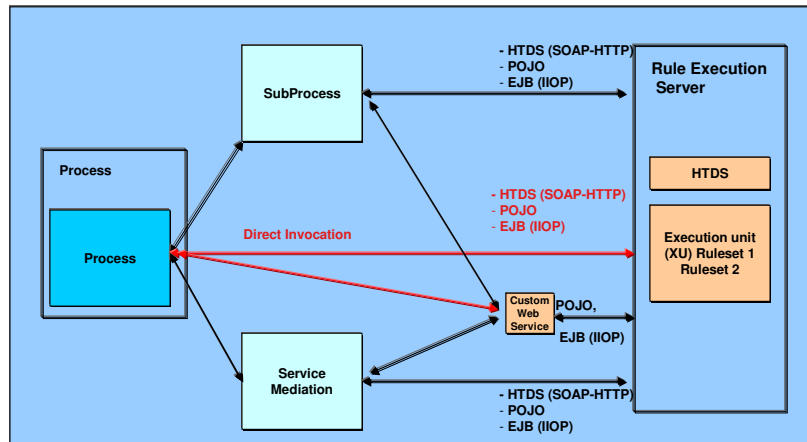
Java



Native



Process Integration & Binding Options with JRules

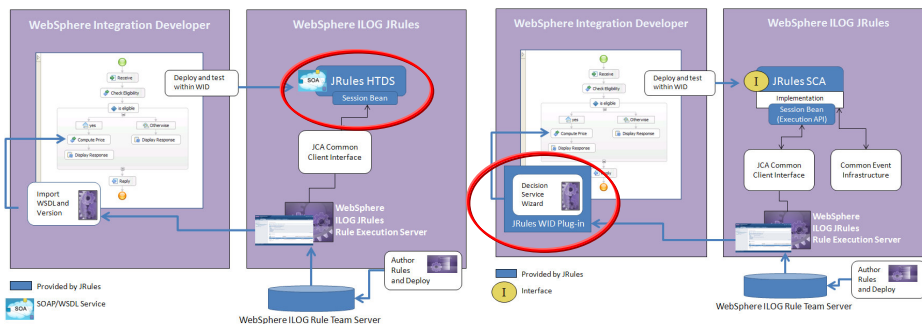


Implementing Patterns with WPS and JRules



Using Web Services and HTDS

Using LA71 Plug in Using EJB, PoJo



Once Ruleapp is created generate WSDL using HTDS and import WSDL into WID using standard WSDL import

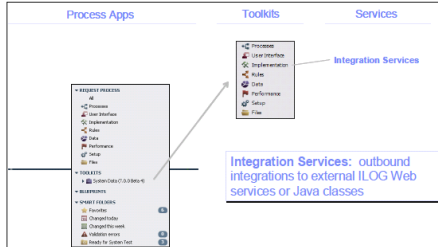
Once Ruleapp is created generate a new Module In WID as rule project which runs wizard to select appropriate Ruleapp rulesets via EJB or PoJo interfaces



Integration Pattern with Lombardi Edition or Filenet

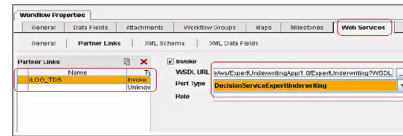


Lombardi Edition



- Most common integration method
- Use Web Services using HTDS
- Import WSDL into Lombardi as an Integration Service
- Use Indirect integration option where HTDS WSDL is encapsulated in SubProcess and has mapping between JRules and Process

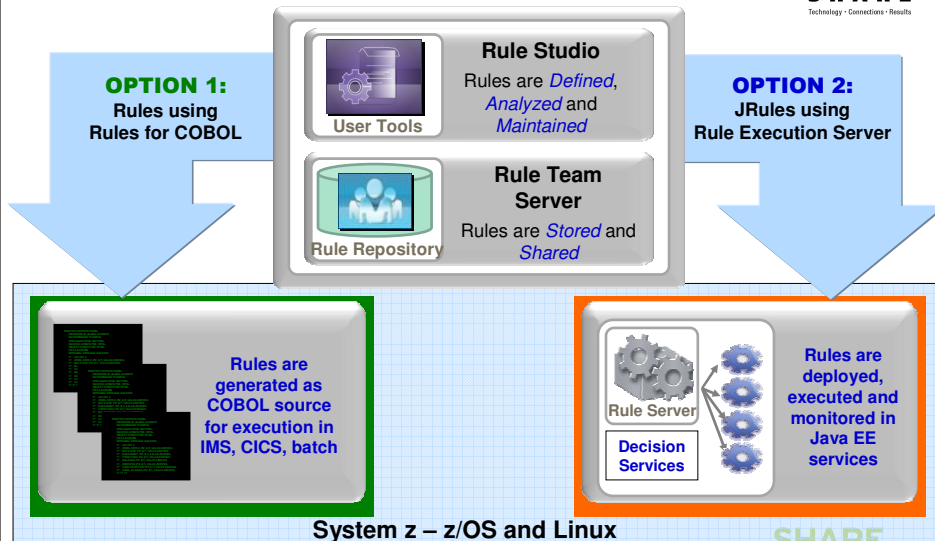
Filenet P8



- Most common integration method
- Use Web Services using HTDS
- Import WSDL into Filenet via the Partnerlink interface
- Map interfaces in process for direct binding or use indirect binding using Subprocess



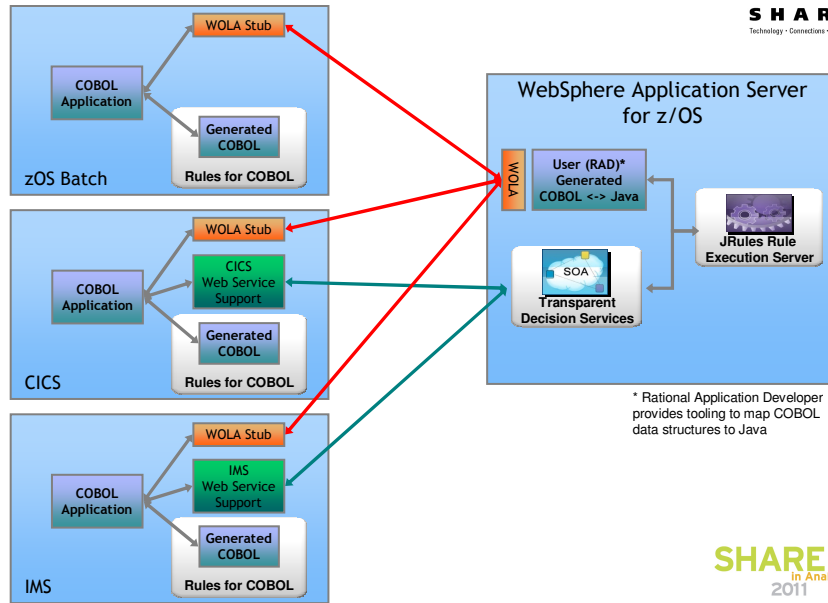
ILOG BRMS System z Options



System z – z/OS and Linux

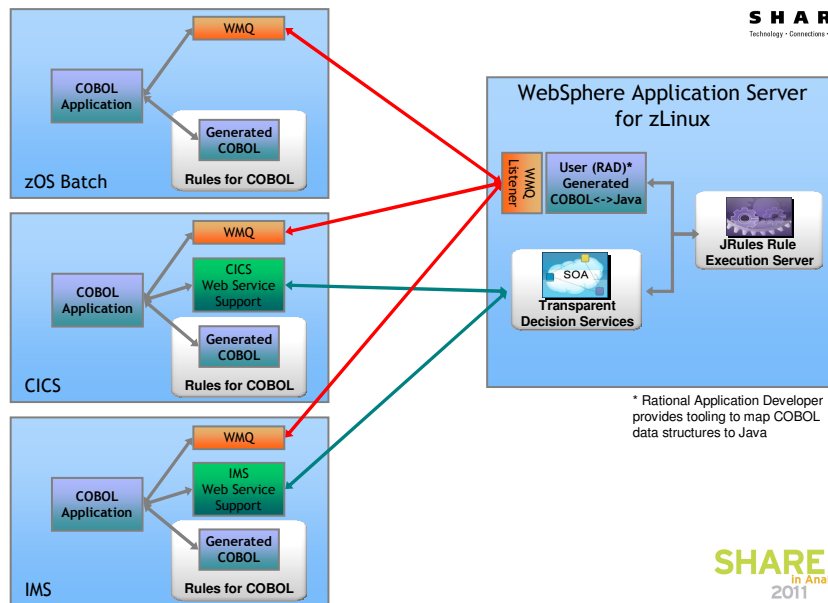


Rule Invocation Options for System z Applications



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Rule Invocation Options for System z Applications



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1

The case for a Business Rule Management Systems

2

WebSphere ILOG BRMS

3

Integration Patterns

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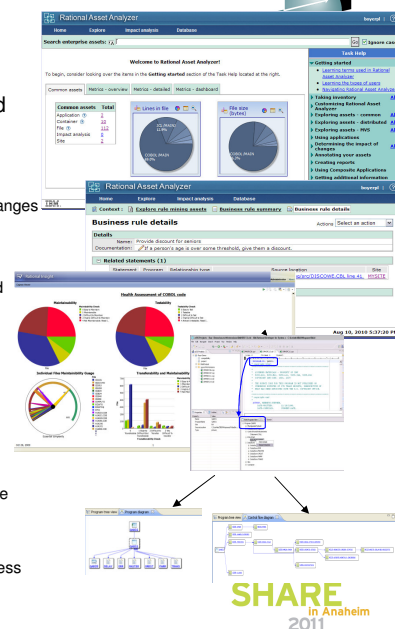
Rule Discovery

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What is Rational Asset Analyzer?

An application understanding tool

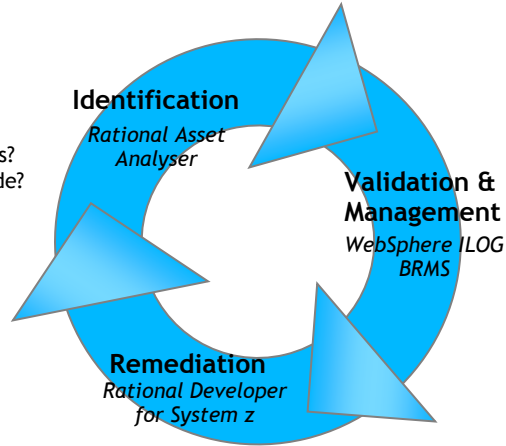
- Improved project effectiveness, with reduced risk and improved productivity
 - Gather complexity metrics across multi-platform applications
 - Determine the application structure and key relationships
 - Identify scope and impact of pending application or database changes
- Role Oriented User Interface
 - Developer-oriented Eclipse user interface integrated with RDZ
 - Easy-to-use browser interface for search, exploration, dashboard and construction of complex queries
- Comprehensive repository built on DB2
 - Accessible via RESTful interfaces
 - Data schema is documented
 - Enabled for Rational Insight dashboard integration
- Fundamental to business decision making solutions
 - Provides business rule identification in source code inventory
 - Enables business rule capture and management with WebSphere ILOG BRMS
- Platform-specific editions available
 - Rational Asset Analyzer – Windows server-based with z/OS access
 - Rational Asset Analyzer for System z – z/OS server-based with Windows and AIX access



Business Rule Modernization – Rational and ILOG BRMS



- What decisions?
- Using which rules?
- Where in the code?



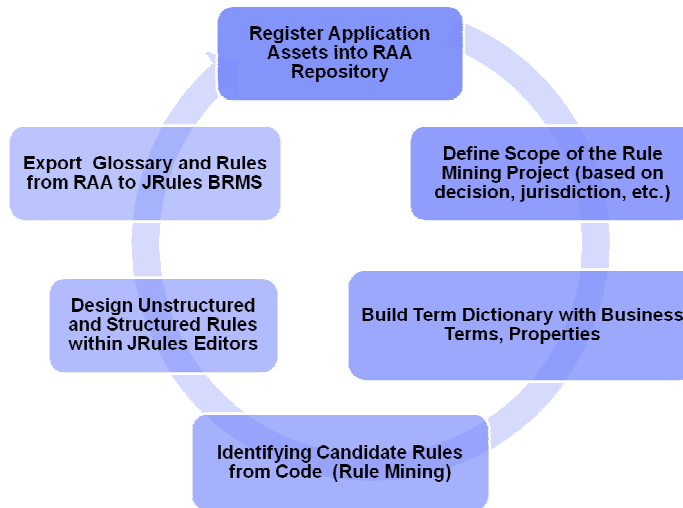
- Align rules with business goals
- Manage rules
- Execute rules

- Adjust the source to match the rule invocation
- Extract the rules to a callable element

43

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Mining Rules Embedded from code to management in a BRMS



Export Glossary and Rules from RAA to JRules BRMS

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Business Rule Modernization: Identification



- Source scan scoped by vocabulary
 - Imported from ILOG JRules or defined by the client in RAA
 - Maps business terms to application terms
 - Focused effort for faster time to value
- Identify candidate business rules
 - Locate relevant code segments using terms
 - Tie in relevant data elements
 - Construct candidate rules mapped to code segments
- Capture/redesign candidate rules using ILOG technologies
 - Unstructured format
 - Structured format using ILOG JRules guided editors



Business Rule Modernization: Identification



The screenshot displays the Rational Asset Analyzer interface. On the left, a code editor shows a snippet of code with lines 31 through 44. A dialog box titled "Relate to a Business Rule" is open, prompting the user to relate an IF statement to a business rule. The "Business rule:" dropdown menu is set to "Provide discount for seniors". Below this, a text box states: "The statement has the following data elements with related terms and term nonetries:".

In the foreground, the "Business rule details" window is open, showing the following information:

- Details:**
 - Name: Provide discount for seniors
 - Documentation: If a person's age is over some threshold, give them a discount.
- Related statements (1):**

Statement	Program	Relationship type	Source location	Site
IF	DISCOWE	User asserted	C:\nm\testdata\BusinessRuleMining\src\DISCOWE_CBL_line_41	MYSITE
- User-related assets (0):**

The interface includes a navigation menu with options like Home, Explore, Impact analysis, and Database. The status bar at the bottom indicates the date and time: Aug 10, 2010 5:37:20 PM.

Business Rule Modernization: Validation & Management



Validation

- Reconciling what the source code does with what the business wants
- Drive an objective discussion and agreement between Business and IT using ILOG JRules
- Adjust the rule definitions in ILOG to conform to the agreement
- Execution with the core business applications running on System z

Management

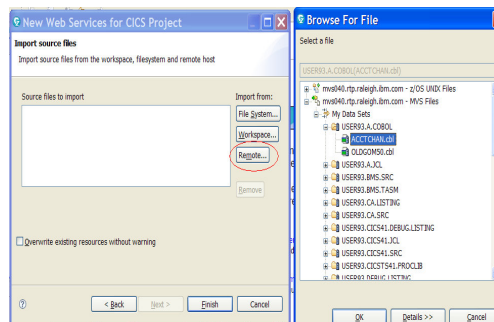
- On-going process of keeping the source in sync with business policy
- Business rules updates should be handled via the ILOG technologies
- Approved changes will drive source code remediation



Business Rule Modernization - Remediation



- **Share same Eclipse Shell with RDz and ILOG Rule Studio**
 - To import remote COBOL data structures in order to create the business model for authoring rules
 - Direct access to z/OS data sets or remote RDz projects to store the Generated COBOL subprogram
- **RDz provides remediation functionality:**
 - Web service generation
 - Deployment of code
 - SCM integration
 - Allow/restrict editing code



New JRules Integration Patterns Redbook



Draft Document for Review October 12, 2010 1:52 pm

Patterns: Integrating WebSphere ILOG JRules with IBM Software

WebSphere ILOG JRules overview and solutions

Patterns with Existing Applications, BPM and Connectivity

Scenarios with JRules, CICS, WebSphere Process Server and WebSphere Message Broker



Andy Ritchie
Girish Subrahmanian
Duncan Clark
Phil Corbridge
Daniel Crossley
Kalle Ghech
Nicolas Poulard
Ian Vassilov
Daniel Millwood

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ILOG BRMS for System z enable smart organizations to capitalize on modernization and innovation



- **Faster Time to Market:**
New products or changes implemented in days vs. months
 - Ability to react to changes in a fast pace competitive marketplace
- **Lower cost of maintenance**
 - Leading to improvement operational efficiency and total cost of ownership
- **Better visibility and control**
 - Leading to improvement to better corporate governance
- **Ability to implement the best rules for the best changes / rules for the best outcome**
 - Business users can see, understand and have the appropriate tools to support the needs of the organization by maximizing their IT investment
- **Manage and document business decisions executed in System z applications**
 - Ability to generate native COBOL from rules within the JRules BRMS
 - Authoring rules for COBOL in business terminology
 - Share business rules with Java and other COBOL applications



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Questions



धन्यवाद
Hindi

多謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Gracias
Spanish

Merçi
French

Obrigado
Brazilian Portuguese

Thank You
English

شكراً
Arabic

Grazie
Italian

多谢
Simplified Chinese

Danke
German

நன்றி
Tamil

ありがとうございました
Japanese

Teşekkürler
Turkish

감사합니다
Korean

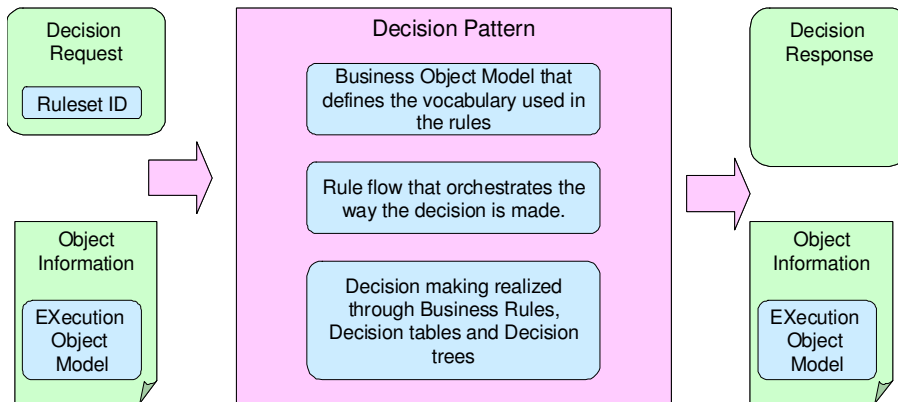
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Back Up

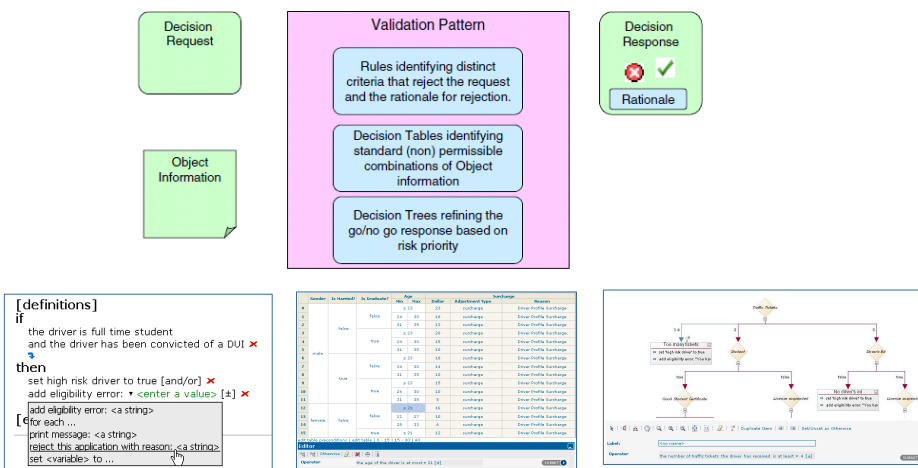


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Generic Decision Pattern



Standard Validation Decision Pattern

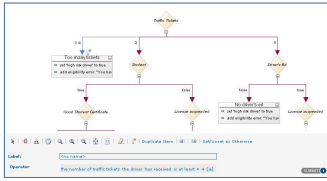


```
[definitions]
if
  the driver is full time student
  and the driver has been convicted of a DUI ✗
then
  set high risk driver to true [and/or] ✗
  add eligibility error: *center a value* [4] ✗
[for each ...]
  print message: <a string>
  reject this application with reason: <a string>
  set <variable> to ...
```

Declarative Rules

Decision	By Name/ID	Is Enabled?	Path	Order	Additional Data	Dependencies
1	None	Yes	1	1	None	None
2	None	Yes	2	1	None	None
3	None	Yes	3	1	None	None
4	None	Yes	4	1	None	None
5	None	Yes	5	1	None	None
6	None	Yes	6	1	None	None
7	None	Yes	7	1	None	None
8	None	Yes	8	1	None	None
9	None	Yes	9	1	None	None
10	None	Yes	10	1	None	None
11	None	Yes	11	1	None	None
12	None	Yes	12	1	None	None
13	None	Yes	13	1	None	None
14	None	Yes	14	1	None	None
15	None	Yes	15	1	None	None
16	None	Yes	16	1	None	None
17	None	Yes	17	1	None	None
18	None	Yes	18	1	None	None
19	None	Yes	19	1	None	None
20	None	Yes	20	1	None	None

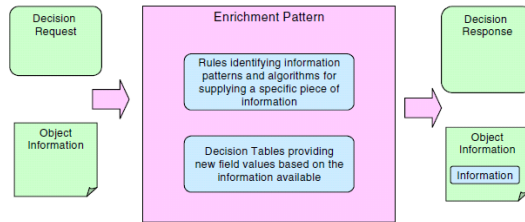
Decision Tables



Decision Trees

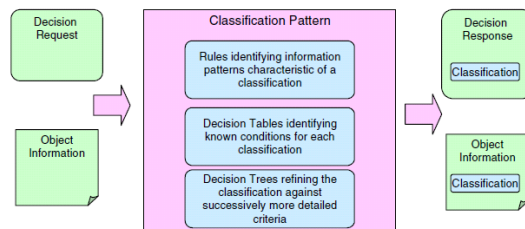


Enrichment & Classification Patterns



Information may be needed by one application and is not provided directly or in the correct form by the client application

Derive information from other information – Car Insurance Group

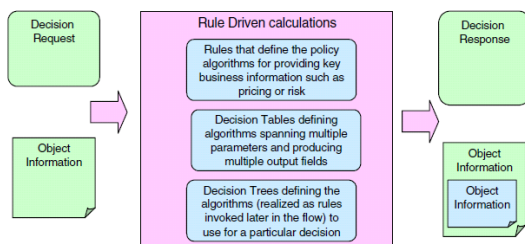


Identifying a known situation or class of information. Use a classification system or taxonomy to classify

Return classification ie type of car fault

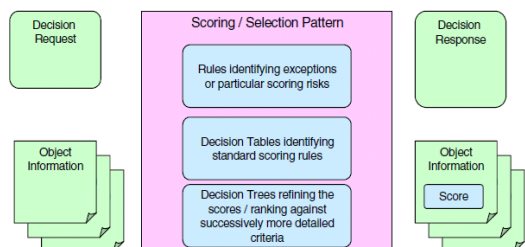
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Rule Driven Calculation & Scoring Patterns



A calculation is required for business purposes. For underwriting this is to provide a quote for the required insurance

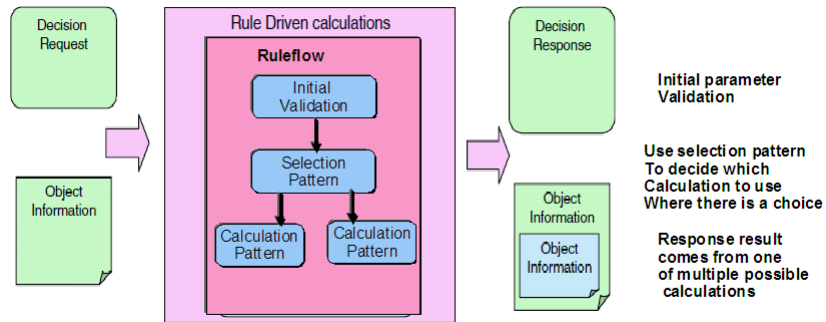
Calculate quote based on requesters driver information, insurance cover requested and car information,



Where there is a choice of outcomes or providers of services. A scoring pattern uses business rules with specific criterion ranked against some cost function and the least cost / greatest value option selected based on the relative scoring

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Complex Calculation Decision Pattern



- Some Decisions require multistage decisions
- JRules can achieve this using its RuleFlow capabilities
- Decisions patterns apply to ruleflow as well as to consumer of JRules decisions