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Modernization of Mainframe Applications with Business Rules and Events

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IBM

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Session 11885

SHARE in Anaheim 2012

Agenda

- Concepts of Operational Decision Management (ODM)
- ODM Capabilities on z/OS
  - Decision authoring and Decision execution options
  - Decision management and lifecycle
- Rule discovery in existing applications

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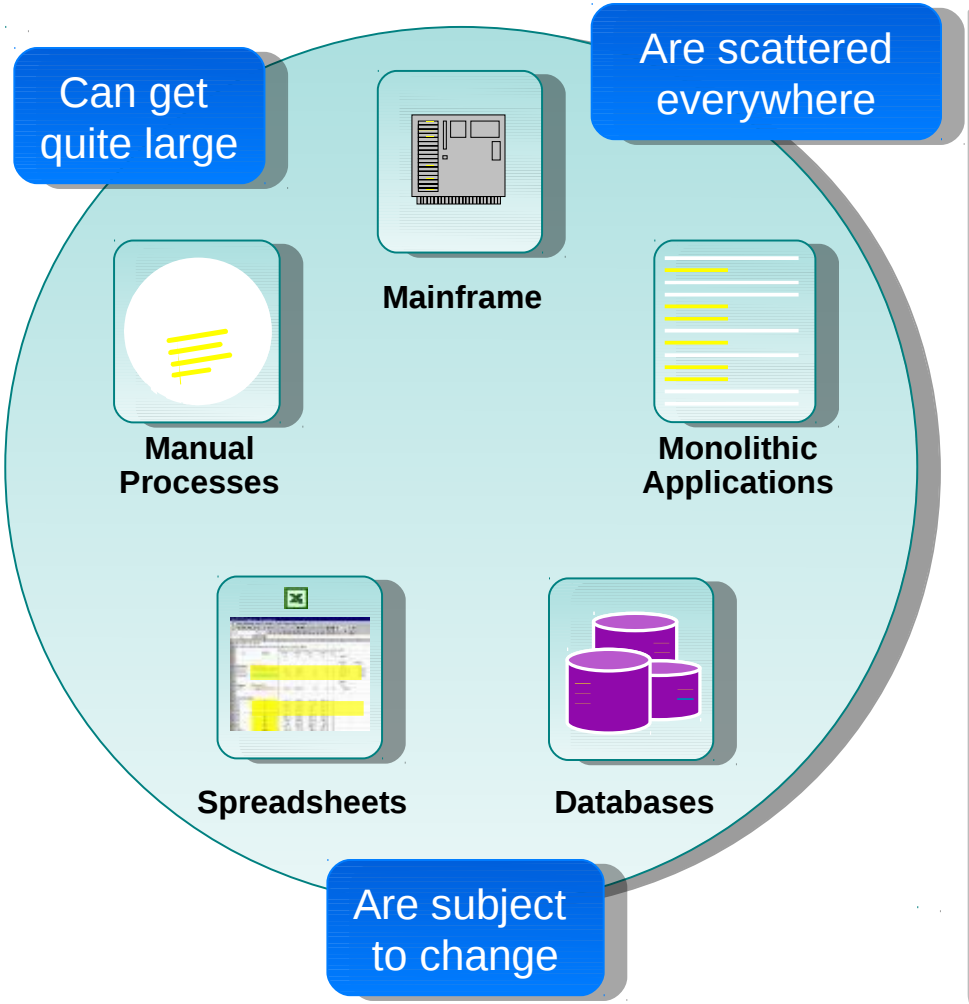
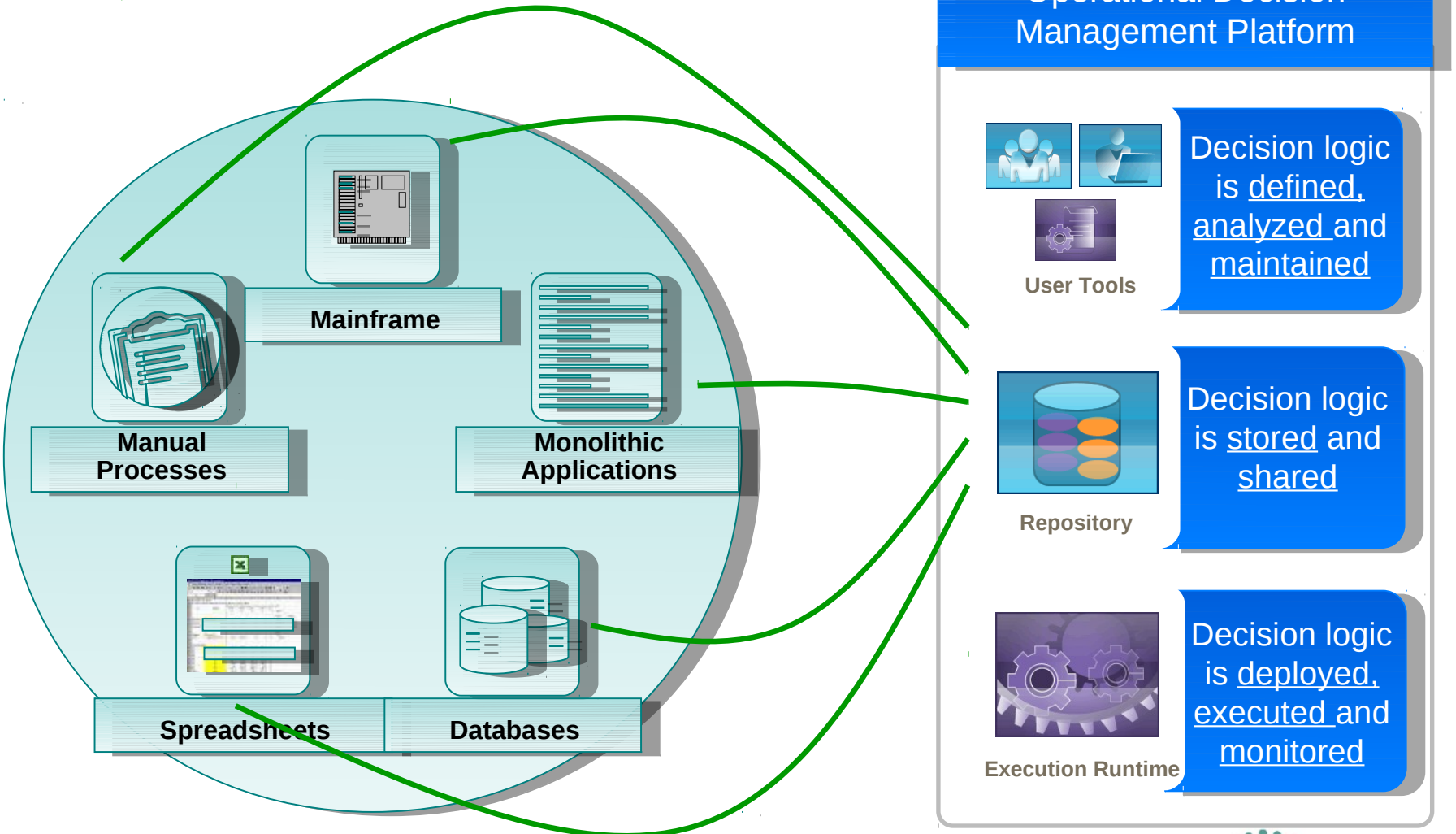
Operational Decisions in Organizations



Challenges for a Change Request

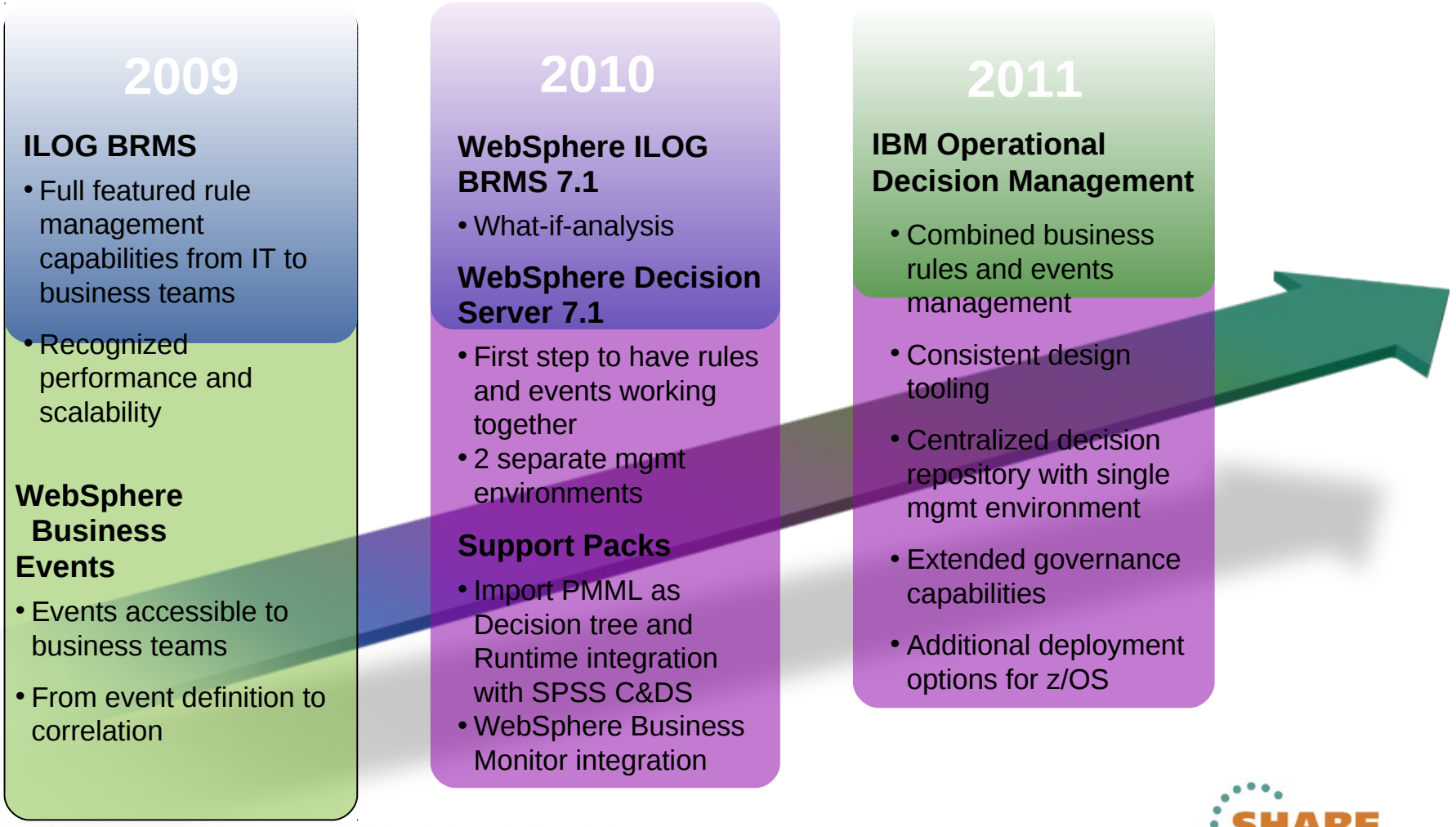
- Changes are costly, resource & time-intensive
  - **Hidden in code**
  - **Most changes have to be programmed – costly**
- Lack of consistency
  - **No central management**
  - **No reuse of decision logic**
- Gap between business analysts & IT administrators
  - **Knowledge fades over time**
- Lack of audit ability
- No easy way to test/simulate changes

Operational Decision Management Approach



IBM's Path to Operational Decision Management

Decision Management is an approach, combining software and expertise, to automate, improve and govern operational decisions across the enterprise



Operational Decision Management = ILOG + WBE

Business Rules

Primarily implements a decision model – given a snapshot view of data, determines best course of action at a specific point in a process or application

Main purpose is to automate a decision based on a combination of factors (business policies, regs, best practices)

If the Passenger is a gold frequent traveler and flight distance is more than 4000 miles and the flight destination is in Europe or Asia Then Add 10,000 points to the fidelity card of the Passenger

Business Events

Primarily implements a time-based pattern detection model – correlating events as data is in motion

Main purpose is to determine what of interest is transpiring and coordinate one or more responses by other systems or generate alerts to people

If more than 2 customer withdrawals in an ATM are done in the same day and the 2 ATMs are from 2 foreign countries Then Investigate possible fraud Reduce cash redraw max amount to 100$

***Gartner** characterizes Rules and Complex Event systems as complementary notions. The combination being required to implement intelligent decision management programs.*

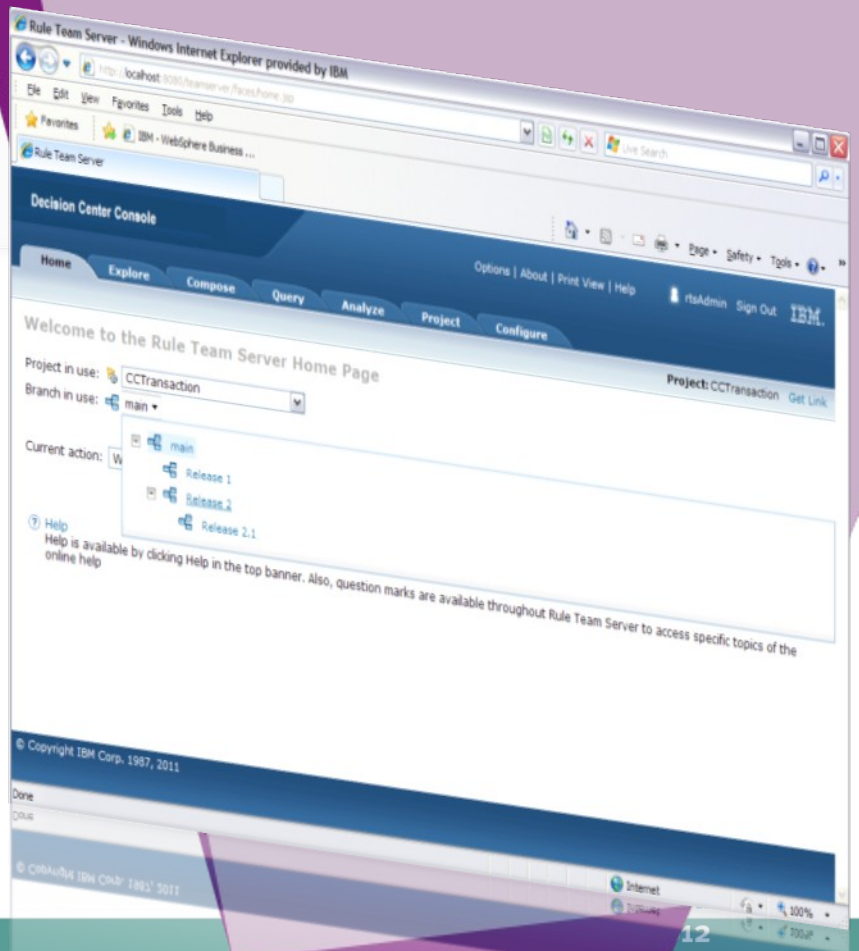
ODM – Precise, Automated Decisions

Horizontal: best/appropriate price, cross-sell/ up-sell recommendations, loyalty promotions, exception identification, risk/fraud assessment, straight-through processing approvals

Insurance	Banking	Healthcare	Government	Energy/Utility
▪ Claim •Validation •STP approval •Exception routing	▪ Loan •Eligibility •Risk •Pricing	▪ Patient Care •Drug interaction risk warnings •Follow-up alerts	▪ Benefits •Eligibility •Calculations	▪ Land/Permits •Conveyance processing •Contract compliance
▪ Policy/ Underwriting •Eligibility •Risk •Pricing	▪ Account •Cross-sell •Fraud/Alerts	▪ Member •Services recommendation •Eligibility •Benefit calculation	▪ Tax Payer •Classification •Audit flagging	▪ Service Mgmt •Service prioritization •SLA alerts •Maintenance alerts •Order configuration
▪ Annuity •Recommendation •Commissioning •Payout calc.	▪ Credit Card •Mktg Offers •Fraud •Credit limit	▪ Provider •Patient eligibility for services	▪ Citizen •Program(s) recommendation	

Modernising your Applications

- *Operational Decision Management enables organizations in every industry to make their business rules and business decisions clear, consistent and **expressed in business language** to be able to change when the business needs.*
- *Transformation or **modernization** of z/OS applications*
- *Ability to **react to change** (timely reaction to market and competitive changes)*
- *Overcome IT and Business mis-alignment – keep up and service **business requests***
- *Eliminate resource drain on application maintenance – **reuse of business decisions** across applications and platforms*



Operational Decision Management Capabilities – Rules

IBM ODM: Components

Operational Decision Management

Decision Center

Versioning

Decision Artifacts

Access and Control

Repository

Define

Update

Visibility & Governance

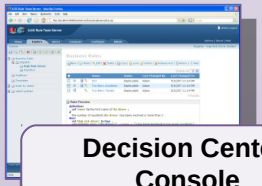
Deploy

Measure

Decision Server

Rule Execution	Event Execution	Decision Monitoring	Connectors

Management

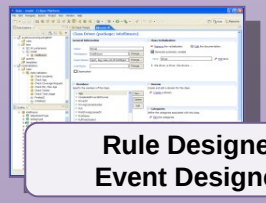


Decision Center Console

Rule Solutions for Office

Decision Center for Business Space

Design



Rule Designer Event Designer

Data Model - Verbalization

Business Object Model	Rule Vocabulary	Business Rule Language
Developer	IT / Business	Rule Developer / Business User

```
01 CUST
  05 NAME
  05 AGE
  05
NUMACCIDENTS
  05 RISKLEVEL
```

- Automatic generation of the rule vocabulary.
- Comprehensive industry focused business terms to define its data and associated actions.
- Localizable vocabulary

"customer"

- the name of …
- the birthday of …
- the number of accidents of …
- the … is a high risk driver

"client"

- le nom du …
- l'anniversaire du …
- Le nombre d'accidents du …
- le … est un conducteur à risque …

Rule: High risk driver

if

the birthday of **customer** is after **12/9/1975** **and**
the number of accidents of **customer** is at least **3**

then
set the **customer** as a **high risk driver**

Règle: Conducteur à risque

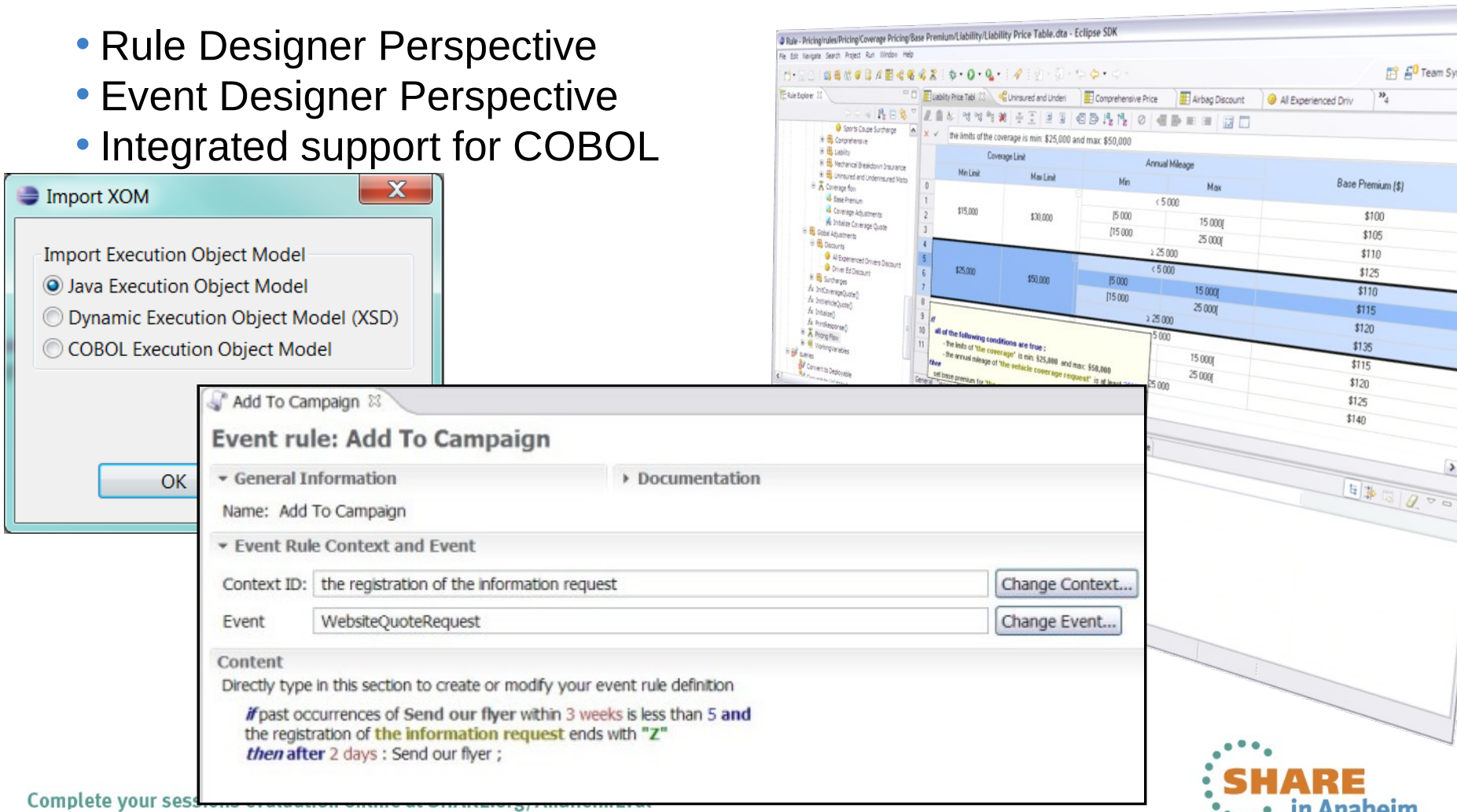
si

L'anniversaire du **client** est après le **12/9/1975** **et**
le nombre d'accident du **client** est au moins **3**

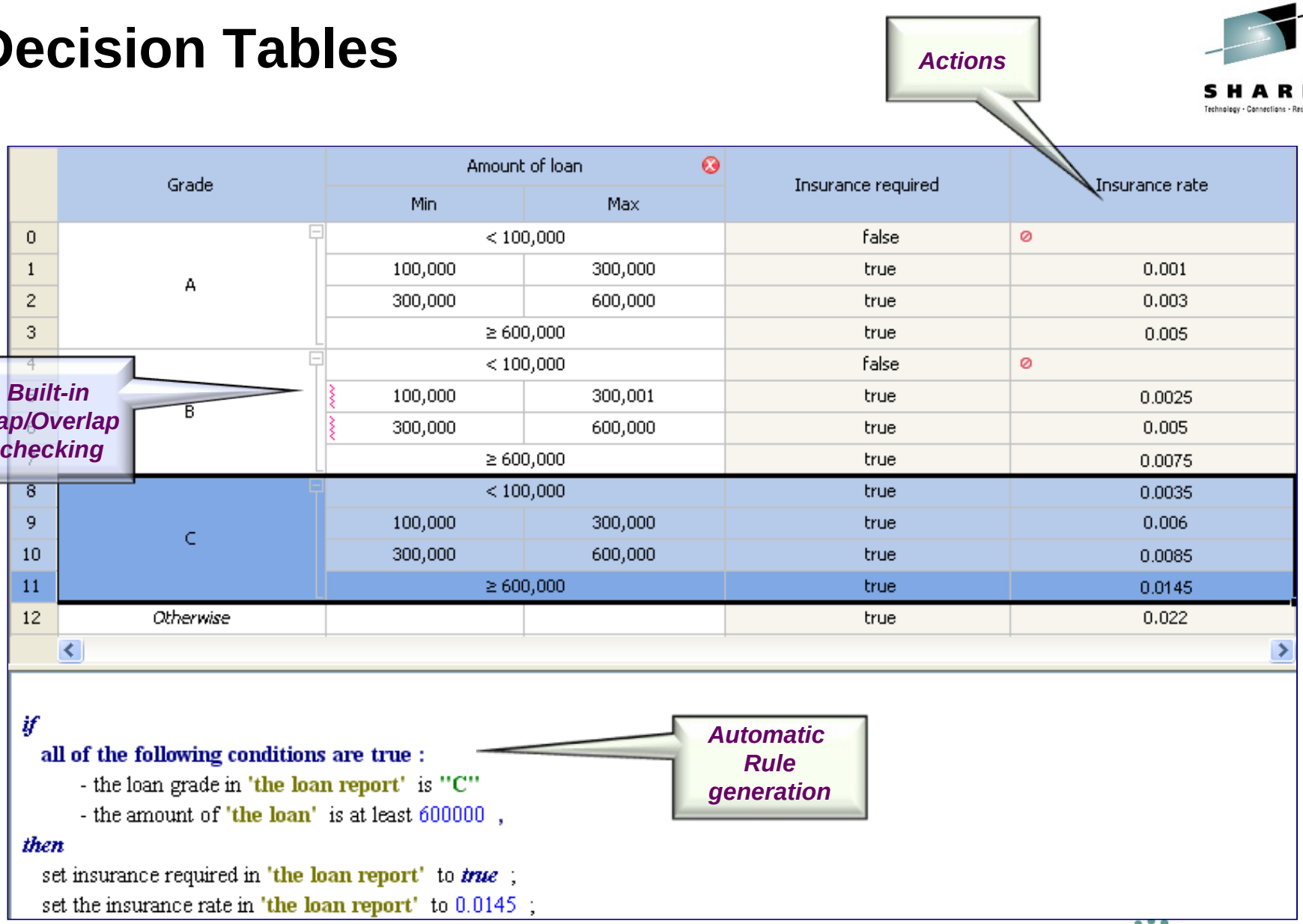
alors
Classer le **client** comme **conducteur à risque**

Rule and Event Designer

- Eclipse-based Development Environment
  - Rule Designer Perspective
  - Event Designer Perspective
  - Integrated support for COBOL



Decision Tables



	Grade	Amount of loan		Insurance required	Insurance rate
		Min	Max		
0	A	< 100,000		false	⊘
1		100,000	300,000	true	0.001
2		300,000	600,000	true	0.003
3		≥ 600,000		true	0.005
4	B	< 100,000		false	⊘
5		100,000	300,001	true	0.0025
6		300,000	600,000	true	0.005
7		≥ 600,000		true	0.0075
8	C	< 100,000		true	0.0035
9		100,000	300,000	true	0.006
10		300,000	600,000	true	0.0085
11		≥ 600,000		true	0.0145
12	*Otherwise*			true	0.022

```
if
   all of the following conditions are true :
        - the loan grade in 'the loan report' is "C"
        - the amount of 'the loan' is at least 600000 ,
then
   set insurance required in 'the loan report' to true ;
   set the insurance rate in 'the loan report' to 0.0145 ;
```

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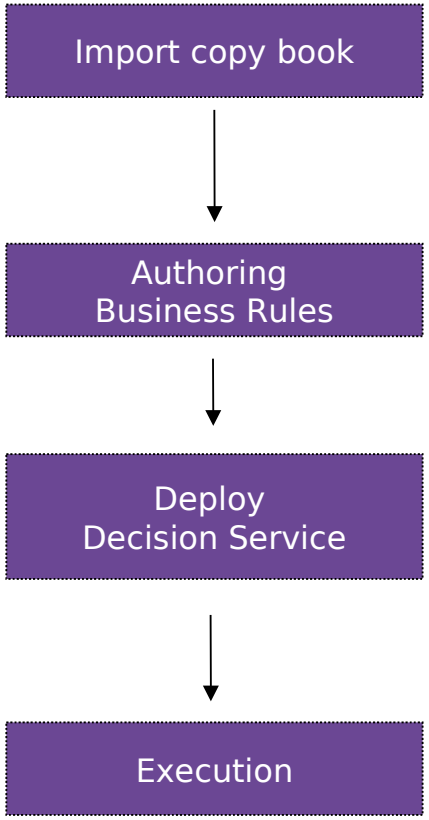
Starting from a COBOL Copybook



Scenario

- Existing COBOL containing business rules
- Data model defined in COBOL copybook
- Use ODM to modernize the business policy

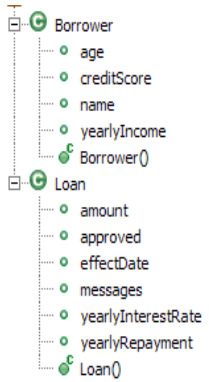
Benefits

- Modernize business policies in ODM
- Rules can be invoked ‘naturally’ from existing COBOL application
- Business policy/rule lifecycle detached from application lifecycle

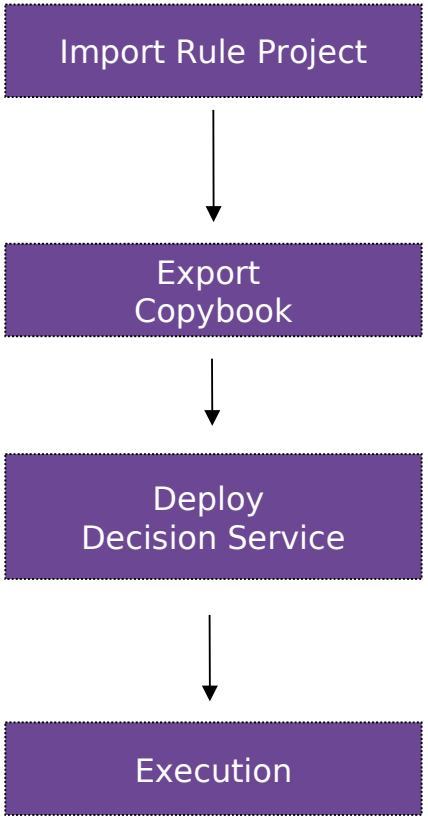
Rule Authoring – COBOL Copybook XOM

- Support Enterprise COBOL 3.4, 4.1 & 4.2
- Java is created from the copybook structure
  - Java XOM & Java code to marshal between COBOL <-> Java
  - 01 level structures mapped to class in BOM
- Redefines statements supported
  - Select which redefines structure to import
- COBOL Table support
  - Mapped to Java **`List<type>`** structures
- COPY statements supported
- Level 88 supported
  - Mapped to methods in BOM

```
01  Borrower.
    05  name                PIC  X(20).
    05  creditScore         PIC  S9(10).
    05  yearlyIncome        PIC  9(10).
    05  age                 PIC  9(3).
01  Loan.
    05  amount              PIC  9(10).
    05  yearlyInterestRate  PIC  99.
    05  yearlyRepayment     PIC  9(10).
    05  effectDate          PIC  X(8).
    05  approved            PIC  X.
    05  messageCount        PIC  9(2).
    05  messages            PIC X(60)
                            OCCURS 0 TO 99 TIMES
                            DEPENDING ON messageCount.
```



Starting from an existing Rule Project



Scenario

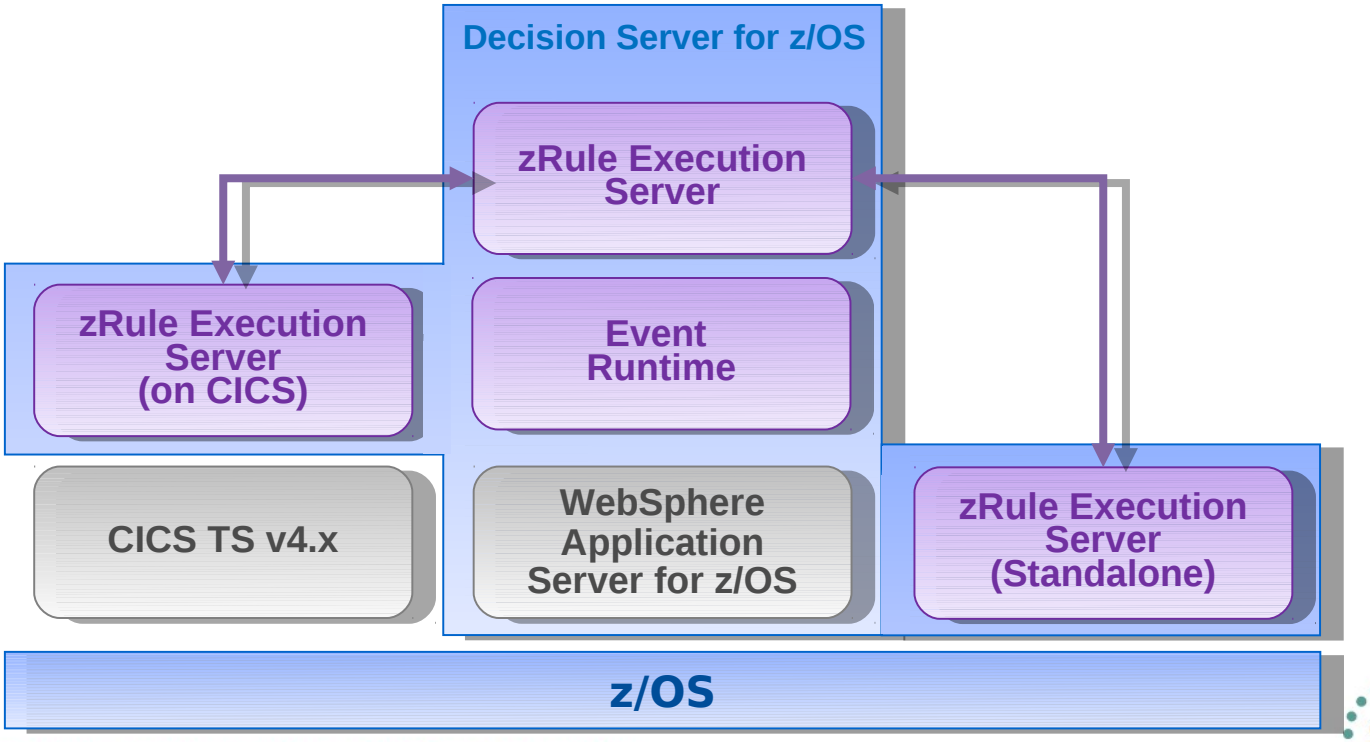
- Existing rule projects exist that are currently in use on distributed platforms
- Concurrent execution of rules is required on System Z

Benefits

- Consistent decision rules wherever they are executed
- Rules can be invoked ‘naturally’ from existing COBOL application
- Enables central rule management across System Z and Distributed platforms

Operational Decision Management on System z

- Decisions can be invoked from existing CICS, IMS and batch applications
- Runtime support for COBOL data types
- Flexible runtime deployment to fit any System z environment:
  - Deployed on WebSphere Application Server for z/OS
  - Deployed standalone to z/OS
  - Deployed in CICS TS 4.x JVM Server environment



New COBOL Programming API

- HBRCONN
  - Connect to the rule engine using conn area
- HBRRULE
  - Run the rules copying in the rule name and data
- HBRDSC
  - Disconnect from the rule engine

```
01 HBRA-CONN-AREA.
   10 HBRA-CONN-EYE              PIC X(4)  VALUE 'HBRC'.
   10 HBRA-CONN-LENTH            PIC S9(8) COMP.
   10 HBRA-CONN-VERSION          PIC S9(8) COMP  VALUE +2.
   10 HBRA-CONN-RETURN-CODES.
      15 HBRA-CONN-COMPLETION-CODE PIC S9(8) COMP.
      15 HBRA-CONN-REASON-CODE    PIC S9(8) COMP.
   10 HBRA-CONN-FLAGS            PIC S9(8) COMP  VALUE +1.
   10 HBRA-CONN-INSTANCE         PIC X(24).
   10 HBRA-CONN-RULE-COUNT       PIC S9(8) COMP.
   10 HBRA-CONN-RULE-MAJOR-VERSION PIC S9(8) COMP.
   10 HBRA-CONN-RULE-MINOR-VERSION PIC S9(8) COMP.
   10 HBRA-CONN-RULEAPP-NAME     PIC X(256).
   10 HBRA-RESPONSE-AREA.
      15 HBRA-RESPONSE-MESSAGE   PIC X(512).
   10 HBRA-RA-PARMETERS.
      15 HBRA-RA-PARMS  OCCURS 32.
         20 HBRA-RA-PARAMETER-NAME   PIC X(48).
         20 HBRA-RA-DATA-ADDRESS     USAGE POINTER.
         20 HBRA-RA-DATA-LENGTH      PIC 9(8) BINARY.
   10 HBRA-RESERVED.
      15 HBRA-RESERVED02          PIC X(12).
      15 HBRA-RESERVED03          PIC X(64).
      15 HBRA-RESERVED04          PIC X(64).
      15 HBRA-RESERVED05          PIC X(128).
      15 HBRA-RESERVED06          PIC X(128).
```

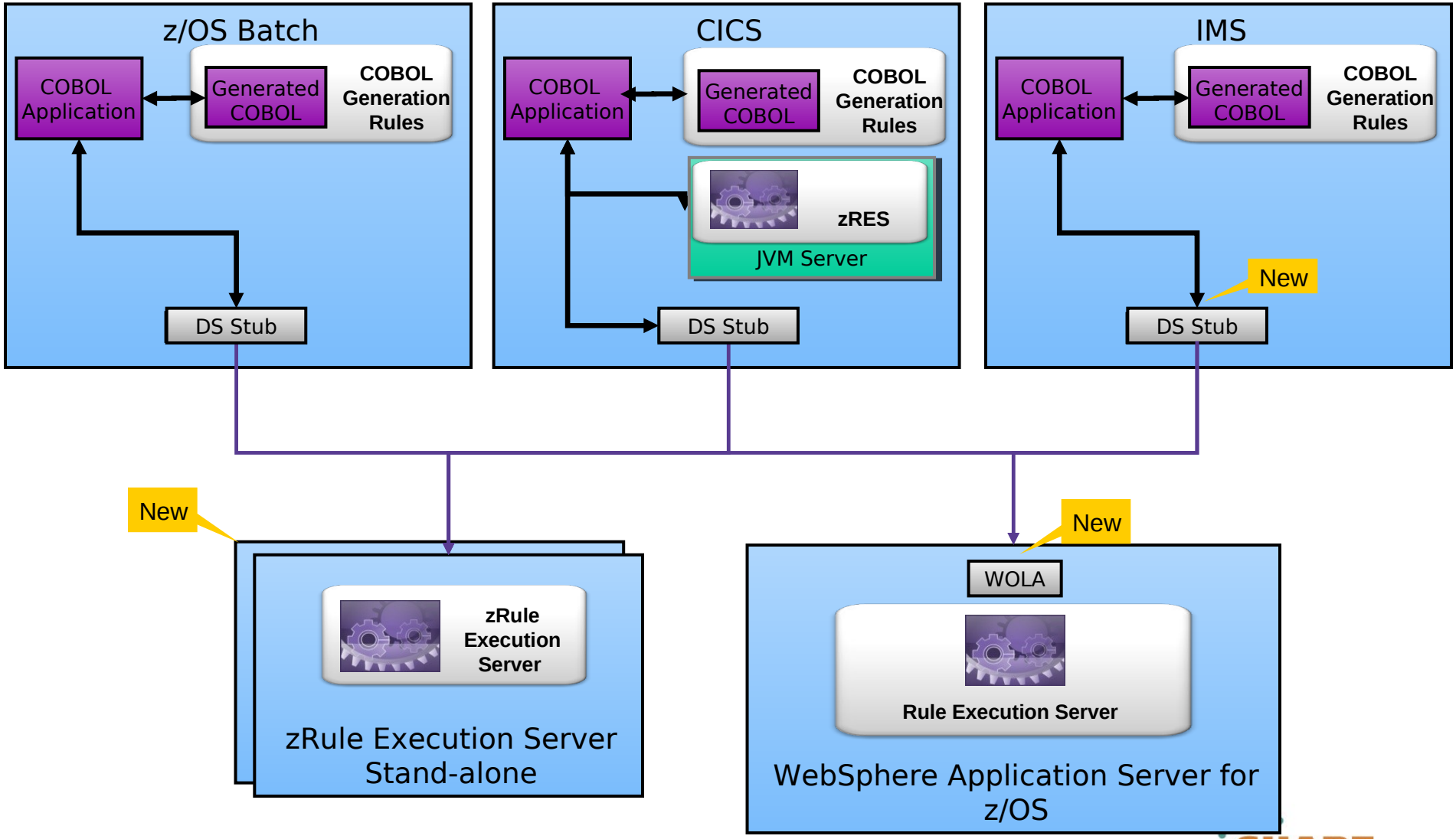
New programming API within a COBOL program

SHARE

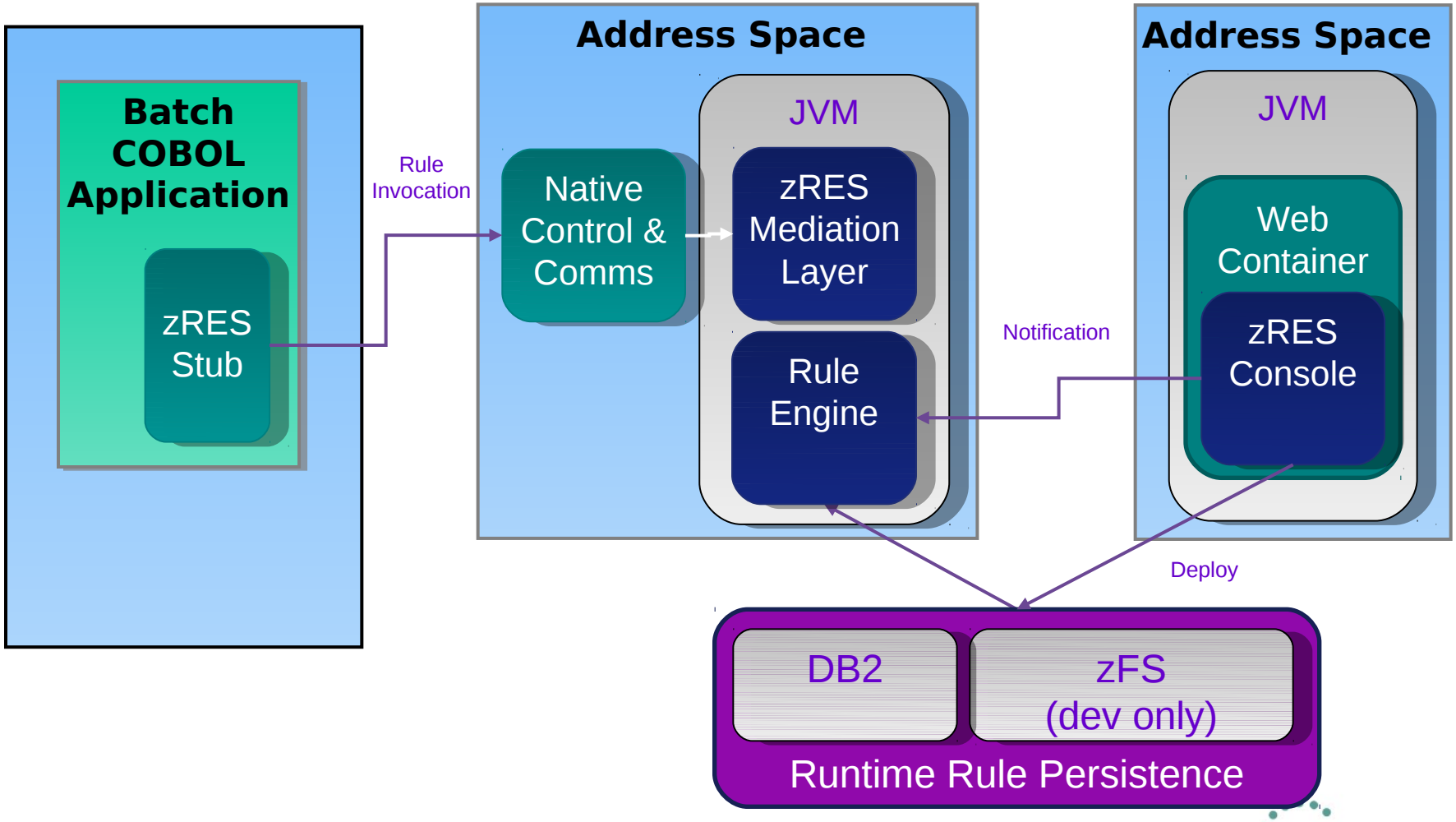
```
Line 33      Column 12    Insert   139 changes
----+-*A-1-B--+----2----+----3----+----4----+----5----+----6----+----7--
      IDENTIFICATION DIVISION.
      PROGRAM-ID. HBRMINC.
      ...

      WORKING-STORAGE SECTION.
      ...
     * Parameter Data
      COPY MINILOAN.
     * Return Code definitions
      COPY HBRC.
     * HBR Header structure
      COPY HBRWS.
      ...

      PROCEDURE DIVISION.

     * Connect to zRES
          call 'HBRCONN' using HBRA-CONN-AREA

          IF HBRA-CONN-COMPLETION-CODE NOT EQUAL HBR-CC-OK THEN
              perform onFailedCall
          END-IF

     * Initialize call parameters
          MOVE ALL SPACES TO Borrower Loan
          MOVE ALL LOW-VALUES TO HBRA-RA-PARMETERS
          MOVE "/zRulesMiniLoanDemoRuleApp/zRulesMiniLoanDemo" TO
                       HBRA-CONN-RULEAPP-NAME

          move LENGTH OF Borrower to HBRA-RA-DATA-LENGTH(1)
          move "borrower"         to  HBRA-RA-PARAMETER-NAME(1)
          set HBRA-RA-DATA-ADDRESS(1) to address of Borrower

          move LENGTH OF Loan          to HBRA-RA-DATA-LENGTH(2)
          multiply length of messages by 10 giving WS-maxMessageLen
          add WS-maxMessageLen to HBRA-RA-DATA-LENGTH(2)
          move "loan"                  to HBRA-RA-PARAMETER-NAME(2)
          set HBRA-RA-DATA-ADDRESS(2) to address of Loan

          move 'F' to approved
```

```
Line 81      Column 12    Insert   144 changes
----+-*A-1-B--+----2----+----3----+----4----+----5----+----6----+----7--
     * Read scenario data
          MOVE ALL LOW-VALUES TO WS-IN
          UNSTRING SCENARIO-DATA DELIMITED BY ','
                   INTO
              WS-IN-data(1) WS-IN-data(2) WS-IN-data(3)
              WS-IN-data(4) WS-IN-data(5) WS-IN-data(6)
     * Populate the borrower from scenario data
          move WS-IN-data(1) to name
          Compute creditscore        = Function numval(WS-IN-data(2))
          Compute yearlyIncome       = Function numval(WS-IN-data(3))
     * Populate the loan from scenario data
          Compute amount             = Function numval(WS-IN-data(4))
          Compute yearlyRepayment    = Function numval(WS-IN-data(5))
          Compute yearlyInterestRate = Function numval(WS-IN-data(6))

     * Invoke the rule
          call 'HBRRULE' using HBRA-CONN-AREA

          EXEC CICS SUSPEND END-EXEC

     * Display rule responses, or error code, as appropriate
          if HBRA-CONN-COMPLETION-CODE = HBR-CC-OK then
              display 'HBR CALL Sucessful'

     * Disconnect
          call 'HBRDISC' using HBRA-CONN-AREA

          IF HBRA-CONN-COMPLETION-CODE NOT EQUAL HBR-CC-OK THEN
              perform onFailedCall
          END-IF

          perform prtDemoText

          EXEC CICS RETURN END-EXEC
          GOBACK.
```

Rule Invocation Options in 8.0



zRule Execution Server for z/OS

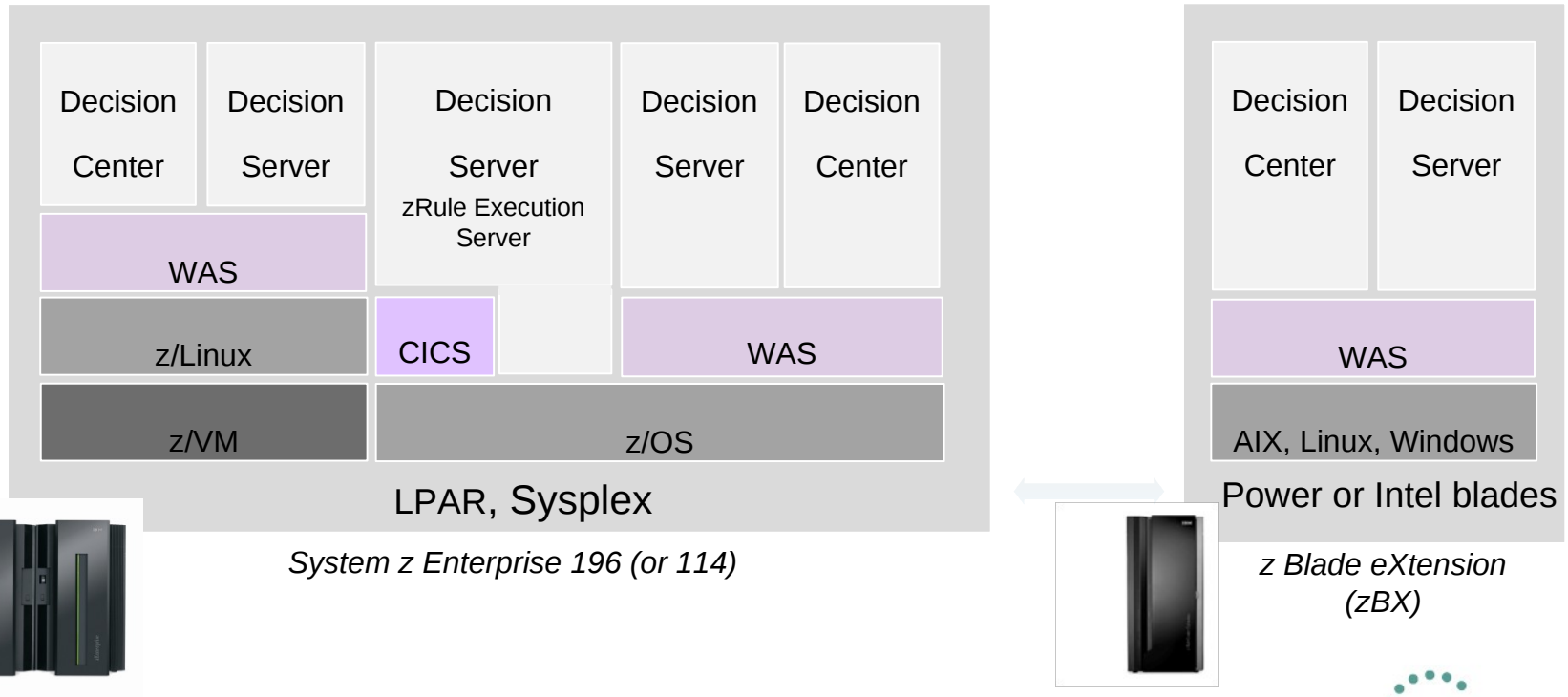


Decision Server Options Summary

	zRule Execution Server deployed in WebSphere Application Server for z/OS	zRule Execution Server deployed as a Standalone environment	zRule Execution Server deployed in CICS TS v4.x JVM Server environment	COBOL Generation Rules
OTTB integration with COBOL applications	✓	✓	✓	✓
Full support for all rule authoring constructs	✓	✓	✓	
Business Event Execution Support	✓			
Hot deployment support for new decision versions	✓	✓	✓	
Integration with Decision Center business tooling	✓	✓	✓	✓
Testing and simulation support	✓	✓		
Decision Warehousing rule auditing support	✓	✓		
Easy sharing of rules with distributed deployments	✓	✓	✓	
Local execution support for CICS TS v4.x			✓	✓
Full HA & transactional support	✓		✓	

Deployment Options for ODM on System z

Decisions can be invoked from existing CICS, Batch, IMS batch applications
Runtime support for COBOL data types
Flexible runtime deployment to fit any System z environment:
Deployed on WebSphere Application Server for z/OS
Deployed on CICS TS 4.x (JVM server environment)
Deployed standalone to z/OS

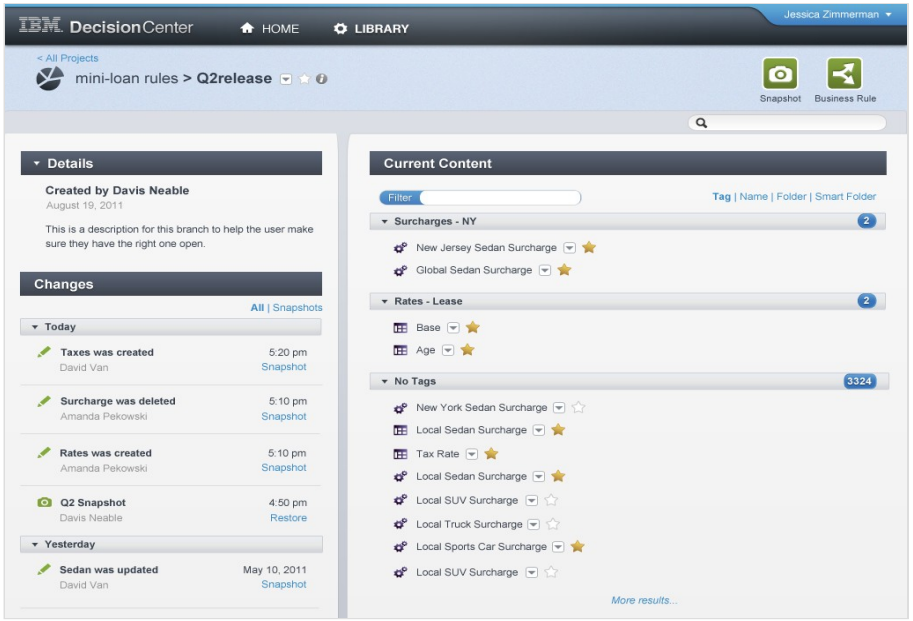


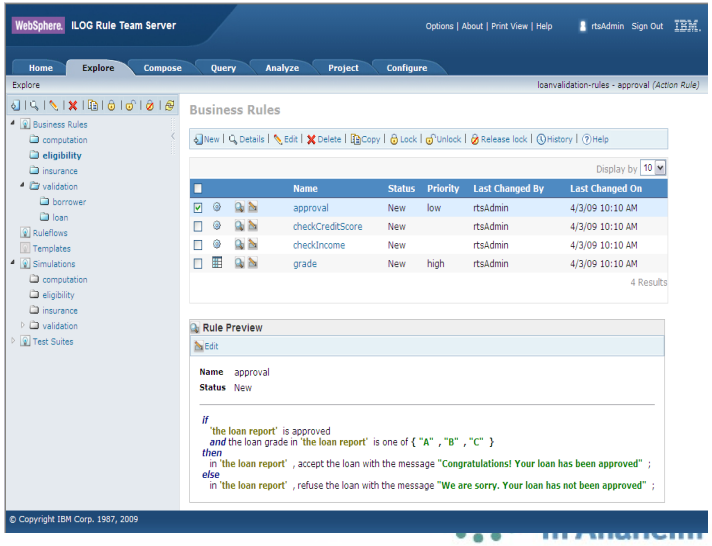
System z Enterprise 196 (or 114)

z Blade eXtension (zBX)

Decision Center: Web-based Console

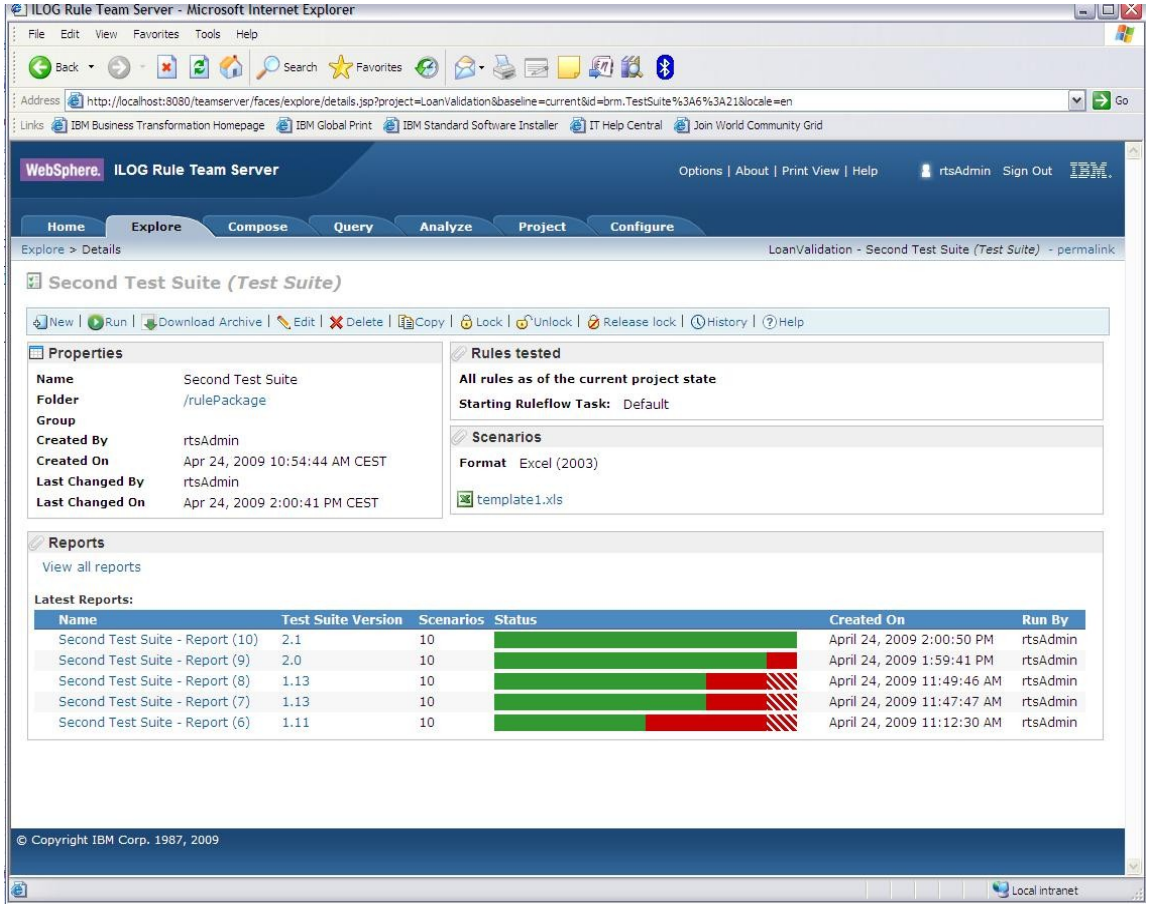
- Access rule artifacts concurrently without conflict or delay
- Take control of very large rulebases with Smart Views, easy search and reporting
- Get automatic notification of rule conflicts, redundancies
- See where rules are used across projects using queries
- Hot-deploy rule changes in minutes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





Testing and Simulation

- Out-of-the-box ruleset testing
- Business impact simulation
- Scenario configuration and customization
- Auditing using Decision Warehouse



Scenario Definition

A19

Create your scenarios … For more information see the HELP

Scenario name	Description	borrower: yearly income	borrower: credit score	borrower: name	loan: amount	loan: approved	loan: yearly interest rate	loan: duration
Scenario 1	Good credit; get rate with insurance	75000	600	John Simons	250000	FALSE	0.0625	120
Scenario 2	Good credit; get higher rate	110000	700	Jane Howe	300000	FALSE	0.0575	120
Scenario 3	Good credit; get rate	125000	750	Isaac Mintner	500000	FALSE	0.0625	120
Scenario 4	Great credit; get lower rate	100000	800	Fernando Rodriguez	300000	FALSE	0.075	120
Scenario 5	Good credit; loan too high	90000	700	Jaclyn Perkins	500000	FALSE	0.0775	120

Scenarios | Expected Results

Input Data

L15

Fill in only the cells for the expected results you want … for more information see the HELP

Scenario name	loan: Approved	loan: Yearly Repayment
Scenario 1	TRUE	1595.45
Scenario 2	TRUE	1755.45
Scenario 3	TRUE	3190.9
Scenario 4	TRUE	1755.45
Scenario 5	FALSE	0

Expected Results

F9

Fill in the cells for the processing expected results you want … for more information see the HELP

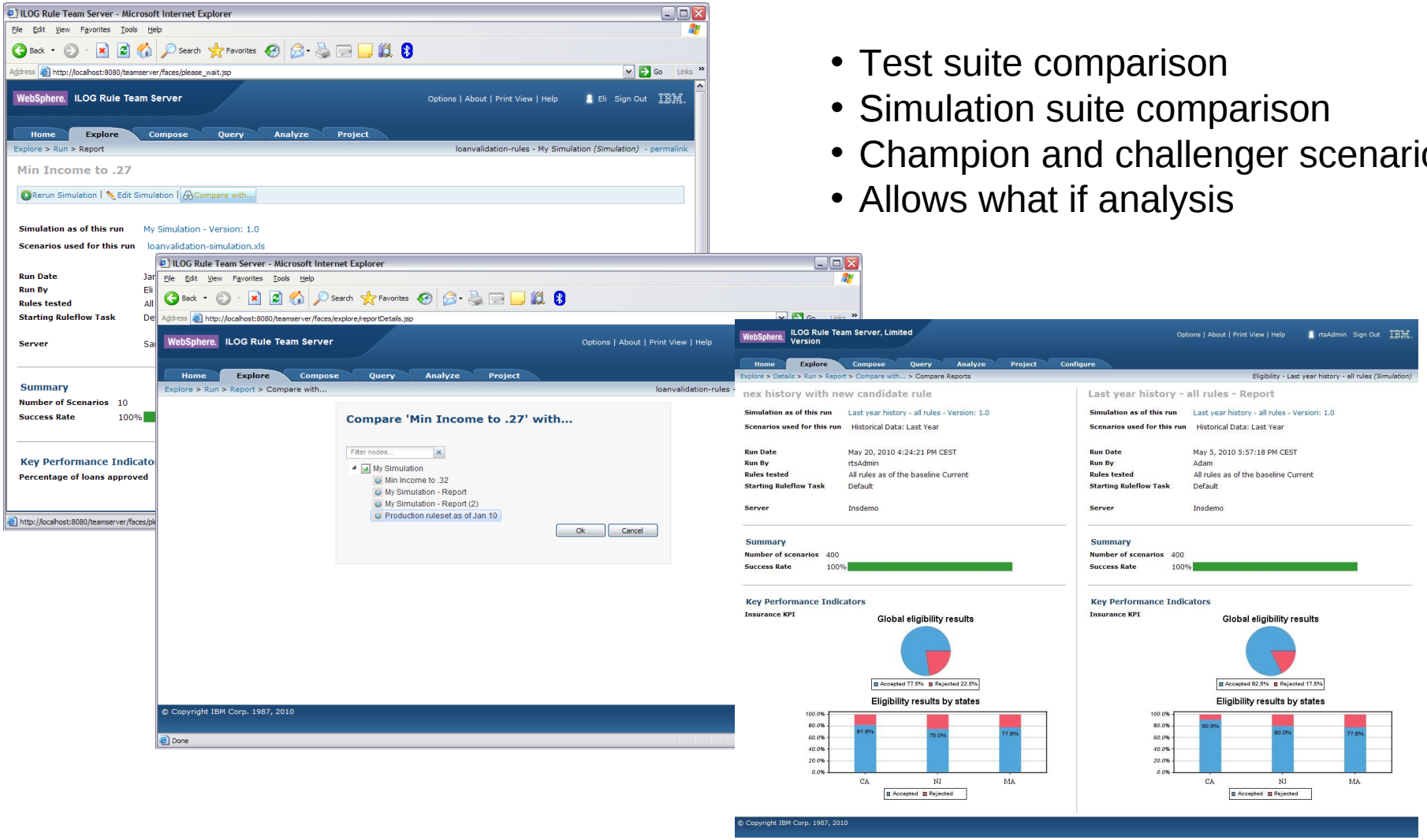
Scenario name	Number of ruleflow tasks e: is	Number of rules fired: is
Scenario 1	4	15
Scenario 2	4	16
Scenario 3	4	14
Scenario 4	4	15
Scenario 5	3	5

Scenarios | Expected Results | Expected Processing Results | HELP

Rulset Tests

Simulation Capabilities

- Test suite comparison
- Simulation suite comparison
- Champion and challenger scenario
- Allows what if analysis



Today

Tomorrow

Side by side comparison

Rational Asset Analyzer
Rule Discovery

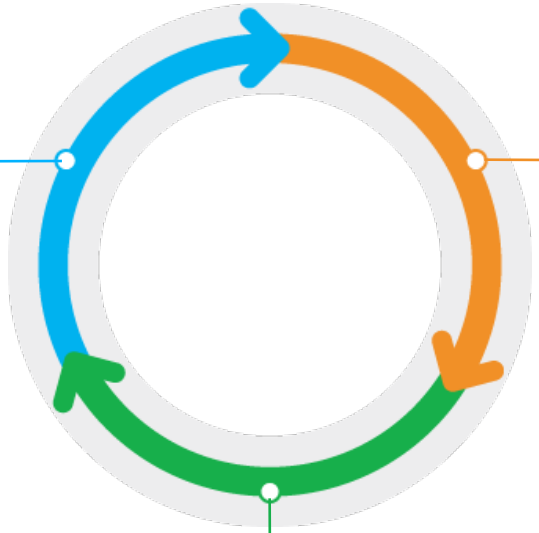
Rational Asset Analyzer and Rational Asset Analyzer for System z V6.0

Now integrates with WebSphere Operational Decision Management

Announce: Oct. 26 2010

Available: 7 Dec 2010

Business rule modernization



IDENTIFICATION

IBM Rational® Asset Analyzer

- What decisions
- Using which rules
- Where in the source

VALIDATION & MANAGEMENT

IBM ODM

- Align rules with business goals
- Manage business rules life cycle
- Test and validate rules

REMEDIATION

IBM Rational Developer for System z®

- Adjust the source to match the rule
- Extract the rule to a callable element
- Extract the rule to a rule server

Delivering…

The essentials for business rule mining of existing software assets enhancing the ability to capture, maintain and take advantage of application knowledge that can provide insight into an application's structure and its interactions with business data.

Business Rule Mining Capabilities

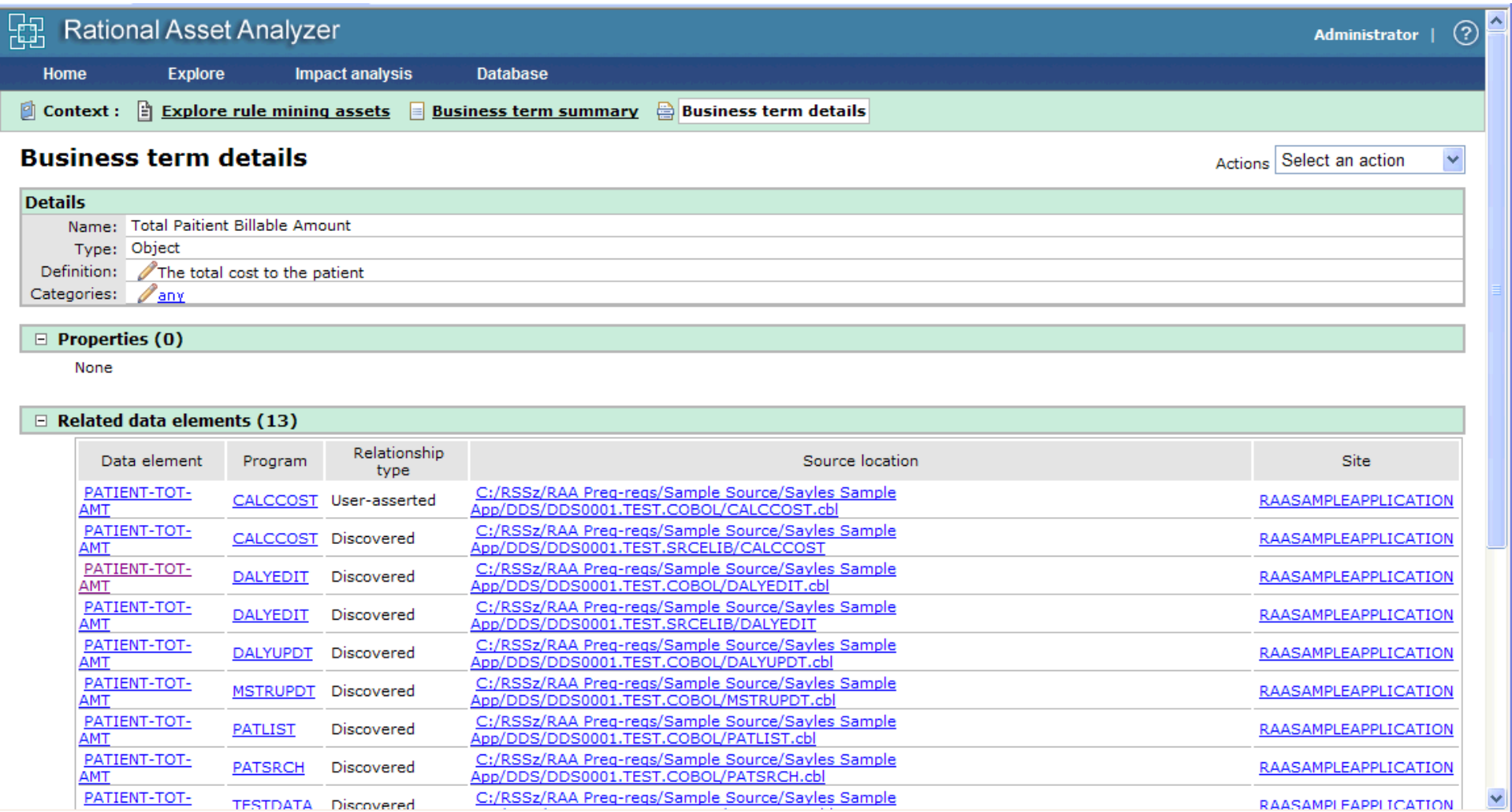
New functionality to assist clients in their business rule mining efforts

- Allows you to identify, capture and relate business rule assets to its existing set of IT assets.
- Introducing new asset types:
  - Business term (term)
  - Business term property (property)
  - Business rule (rule)
  - Business category (category)
  - Business process model (process model)
  - Business activity (activity)

- New dialogs, Source views and relationship detection
- Leveraging Web 2.0 technologies
- Import/Export function with WebSphere ILOG BRMS

Complete your sessions evaluation online at SHARE.org/AnaheimEval

Business Rule Modernization: Identification ...



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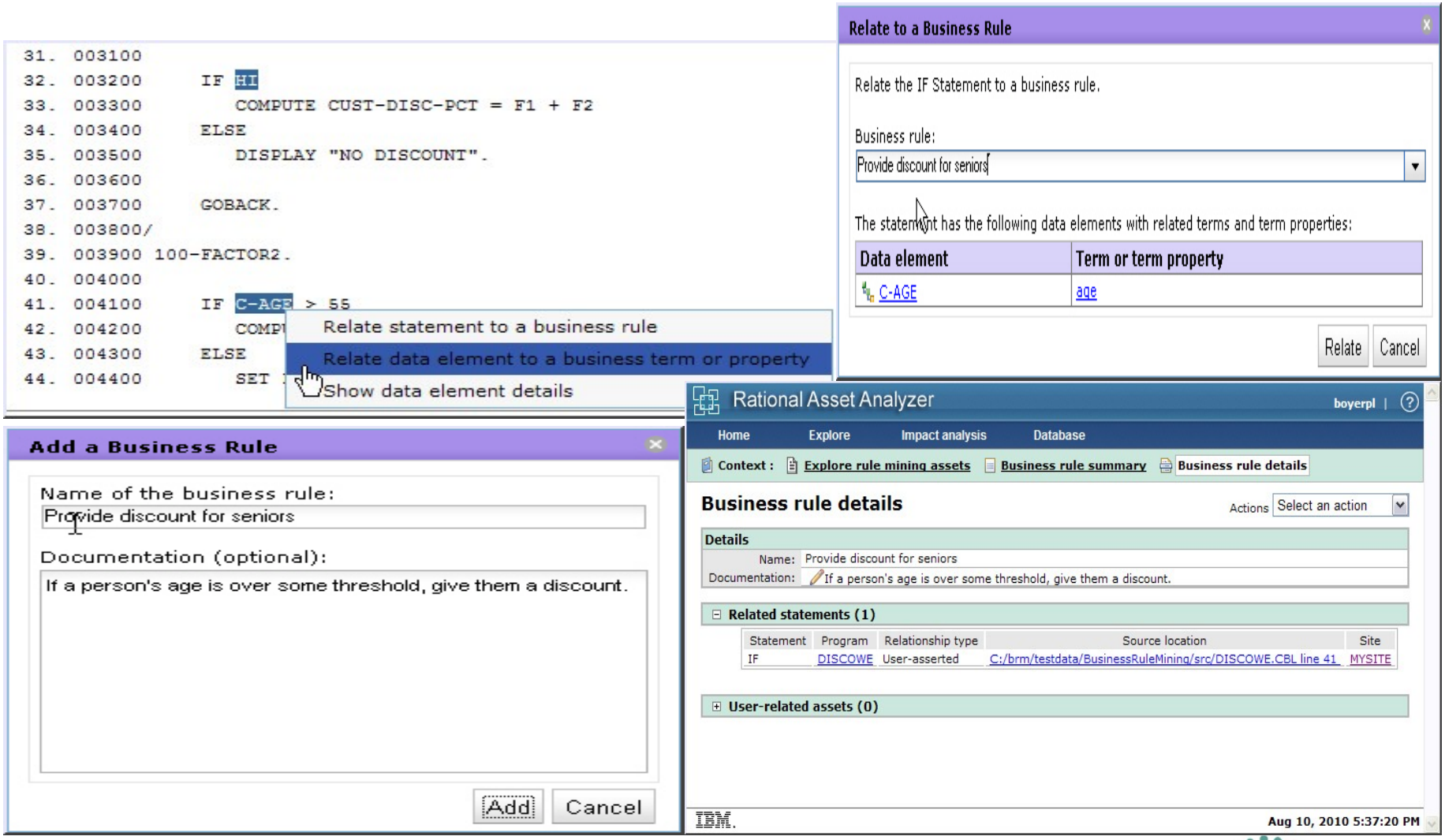
Business Rule Modernization: Identification ...



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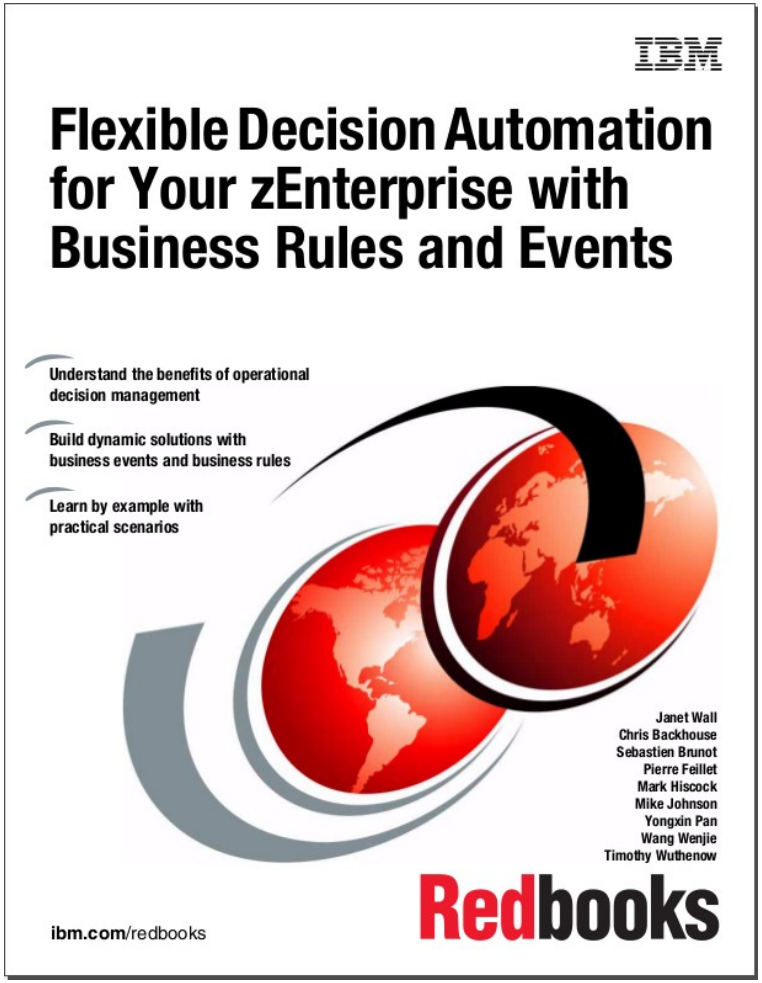
ODM for System z enables smart organizations to capitalize on modernization and innovation

- *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 decisions for the best changes and 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
- *Ability to manage and document business decisions executed in System z applications*
  - Ability to generate native COBOL from rules within the WODM Rule Designer
  - Authoring rules for COBOL in business terminology
  - Ability to share business rules with Java and other COBOL applications

IBM ODM for z/OS Redbook



http://www.redbooks.ibm.com/abstracts/sg248014.html

Thank You !

Any further questions?

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