Modernizing Mainframe Applications with Business Rules and Events

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SHARE
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2013

Key challenges addressed by Decision Management

*How can we ensure the **right** decision is being made at the right time?*

➔*Visibility*

*How can we **rapidly** respond to evolving market demands, competitive actions and regulatory requirements?*

...boration

*How can we ensure that business decisions are **managed** in a controlled environment?*

➔*Governance*

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Next Generation Business Rules

- Manage business policies at scale

- Operationalize enterprise intelligence
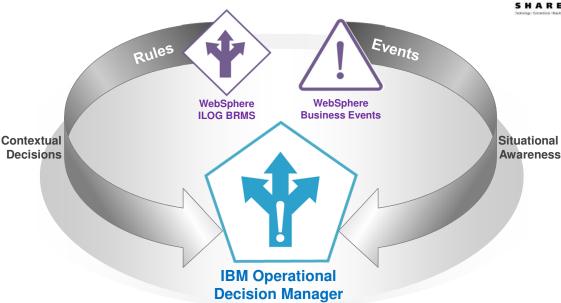
- Enable social collaboration to manage business change

Apply Operational Decision Management…

- To flexibly and reliably manage repeatable, automated decisions

- When decisions change frequently

- To increase straight-through-processing

- When decision services must be shared across systems

- To manage and govern large numbers of rules

- When real-time events require immediate actions

3

Introducing IBM Operational Decision Manager

Rules

Events

WebSphere
ILOG BRMS

WebSphere
Business Events

Contextual
Decisions

Situational
Awareness

IBM Operational
Decision Manager

Your business decisions.

Made by your business *experts*.   Delivered in *real-time* by technology.

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Rules vs Events

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 **ATM** withdraws from same **account** are done in the **same day** and the 2 **ATM** transactions are from 2 foreign countries
Then **Investigate possible fraud**

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 **customer** is not **primary card holder** and **age** is less than 21 then Freeze **account** and notify **primary card holder**

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

Event Pattern Detection

CICS Events
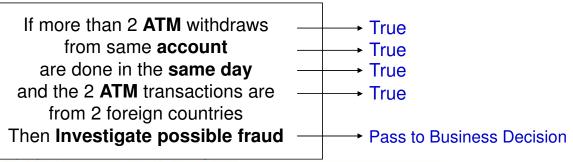
```
07:00 08/09/2012 ATM 0123 WITHDRAW $ 400.00   CANNES
07:09 08/09/2102 WEB 2405 TRANSFER $1000.00   USA
08:09 08/09/2102 TEL 2948 DEPOSIT  $ 269.00   USA
12:00 08/09/2102 ATM 0123 WITHDRAW $ 400.00   NICE
12:01 08/09/2102 WEB 9485 BILLPAY  $ 294.00   USA
13:04 08/09/2102 TEL 8204 WITHDRAW $2000.00   USA
14:10 08/09/2102 ATM 0123 WITHDRAW $ 500.00   MONACO
```
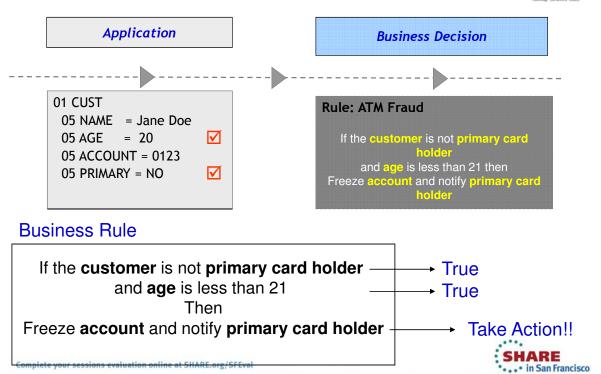
Event Pattern Match

Business Event Pattern

If more than 2 **ATM** withdraws — True
from same **account** — True
are done in the **same day** — True
and the 2 **ATM** transactions are — True
from 2 foreign countries
Then **Investigate possible fraud** — Pass to Business Decision
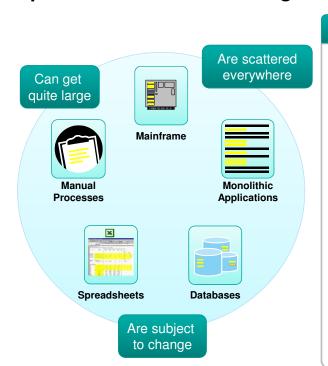
Event Driven Decision to Act

Application		Business Decision

```
01 CUST
   05 NAME   = Jane Doe
   05 AGE    = 20        ☑
   05 ACCOUNT = 0123
   05 PRIMARY = NO       ☑
```

Rule: ATM Fraud

If the **customer** is not **primary card holder**
and **age** is less than 21 then
Freeze **account** and notify **primary card holder**

Business Rule

If the **customer** is not **primary card holder** → True
and **age** is less than 21 → True
Then
Freeze **account** and notify **primary card holder** → Take Action!!

Operational Decisions In Organisations

Can get quite large

Are scattered everywhere

Mainframe

Manual Processes

Monolithic Applications

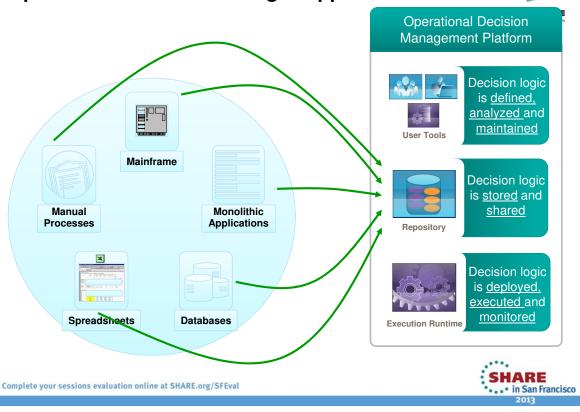**Spreadsheets**

Databases

Are subject to change

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 Manager Approach

Operational Decision Management Platform

User Tools

Decision logic is <u>defined, analyzed</u> and <u>maintained</u>

Repository

Decision logic is <u>stored</u> and <u>shared</u>

Execution Runtime

Decision logic is <u>deployed, executed</u> and <u>monitored</u>

Mainframe

Manual Processes

Monolithic Applications

Spreadsheets

Databases

Why modernize with ODM on z/OS & why now?

Benefits of the ODM Approach

Modernization issues to resolve

1. **Consolidation of COBOL application portfolio**

2. **Be able to react to changes requested by business in days, not months.**

3. **Sharing rules across platform**

4. **Running parallel**

✓ **Cost savings**
– More effective application development & maintenance with less business risk
– Consolidation/restructure of existing applications, saving hardware & resources
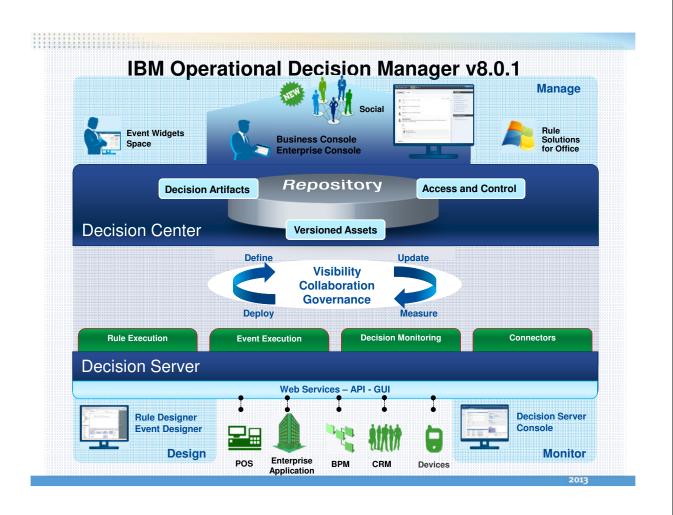– Rule testing and simulation to ensure accuracy of changes prior to deployment which will minimize re-work

✓ **Chang ratio of source inventory to development skills**
– Forcing need for formal processes with an on line electronic repository
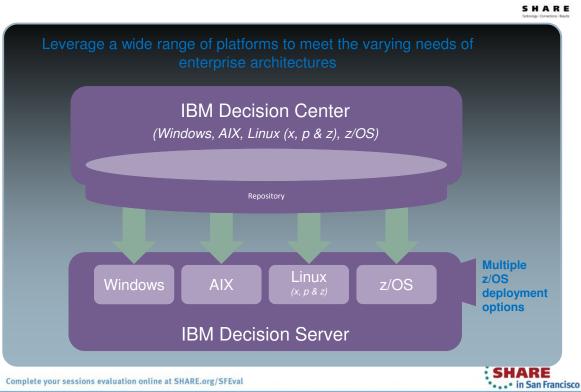
✓ **Improved agility**
– Decouple development and business decision change lifecycles
– New rules to enforce new business policies to multiple applications

✓ **Incremental rule modernization: applying technology and process to gain increased "decision making" agility**
– Gradually pull out decisions from existing applications
– Incremental approach does not require a "big bang" change
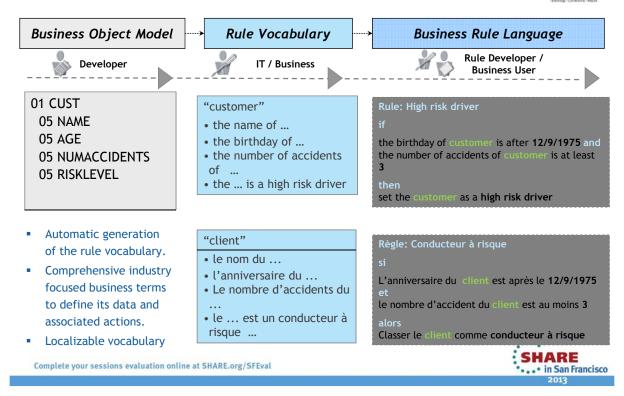– Manage business decisions in natural language

IBM Operational Decision Manager v8.0.1

Operational Decision Manager : Runtime Support

Leverage a wide range of platforms to meet the varying needs of enterprise architectures

IBM Decision Center
(Windows, AIX, Linux (x, p & z), z/OS)

Repository

Windows | AIX | Linux *(x, p & z)* | z/OS

Multiple z/OS deployment options

IBM Decision Server

Complete your sessions evaluation online at SHARE.org/SFEval

ODM Brings the IT and Business World together

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
```

"customer"
- the name of ...
- the birthday of ...
- the number of accidents of ...
- the ... is a high risk driver

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**

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

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

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 & Event Designer

- ## Eclipse-based Development Environment

  - Rule Designer Perspective
  - Event Designer Perspective
  - Integrated support for COBOL

Decision Tables

Actions

	Grade	Amount of loan		Insurance required	Insurance rate
		Min	Max		
0			< 100,000	false	⊘
1	A	100,000	300,000	true	0.001
2		300,000	600,000	true	0.003
3			≥ 600,000	true	0.005
			< 100,000	false	⊘
	B	100,000	300,001	true	0.0025
		300,000	600,000	true	0.005
7			≥ 600,000	true	0.0075
8			< 100,000	true	0.0035
9	C	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

Built-in Gap/Overlap checking

Automatic Rule generation

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 ;

Rule Authoring: Visual Decision Flow

- ⊞ carrental-xom
- ⊞ loanvalidation-application
- ⊟ loanvalidation-rules
  - ⊟ rules
    - ⊟ computation
      - bankruptcyScore
      - initialCorporateScore
      - neverBankruptcy
      - rate
      - repayment
      - salary2score
    - ⊟ eligbility
      - approval
      - checkCreditScor
      - checkIncome
      - grade
    - ⊟ insurance
      - defaultInsurance
      - insurance
    - ⊞ validation
    - ⊞ ilrmain(Object)
    - loanvalidation

Function Task

Rule Task

Flow Conditions

Pre/Post Conditions

Decision Center: Console for Rule Maintenance

- Access decision artifacts concurrently without conflict or delay

- Represent complex policies using rule overrides and hierarchies

- 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

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Decision Center *Enterprise* Console   Decision Center *Business* Console

| Decision Artifacts | Versioning | Access and Control |

Repository

Enterprise Console (current) functionality for advanced business analysts and administrators to fully develop, manage and govern decisions
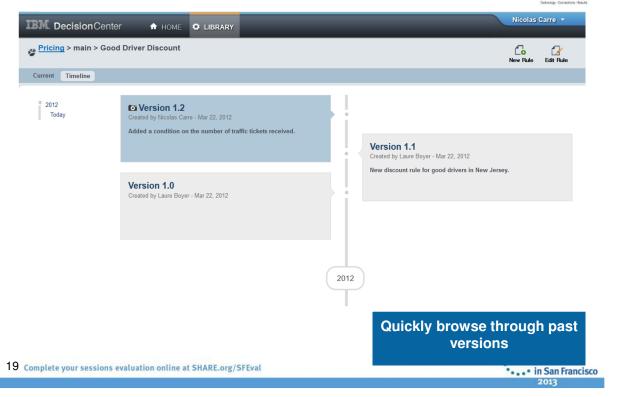
Business Console (new) functionality for business experts to manage & govern lifecycle of decisions

Track Versions through Timeline

Quickly browse through past versions
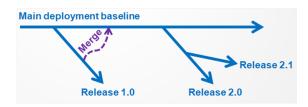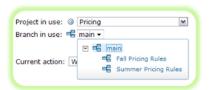
Multiple Release Management

Greater flexibility for deploying business decisions

- **Enable business users** to make changes to a deployed rule application without interfering with work they are doing on an upcoming release

- **Merge and diff** between releases
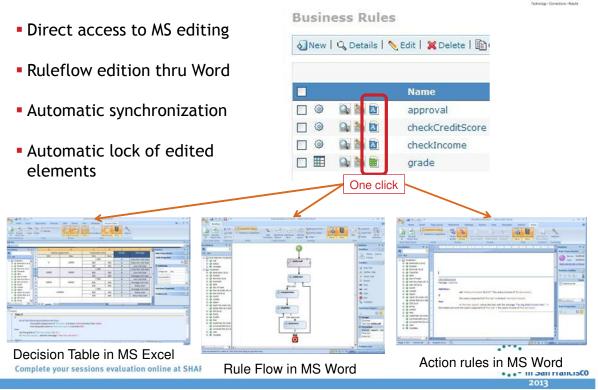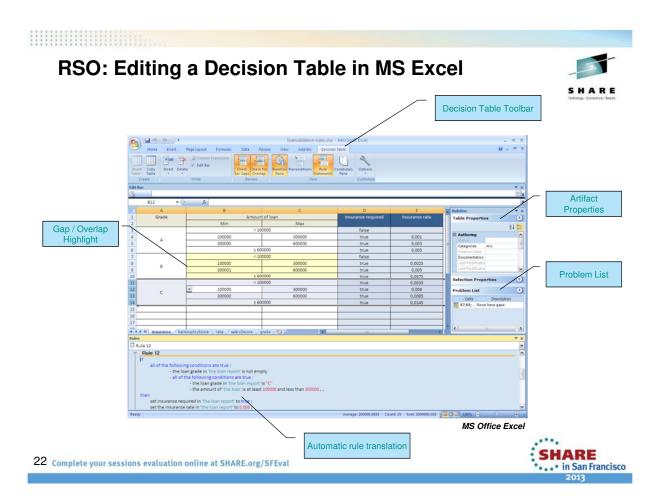
Easily implement changes in distinct versions and better control how to merge them across different releases
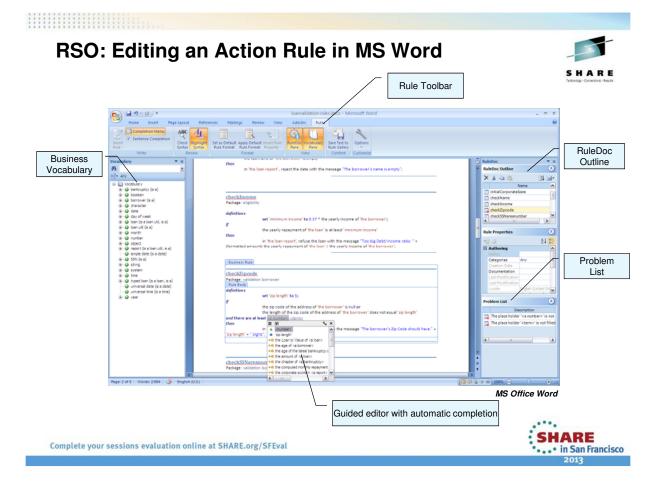
Extended Rule Authoring Experience

- Direct access to MS editing

- Ruleflow edition thru Word

- Automatic synchronization

- Automatic lock of edited elements

One click

Decision Table in MS Excel

Rule Flow in MS Word

Action rules in MS Word

RSO: Editing a Decision Table in MS Excel

Decision Table Toolbar

Artifact Properties

Gap / Overlap Highlight

Problem List

Automatic rule translation

MS Office Excel

RSO: Editing an Action Rule in MS Word

Rule Toolbar

Business Vocabulary

RuleDoc Outline

Problem List

MS Office Word

Guided editor with automatic completion

Testing and Simulation

- The feature formally know as Decision Validation Services

- Functionality Overview

  - Out-of-the-box ruleset testing in Decision Center

  - Business impact simulation in Decision Center

  - Scenario configuration and customization in Rule Studio

  - Audit - Decision Warehouse in Rule Execution Server

Test Suite Results in Decision Center

Detailed Scenario Reports
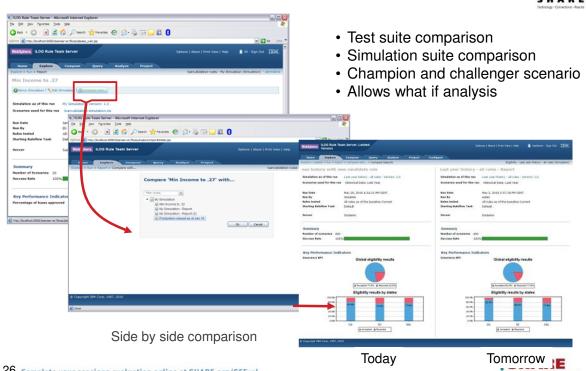
Simulation Capabilities

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

Side by side comparison

Today   Tomorrow

The Lustratus BRMS Maturity Model

Rules Based Enterprise
- Full enterprise operations based on cross domain shared rules
- Rules based compliance management, audit & governance

Business Driven
- Business units create and manage rules
- Optionally, IT still controls deployment

Direct Business Interaction
- IT builds rules but business units can edit them as necessary

Development / Business Collaboration
- IT shares and discusses rules with business units

Development Efficiency
- IT Drive rule usage, to make maintenance quicker and easier

http://www.lustratusresearch.com/store/product/Using-business-rules-with-CICS-for-greater-flexibi,215,0.aspx

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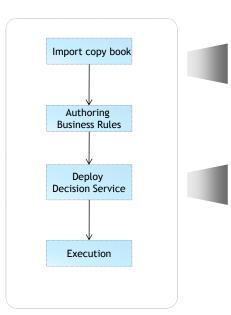
Rules on z/OS

Starting from a COBOL copybook

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

Benefits
- Modernize business policies in BRMS
- Rules can be invoked 'naturally' from existing application
- Business policy/rule lifecycle detached from application lifecycle

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Rule Authoring COBOL Copybook XOM
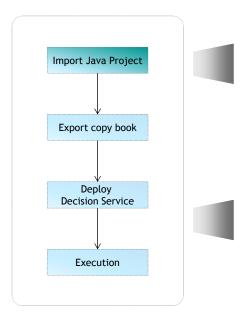
- Support Enterprise COBOL 3.4, 4.1 & 4.2
- A Java is created from the copybook structure
  - Java XOM & Java code to marshal between COBOL <-> Java
  - 01 level structures mapped to class in BOM
- Redefines statements supported
  - Select which redefines structure to import
- COBOL Table support
  - 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 With an Existing Java Project

Import Java Project

↓

Export copy book

↓

Deploy
Decision Service

↓

Execution

Scenario
- Existing Rule projects exist that are currently in use on distributed platforms
- Concurrent execution of rules required on System z

Benefits
- Consistent decision rules where ever executed
- Rules can be invoked 'naturally' from existing applications on all platforms
- Enables central rule management across System z and distributed execution
- Business policy/rule lifecycle detached from application lifecycle
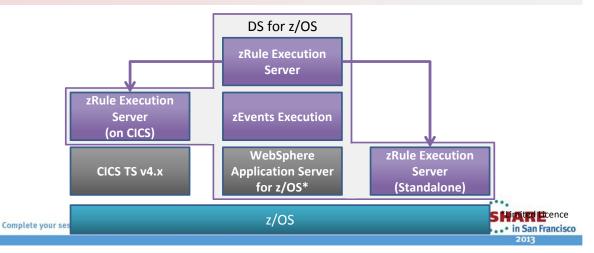
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Decision Server Runtime Options
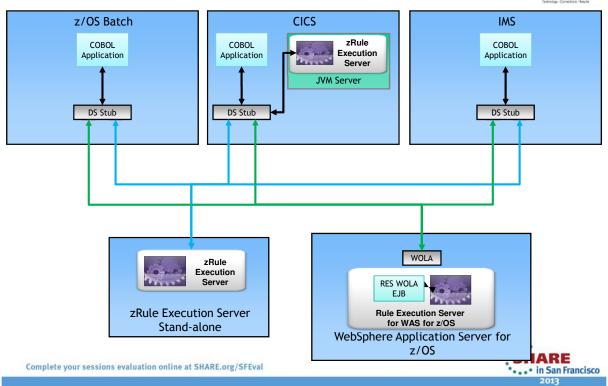
- Decisions can be invoked from existing CICS, batch and IMS applications

- 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 JVMServer environment

DS for z/OS

zRule Execution Server

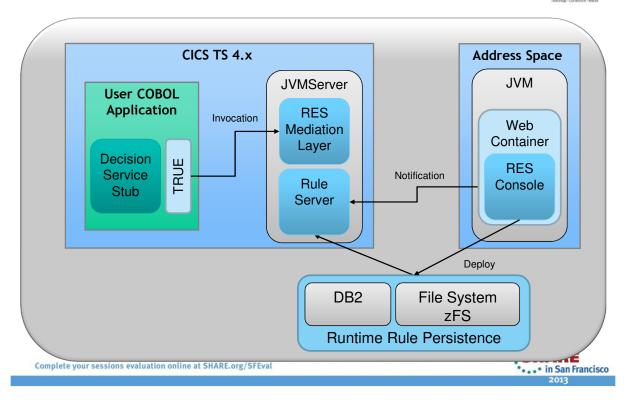zRule Execution Server (on CICS)

zEvents Execution

zRule Execution Server (Standalone)

CICS TS v4.x

WebSphere Application Server for z/OS*

z/OS

Decision Invocation Options on z/OS

z/OS Batch

COBOL Application

DS Stub

CICS

COBOL Application

zRule Execution Server

JVM Server

DS Stub

IMS

COBOL Application

DS Stub

zRule Execution Server Stand-alone

WOLA

RES WOLA EJB

Rule Execution Server for WAS for z/OS

WebSphere Application Server for z/OS

zRule Execution Server – Stand Alone

Address Space

JVM

User COBOL Application

Invocation

Native Control & Comms

Rule Server

Notification

Decision Service Stub

CICS
Batch
IMS Batch

Address Space

JVM

Web Container

RES Console

Deploy

DB2

File System zFS

Runtime Rule Persistence

zRule Execution Server for z/OS – CICS 4.x & 5.1

CICS TS 4.x

User COBOL Application

Decision Service Stub

TRUE

Invocation

JVMServer

RES Mediation Layer

Rule Server

Address Space

JVM

Web Container

RES Console

Notification

Deploy

DB2

File System zFS

Runtime Rule Persistence

in San Francisco
2013

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zRule Execution Server for z/OS for WAS on z/OS

WAS for z/OS

User COBOL Application

Decision Service Stub

WOLA

Invocation

WOLA

JVM

RES WOLA EJB

Rule Server

JVM

RES Console

Notification

DB2

File System zFS

Runtime Rule Persistence

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zRES New Programming API

* Connect to Execution Region
call 'HBRCONN'
  using HBRA-CONN-AREA

* Populate Header with parameter data

* Connect to Execution Server
call 'HBRRULE'
  using HBRA-CONN-AREA
IF HBRA-CONN-COMPLETION-CODE = HBR-CC-OK
 THEN
  . . .

* Disconnect from Execution Region
call 'HBRDISC'
  using HBRA-CONN-AREA

```
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).
```

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zRES API Within a Program

Decision Server Options Summary

✓ Since v7.5
✓ New in v 8.0
✓ New in v 8.0.1

	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 JVMServer environment	COBOL Generation Rules
Full support for all rule authoring constructs	✓	✓	✓	
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	✓		✓	

2013

Business Rule Execution

System z

CICS — Business Rules / Service — zRES — COBOL Application

IMS — COBOL Application

z/OS Batch — COBOL Application

Business Rules / Service — zRES

RES on WAS for z/OS — Business Rules / Service

z/OS

Architect, Application Developer

Rule Designer + COBOL Management
Workstation

Business Analyst, Business Manager

Decision Center + COBOL Management
Decision Center Repository
Distributed or z

Deploy

2013

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 though Business events and rules
- *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
- *Ability to manage and document business decisions executed in System z applications*
  - Authoring rules for COBOL applications in business terminology
  - Ability to share business rules with Java and other COBOL applications
  - Integrate seamlessly with existing COBOL applications

Where can I find out more this week?

- 12503: Modern environment for z/OS development
  Today 4:30pm Golden Gate 4

- 12446: CICS and Java: How the JVM Server Transforms Java in CICS
  Thursday 1:30 Grand Ballroom B

- 12177: Modernizing CICS - Hands on Lab
  Thursday 4:30 Union Square 23-24

Where can I find out more?

- http://www.ibm.com/operational-decision-management
  - Shortcut: http://ibm.com/ibmodm
  - IBM Operational Decision Manager for z/OS

- White papers & tech docs
  - WebSphere z/OS – The Value of Co-Location
  - Brief introduction to WebSphere Optimized Local Adapters
  - WebSphere for System z Prescriptive Use Cases (Oct. 28, 2011 Addendum)

- Redbooks
  - Flexible Decision Automation for Your zEnterprise with Business Rules and Events
  - Batch Modernization on z/OS
  - Patterns: Integrating WebSphere ILOG JRules with IBM Software

- IBM Operational Decision Management YouTube demo

- Top 10 Business Use Cases for Operational Decision Management

- Good Decision! Decision Management blog

System z Social Media Channels

- **Top Facebook pages related to System z:**
  - **IBM System z**
  - **IBM Academic Initiative System z**
  - **IBM Master the Mainframe Contest**
  - **IBM Destination z**
  - **Millennial Mainframer**
  - **IBM Smarter Computing**

- **Top LinkedIn groups related to System z:**
  - **System z Advocates**
  - **SAP on System z**
  - **IBM Mainframe- Unofficial Group**
  - **IBM System z Events**
  - **Mainframe Experts Network**
  - **System z Linux**
  - **Enterprise Systems**
  - **Mainframe Security Gurus**

- **Twitter profiles related to System z:**
  - **IBM System z**
  - **IBM System z Events**
  - **IBM DB2 on System z**
  - **Millennial Mainframer**
  - **Destination z**
  - **IBM Smarter Computing**

- **YouTube accounts related to System z:**
  - **IBM System z**
  - **Destination z**
  - **IBM Smarter Computing**

- **Top System z blogs to check out:**
  - **Mainframe Insights**
  - **Smarter Computing**
  - **Millennial Mainframer**
  - **Mainframe & Hybrid Computing**
  - **The Mainframe Blog**
  - **Mainframe Watch Belgium**
  - **Mainframe Update**
  - **Enterprise Systems Media Blog**
  - **Dancing Dinosaur**
  - **DB2 for z/OS**
  - **IBM Destination z**
  - **DB2utor**