Enterprise Application Modernization and Business Process Modeling

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Topics

- Business Process Modeling
  - Terminology
  - Implementation - IBM BPM components

- IMS as part of an Integrated Process Flow

- IBM ODM and business rules

- Expanding IMS – Creating an Internal Control Flow

Business Process Terminology ...

- Business Process

    - A set of activities that accomplish a specific organizational goal

        - Comprised of service components that are architected for reuse and flexible integration
            - Including business elements, human tasks, and business rules

        - Defines the orchestration of the process components
            - And transformation of information from one form to another

    http://www.redbooks.ibm.com/redbooks/pdfs/sg248175.pdf

Business Process Terminology …
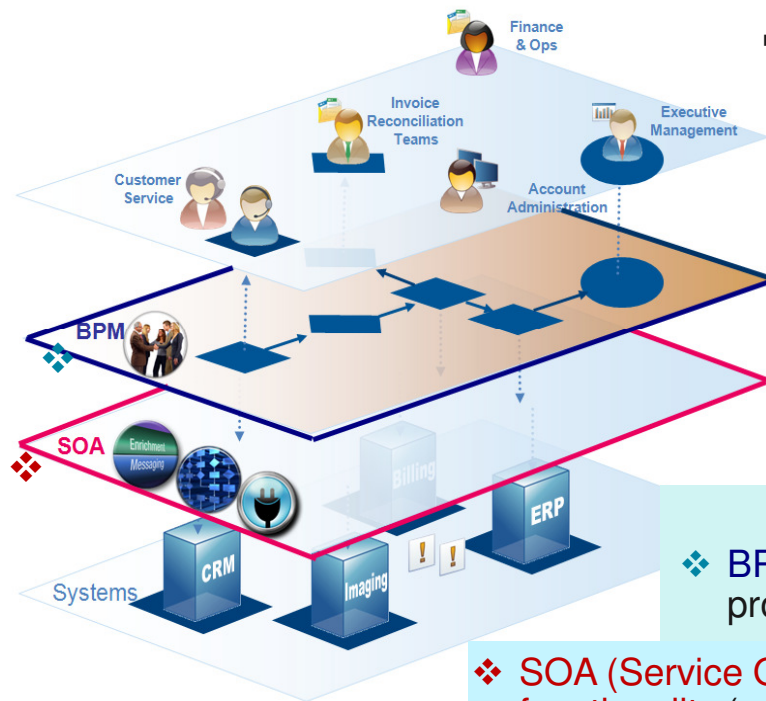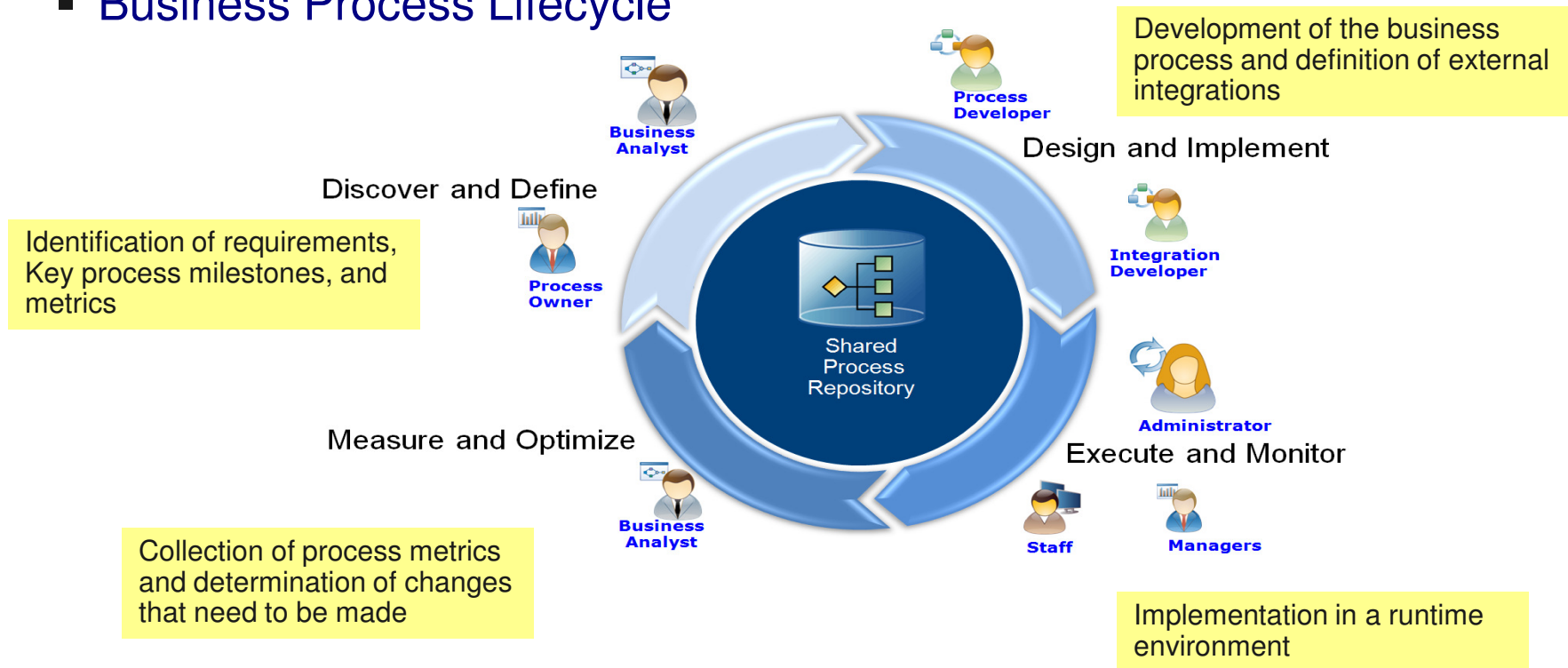
Business Process Management (BPM)

- A discipline that enables organizations to be more efficient, effective, and capable of change while managing time and costs

  - Identifies processes that are strategic assets
  - Defines and improves end-to-end visibility
  - Provides control for the entire business process including those that span humans and IT systems

❖ BPM focuses on flow of business functionality (people, process, technology, and data)

❖ SOA (Service Oriented Architecture) focuses on technical functionality (activities, events, documents, and data)

Business Process Concepts

- ## Business Process Lifecycle

Development of the business process and definition of external integrations

Design and Implement

Discover and Define

Identification of requirements, Key process milestones, and metrics

Shared Process Repository

Measure and Optimize

Execute and Monitor

Collection of process metrics and determination of changes that need to be made

Implementation in a runtime environment

Business Analyst

Process Developer

Process Owner

Integration Developer

Administrator

Business Analyst

Staff

Managers

Business Process Concepts …

Business Process orchestration **Versus** **Business Process choreography**

– Common approach that is used to define the sequence of steps within a process and a corresponding central controller to implement the sequence

- Defines a single master control of all aspects of a process (top-down approach)
- Is usually simpler to start with; but often harder to scale to more complex processes
- describes a process flow between services from the perspective of one participant (centralized control),

– Alternative to orchestration that supports complex processes with many interacting parts, as well as event-based or agent-based systems

- The overall process behavior "emerges" from the working of its parts (bottom up)
- Is usually more difficult to start, but easier to scale to complex processes
- tracks a sequence of messages involving multiple parties (decentralized control) where no one party truly owns the conversation

http://www.bptrends.com/publicationfiles/04-08-COL-BPMandSOA-OrchestrationorChoreography-%200804-Rosen%20v01%20_MR_final.doc.pdf

Business Process Concepts …

- Modeling a Business Process includes:

  - Defining the steps of the business process
    - Determining the participation required from people or systems at any point in the process
      - Identifying integration requirements

  - Creation of a process map
    - Definition/visualization of the business process steps
      - Some steps might require human interaction
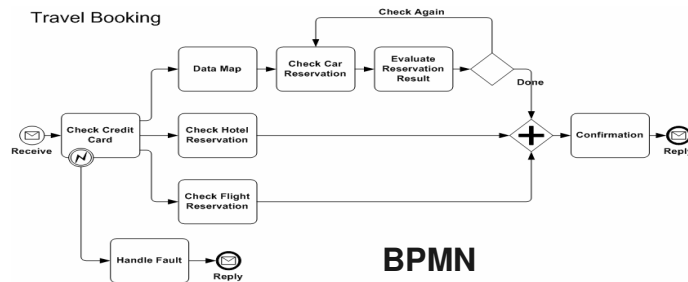   - » Others might be more systems or application oriented

Business Process Terminology …

- Standards for defining the process

  - **BPMN** (Business process modeling notation) defines the visual representation of the sequence
    - Easily understandable
    - Created by business analysts

  - **BPEL** (business process execution language) is the 'code' that executes the sequence, i.e.,) as
    - Used by IT specialists to translate a BPMN model to executable form

BPMN

```
<assign name="DataMap1" wpc:displayName="DataMap1" wpc:id="20">
<target linkName="link1"/>
<source linkName="link2"/>
<copy>
<from part="cardNumber" variable="input"/>
<to part="cardNumber" variable="checkCreditCardRequest"/>
</copy>
<copy>
<from part="cardType" variable="input"/>
<to part="cardType" variable="checkCreditCardRequest"/>
</copy>
</assign>
<invoke inputVariable="checkCreditCardRequest" name="checkCreditCard"
operation="doCreditCardChecking"
outputVariable="checkCreditCardResponse" partnerLink="CreditCardCheckingService"
portType="wsdl4:CreditCardCheckingServiceImpl" wpc:displayName="Check Credit Card" wpc:id="5">
<target linkName="link2"/>
<source linkName="link3"/>
<source linkName="link6"/>
<source linkName="link9"/>
</invoke>
```

BPEL

IBM Business Process Management

- IBM provides a governance framework
  - Implemented with a suite of products that includes tooling and run time for process design, execution, monitoring, and optimization (mix/match as needed)

    - IBM Blueworks Live - cloud-based BPM tool
      - Enables collaboration and process automation
    - ✓ **IBM Business Process Manager** - BPM platform
      - Provides visibility and insight to manage business processes
    - IBM Business Monitor
      - Provides end-to-end business process and activity monitoring along with dashboards representing insight that can be used in process optimization
    - ✓ **IBM Operational Decision Manager (ODM)**
      - Integrates business events and business rules to automate decisions across processes and applications
    - IBM Case Manager
      - Unites information, processes and people to provide a 360 degree view of case information and achieve optimized outcomes
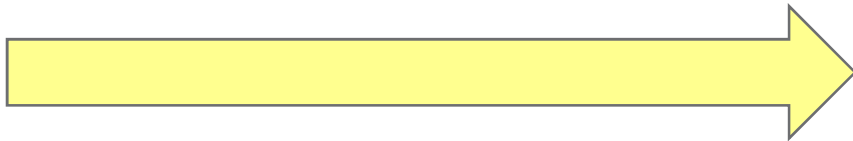
✓ Interfaces with IMS

IBM Business Process Manager
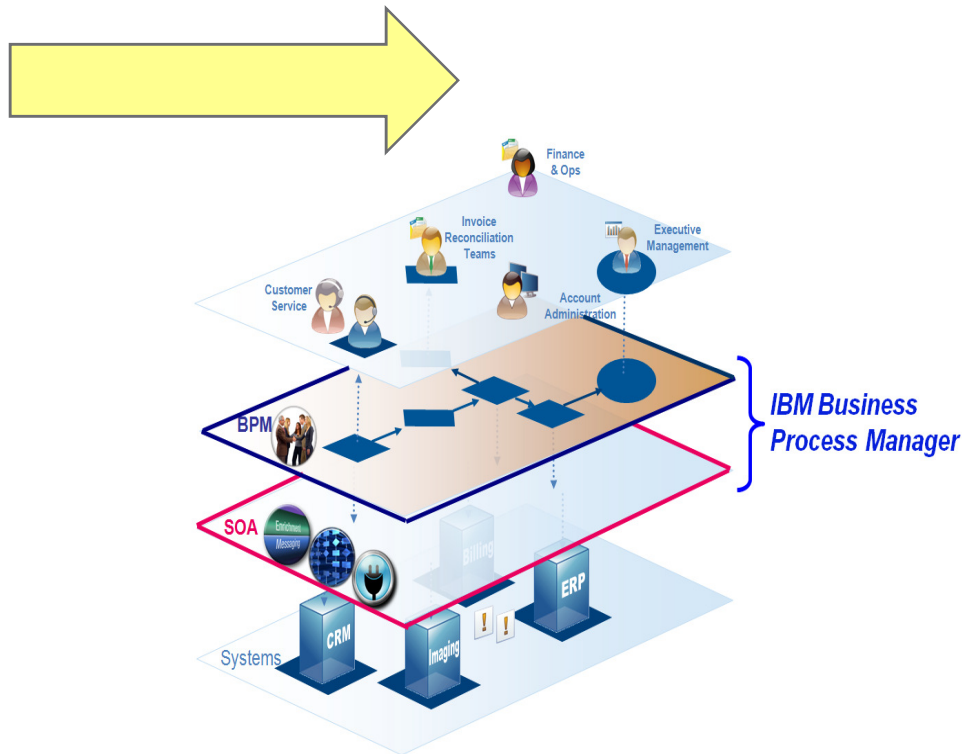
Provides a platform that helps process participants gain enterprise-wide visibility of business processes

Allows changes to be made quickly by those who know the processes best

http://www.redbooks.ibm.com/redbooks/SG248175/wwhelp/wwhimpl/js/html/wwhelp.htm

IBM Business Process Manager

- Provides
  - A repository (**Process Center**)
    - Stores and develop IBM BPM artifacts

  - Authoring tools (Blueworks Live, Process Designer, Integration Developer)
    - Allow process developers to develop and test processes

  - Runtime environments (**Process Server**)
    - Support the deployment of processes
      - Provides the infrastructure to execute business processes including an application server

  - Administration and monitoring tools
    - Administer and monitor the business processes
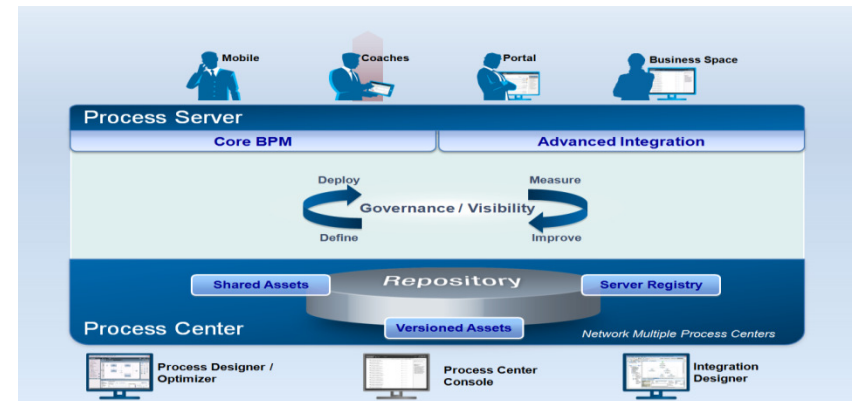
- Value

  - Allows improvements to be made quickly by those who understand the business processes

  - Encourages collaboration

  - Supports strong governance of process change.

IBM Business Process Manager

- Authoring tools

  - *Blueworks live* - process modeling tool available in the IBM Cloud

  - *Process Designer* - provides the capability to model and implement business processes as process applications
    - Uses BPMN specification to create a BPD (business process definition)

  - *Integration Designer*
    - Authors complex integrations and fully automated processes that support process applications designed in the Process Designer
    - Supports development of BPEL processes
    - Builds reusable SOA services, orchestrates the services, and integrates with back-end systems
      - There are various types of services and service-related functions
        » E.g., adapter-based services - Services that make enterprise data from large back end system
   » IBM resource adapters include: CICS ECI resource adapter, IMS TM Resource Adapter, WOLA Adapter

Business Process Definition

A *lane* is the container for all the activities associated with a specific group of users or system

- Lane name is specified during the BPD creation
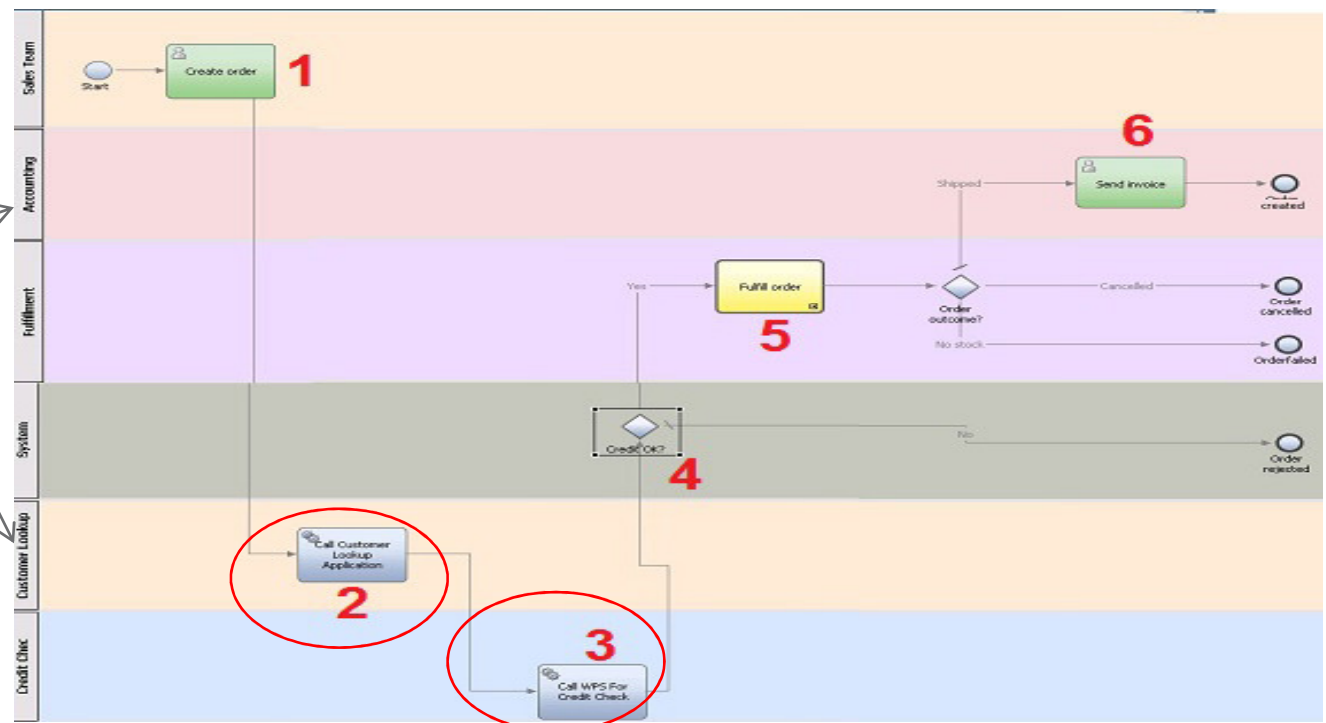
Define the resources that need to be accessed

http://www.ibm.com/developerworks/bpm/library/techarticles/1404_venn/1404_venn.html
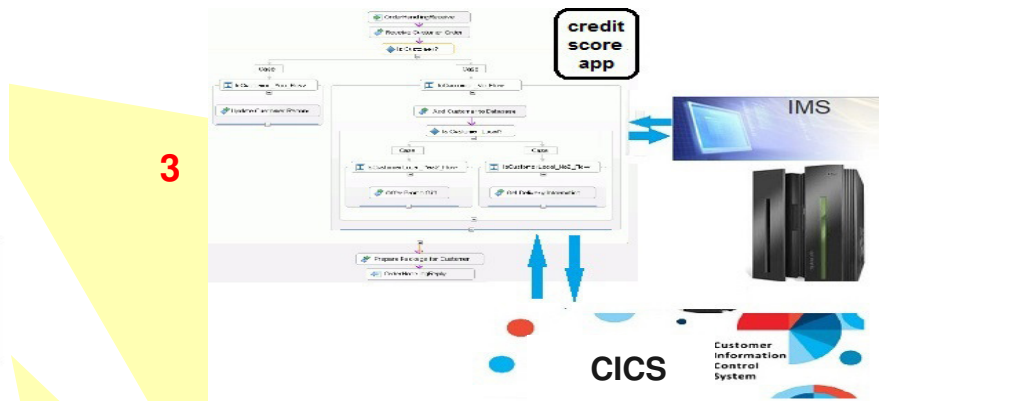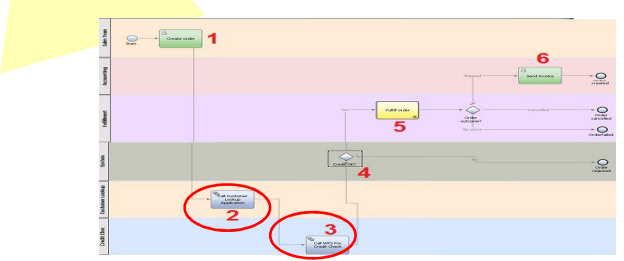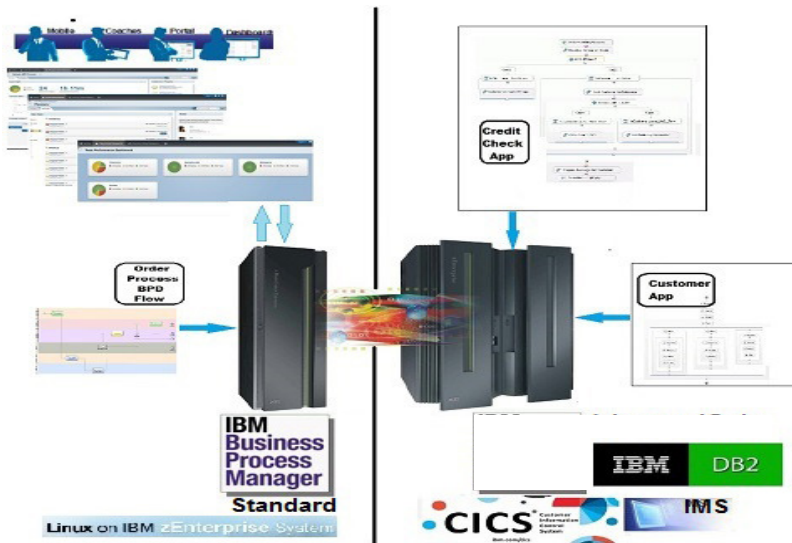
3

The automated credit check is another BPEL application that interfaces with CICS and IMS to retrieve the customer's historical data. This application is invoked from the BPD flow
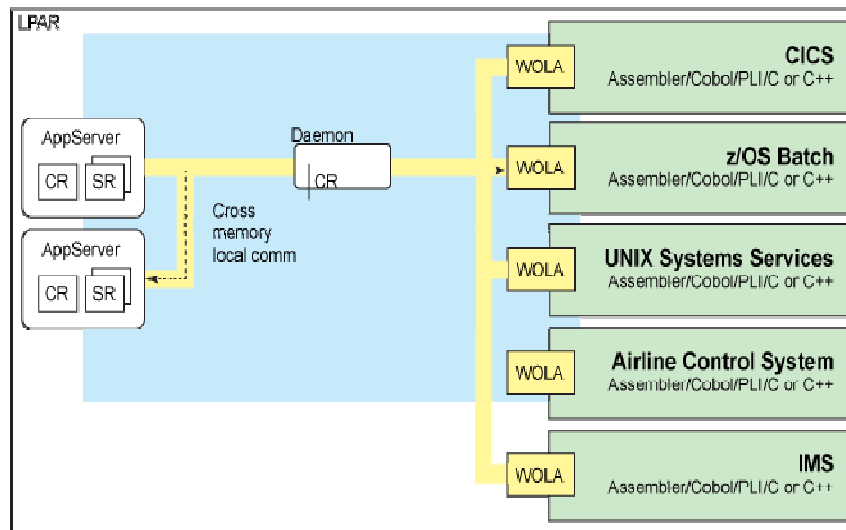
2

The customer details are stored in a DB2 database. A BPEL application developed in IBM Integration Designer retrieves the customer details from the database. This application is invoked from the BPD flow

WebSphere Optimized Local Adapters (WOLA)

WebSphere optimized local adapters (WOLA): a cross-memory mechanism for inbound and outbound calls for WebSphere Application Server on z/OS.

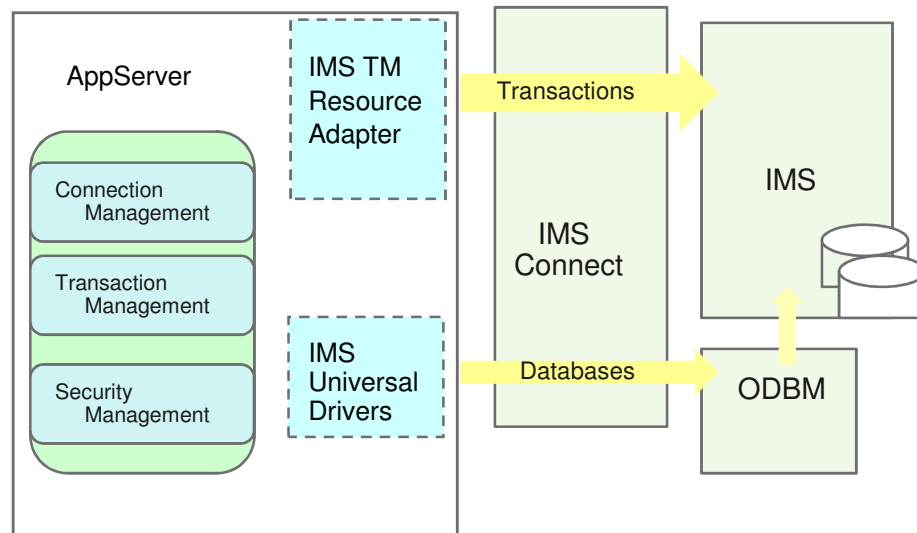**Provided with WebSphere Application Server**

Accessing IMS – WOLA

- WAS to IMS transactions
  - Uses the OTMA CI
  - Or, uses the WOLA APIs

- IMS to WAS uses WOLA APIs and ESAF

http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101490
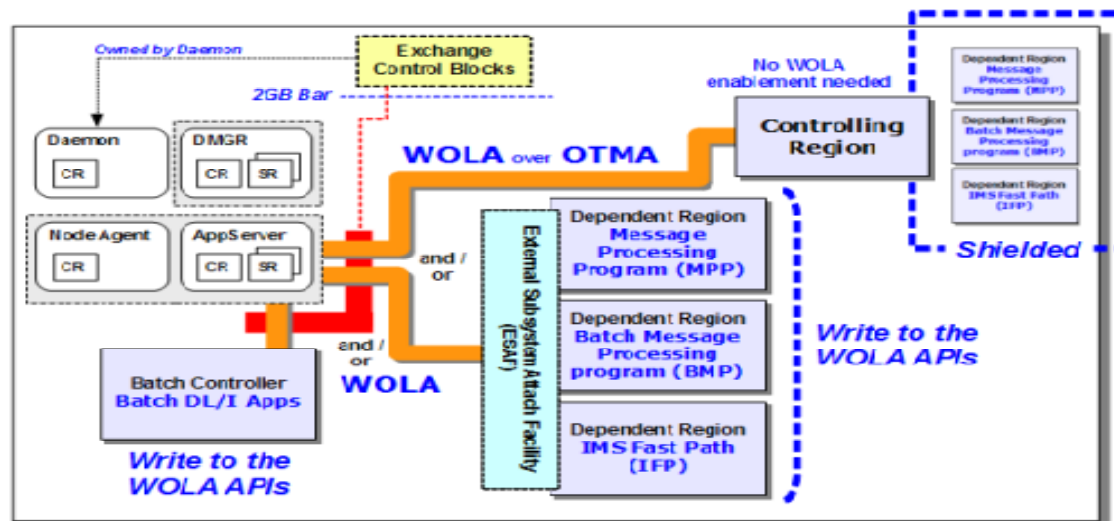
Alternatively: Accessing IMS

The IMS TM Resource Adapter (IMS TMRA) implements the JCA 1.5 connection architecture. It supports access to IMS transaction including IMS MFS services in business processes and IMS conversational transactions through Business process choreography.
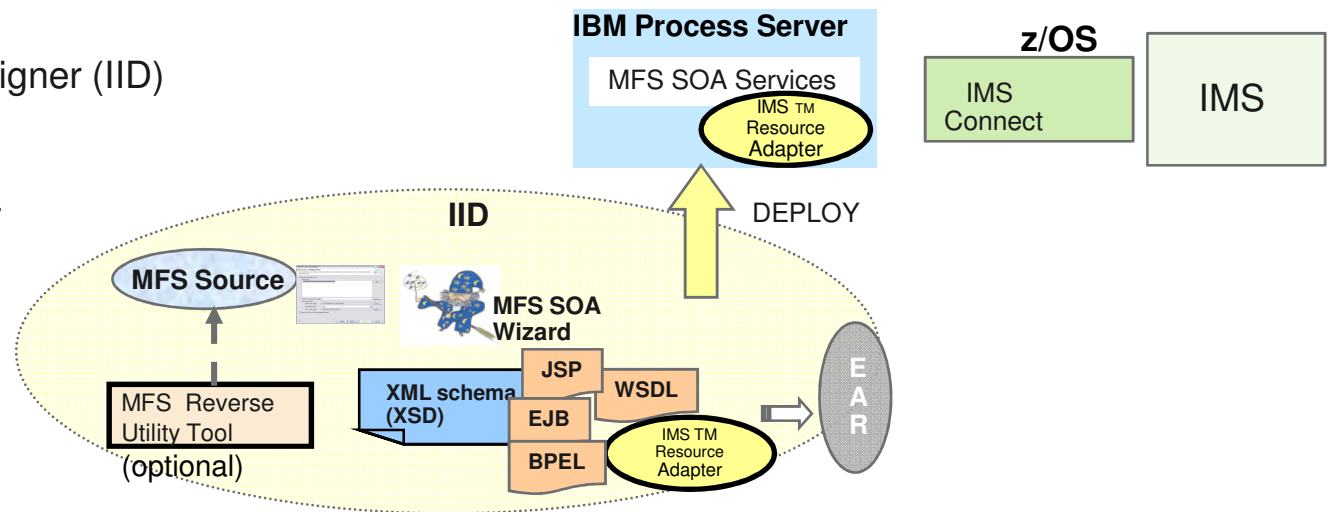
Additionally, IMS universal drivers support direct access (DRDA) requests to IMS databases.

Provided by IMS

Accessing IMS – IMS TMRA

▪ MFS transaction support for Business Process Choreography

  – Supports the transformation of existing MFS-based IMS applications into MFS SCA service which can then be integrated into a BPEL process
    ▪ Flexible and adaptable elements

  – Tooling
    ▪ IBM Integration Designer (IID)

  – Deployment
    ▪ IBM Process Server

IBM Process Server

MFS SOA Services

IMS TM Resource Adapter

z/OS

IMS Connect

IMS

DEPLOY

IID

MFS Source

MFS SOA Wizard

MFS Reverse Utility Tool
(optional)

XML schema (XSD)

JSP

EJB

BPEL

WSDL

IMS TM Resource Adapter

E A R

http://www-01.ibm.com/support/knowledgecenter/SSEPH2_13.1.0/com.ibm.etools.mfssoa.doc/topics/mfs_busprocessterms.htm?lang=en
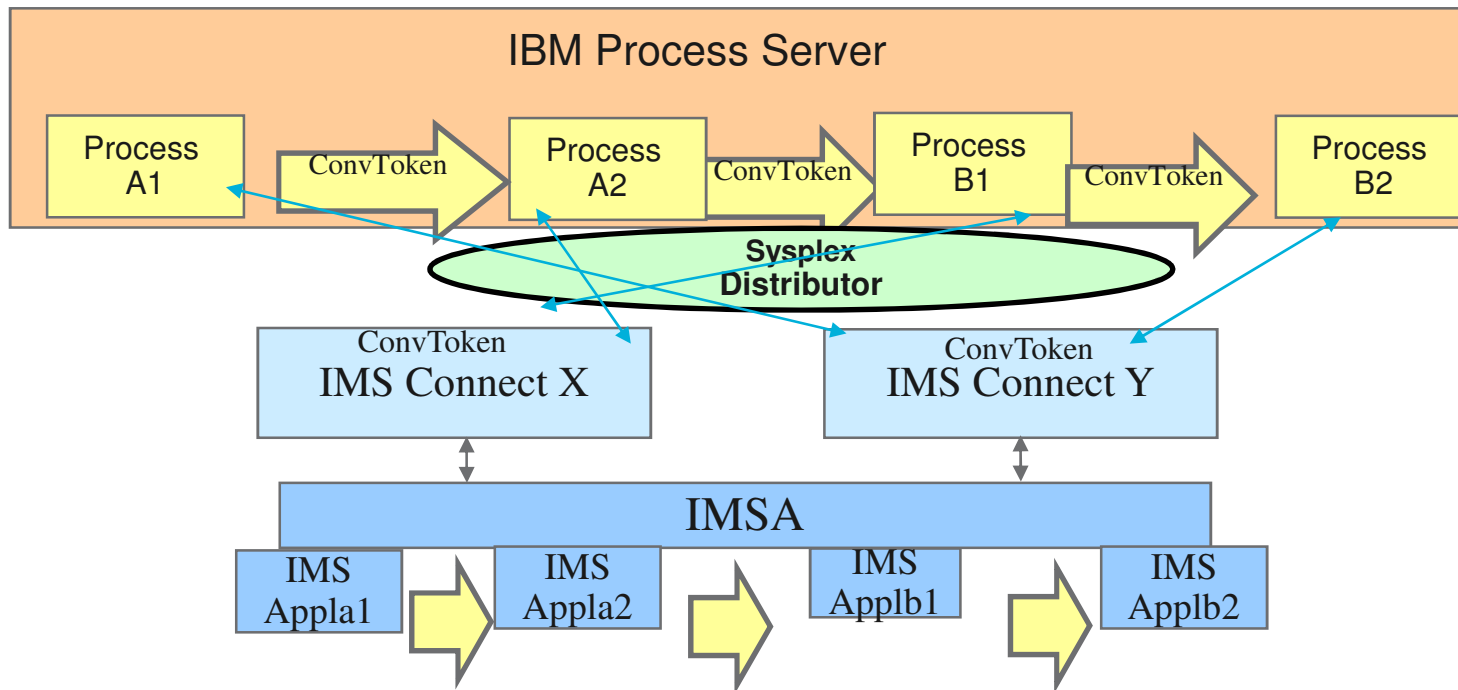
Accessing IMS – IMS TMRA…

- Including support for IMS Conversational Transactions
  - Multi-connection IMS conversation support with BPEL processes require:

    - Creating an operation in the BPEL process mediation flow for each iteration in the conversation:
      - conversation ID (convID) must be passed to subsequent iterations
        - » Last iteration must end the conversation if the conversation is not ended by the IMS application
      - Each operation has specific data types:
        - » Input data type is generated from the MID and output from the MOD
        - » Additional data types that contain information about the conversation ID (the value of the convID property) and whether the conversation has ended (indicated by the convEnded property value).

Accessing IMS – IMS TMRA...

- Including support for IMS Conversational Transactions ...

Accessing IMS – IMS DB Resource Adapter

- And access to IMS databases through the IMS Universal DB Resource Adapter
  - Provides an environment that manages access to online IMS databases using open standards for connectivity

    - When running on the same logical partition (LPAR), applications running in WebSphere Application Server for z/OS can access IMS databases by using the type-2 connectivity provided by the IMS Universal Database resource adapters

    - Alternatively, the type-4 drivers can be used to access IMS on a different LPAR
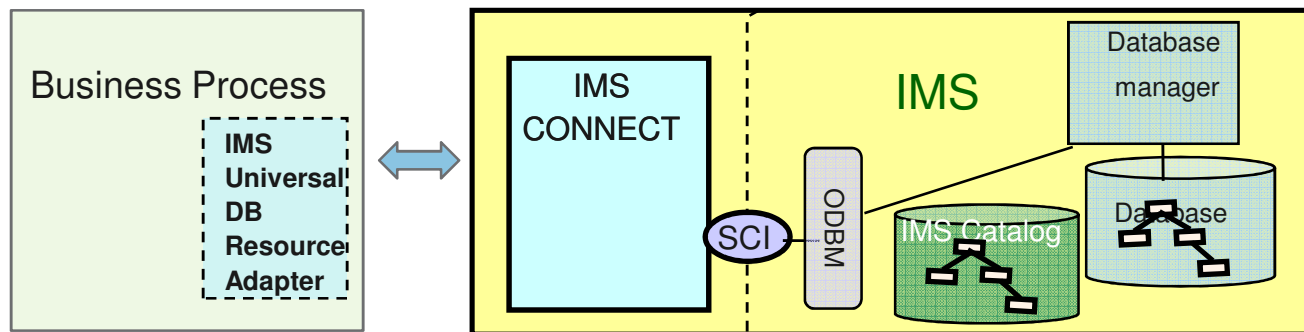
But what if Changes need to be made?

- Part of effective business process management is the ability to stay up to date with business needs
  - Requires the ability to change processes quickly and effectively

    - Older systems: decision making is buried deep within the code, requiring an application lifecycle process change
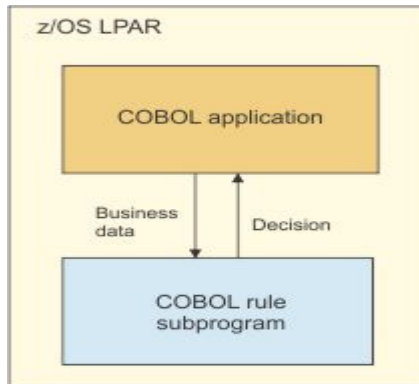
- To change rules that are implemented as a COBOL rule subprogram
  - Regenerate the rule subprogram
  - Recompile the COBOL application
  - Rebuild the load module

But what if Changes need to be made? ...

- New model: separation of policies from the software itself
  - By keeping the decision-making details separate, they can be changed more conveniently, without modifying the software itself
    - Allows different software modules to access the same rules with less risk of contradicting policies

- The answer: a **business rules and events engine** implementation
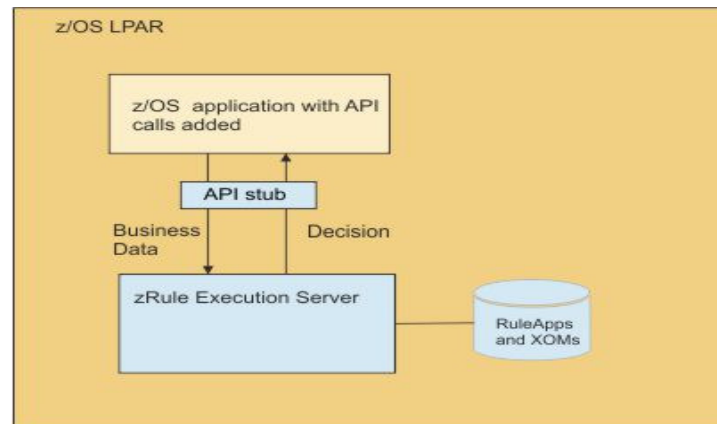
And again …. IBM Solutions

- IBM provides a governance framework
  - Implemented with a suite of products that includes tooling and run time for process design, execution, monitoring, and optimization (mix/match as needed)
    - IBM Blueworks Live - cloud-based BPM tool
      - Enables collaboration and process automation
    - ✓ **IBM Business Process Manager** - BPM platform
      - Provides visibility and insight to manage business processes
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      - Provides end-to-end business process and activity monitoring along with dashboards representing insight that can be used in process optimization
    - ✓ **IBM Operational Decision Manager (ODM)**
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- ✓ Interfaces with IMS

IBM Operational Decision Manager (ODM)
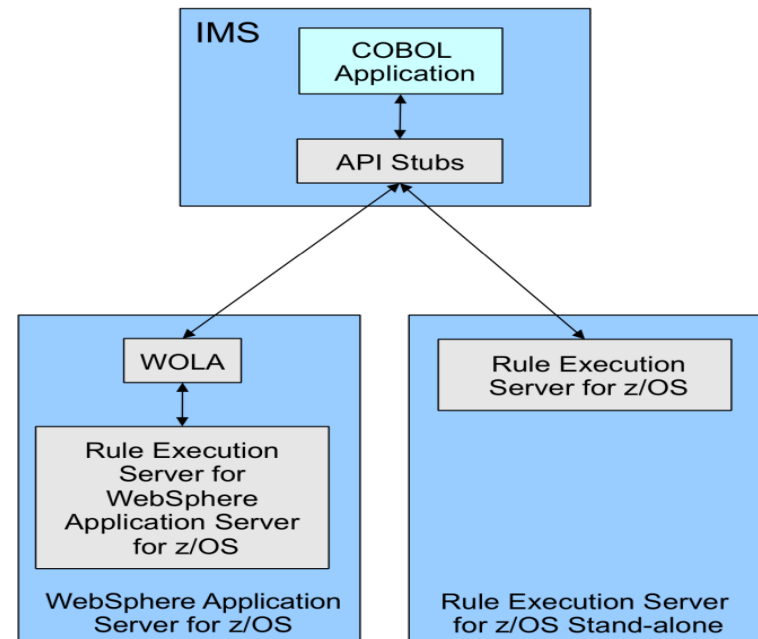
- With support on z/OS
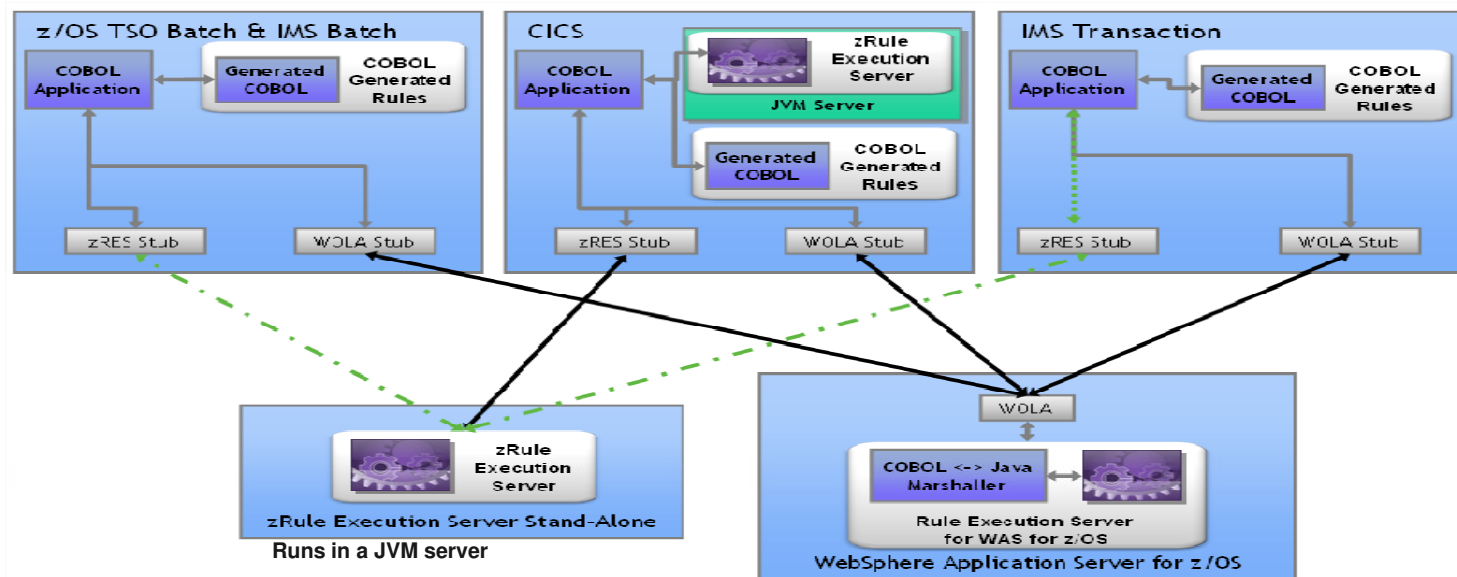
IBM Operational Decision Manager (ODM)

- IBM ODM and IMS

  - Supports rules management for IMS COBOL message processing programs (MPPs), batch message processing programs (BMPs), and DLIBATCH programs

  - Runtimes:

    - Stand-alone on z/OS

    - Within a WebSphere Application Server environment
      - Accessed via WebSphere z/OS Optimized Local Adapters (WOLA)
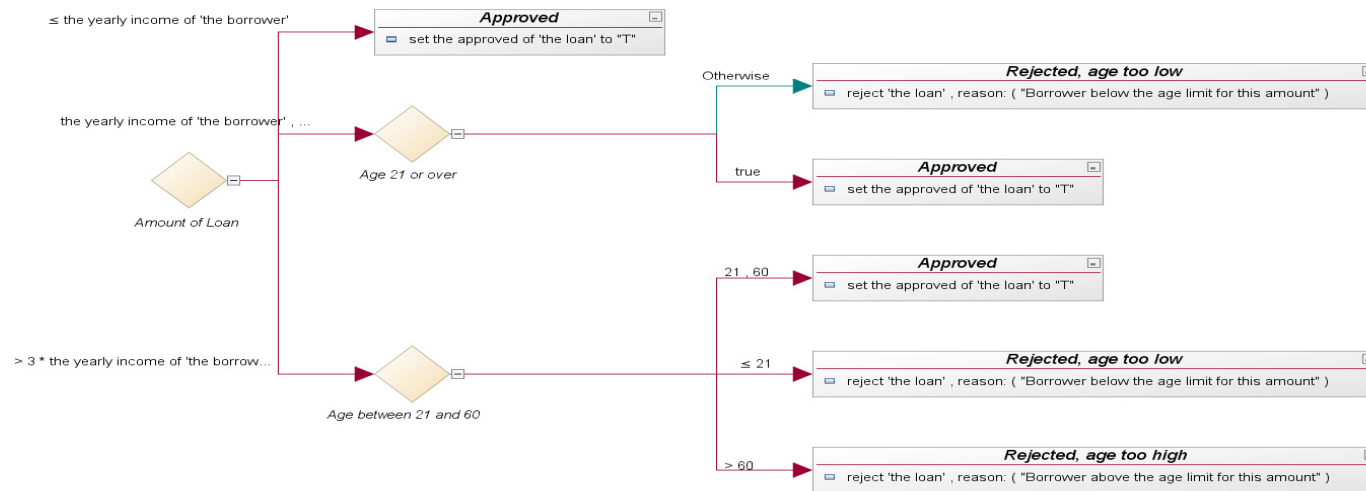
Steps

- Translate a business policy into a set of rules that can be stored inside IBM Operational Decision Manager (ODM).
  - Create all rules in the Rules Designer GUI, which is shipped as part of ODM
    - The Rules Designer works on an Eclipse platform
  - Deploy the rules to the Rules Server

- Rules concepts:
  - **Business Object Model (BOM)** - a model of the core concepts of a business
    - E.g., a loan or a borrower, and their logical connections
      - Represents the objects to the business user for use in rule authoring.
  - **Execution Object Model (XOM)** - represents a model that the runtime implementation uses to execute the rules
    - References the application objects and data, and is the runtime implementation of the BOM.

Steps…

- Rules can be
    - ***Simple:*** if balance < 0 then account_status = overdrawn
    - ***Complex:*** Loan value < \$1M and customer age < 65 and borrower income and borrower income after tax > \$24K and ….

Steps…

- Example of using the Rule Execution Server for z/OS:
  - **_Connect the program to the server_**
    - E.g., Call 'HBRCONN' using HBRA-CONN-AREA

      ```
      01 HBRA-CONN-AREA.
      10 HBRA-CONN-EYE PIC X(4) VALUE 'HBRC'.
      10 HBRA-CONN-LENGTH PIC S9(8) COMP VALUE +3536.
      10 HBRA-CONN-LENTH REDEFINES HBRA-CONN-LENGTH
      ```

  - **_Invoke the Rule Execution Server_** for rules checking as often as needed
    - <u>Specify which rules (or RuleApps) to check</u>

      The location of the rules is specified in the following path:

      HBRA-CONN-RULEAPP-PATH

    - <u>Specify the input and output parameters associated with the rules</u>

      E.g., in HBRA-RA-PARMS of the HBR-CONN-AREA

      ```
      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
      ```
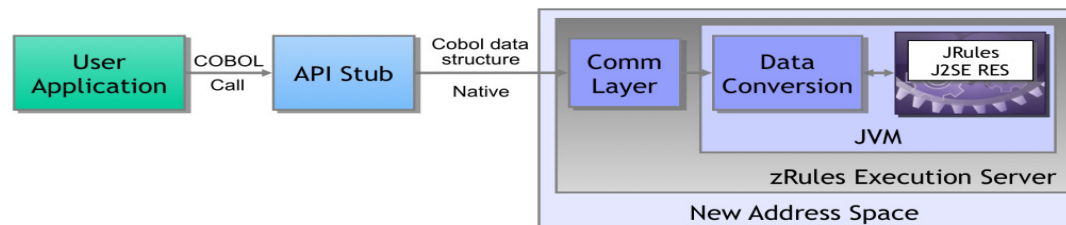
    - <u>Invoke the rule</u>

      E.g., call 'HBRRULE' using HBRA-CONN-AREA

Steps…

- Example of using the Rule Execution Server for z/OS (Rule Execution Server) …
  - *Disconnect from the server*
    - call 'HBRDISC' using HBRA-CONN-AREA

- To resolve the API calls (HBRCONN, HBRRULE & HBRDISC), the IMS program also needs to be link-edited with the HBRISTUB module.
  - INCLUDE HBRLIB (HBRISTUB)

- Alternatively, you can use the Rule Execution Server with WebSphere z/OS Optimized Local Adapters (WOLA) and the ESS interface in IMS

IBM Operational Decision Manager (ODM) ...

- Implementing IBM ODM
  - Allows IMS applications to exploit a powerful decision engine
    - Take advantage of rules-based processing
    - And quickly address evolving business conditions

- Code can support subsequent modifications in the rules engines without having to change the IMS application

- More information including implementation steps and examples
  - http://www.redbooks.ibm.com/abstracts/redp4997.html?Open

But also consider the capabilities
 that IMS offers

IMS Enhancements

- Modernization of the IMS application infrastructure

  - Implementation of a process server or broker function inside IMS

    - Reduces unnecessary network traffic when accessing multiple applications in the same IMS or IMSplex

    - Provides an internal service flow of IMS transactions to complete a business process
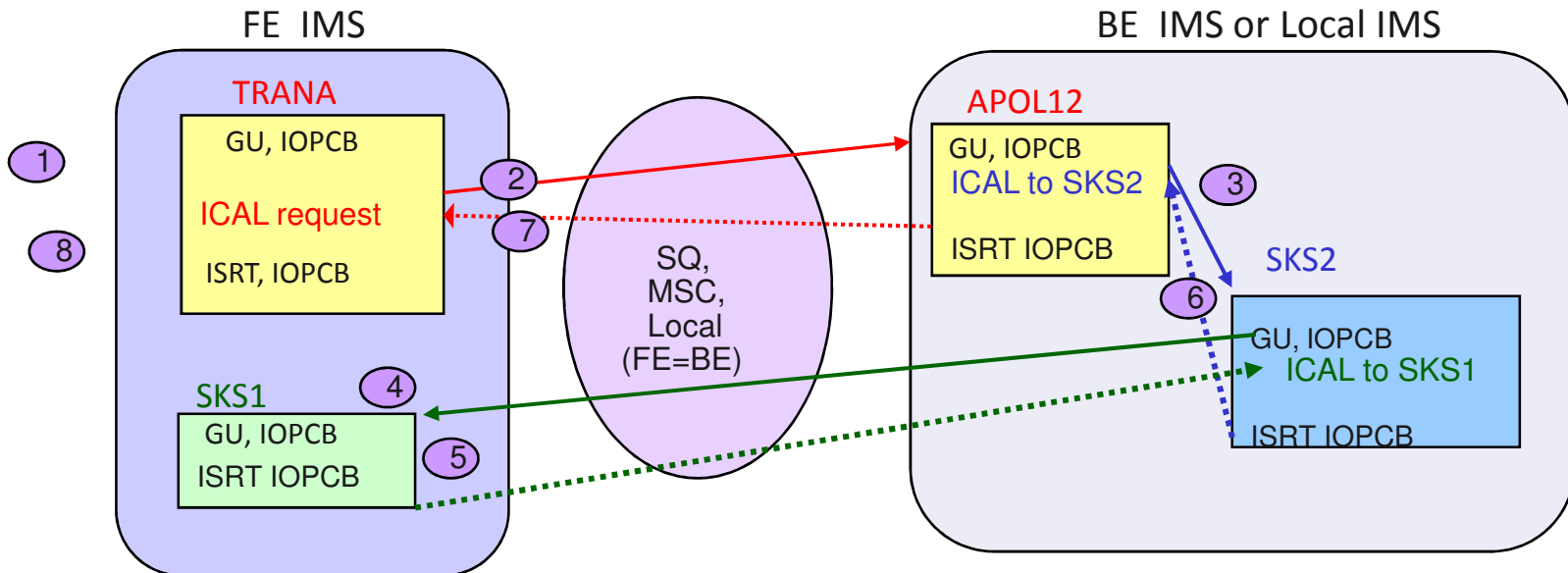   - In the same IMS or a different IMS
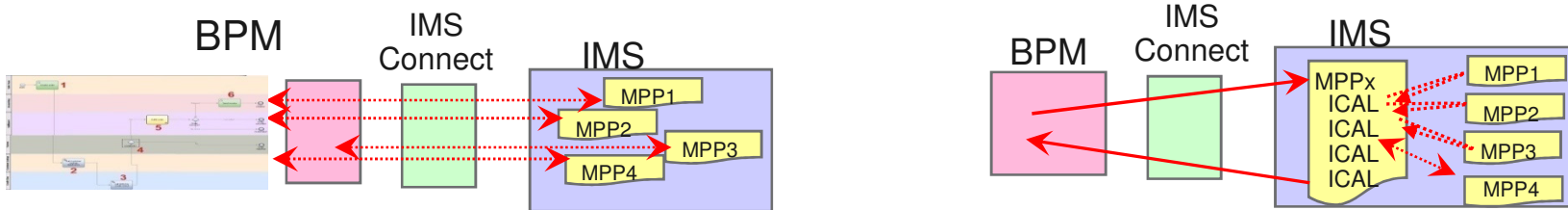
IMS Enhancements…

- Creating an internal service flow model
  - Call to a web service
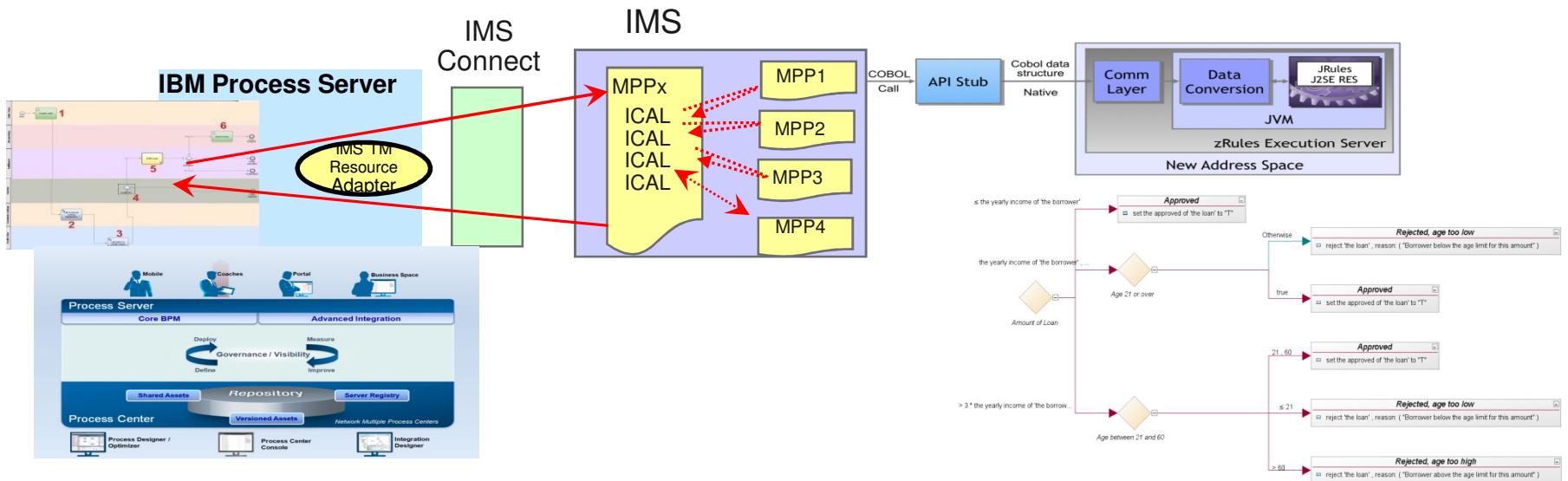 - Call to another IMS program
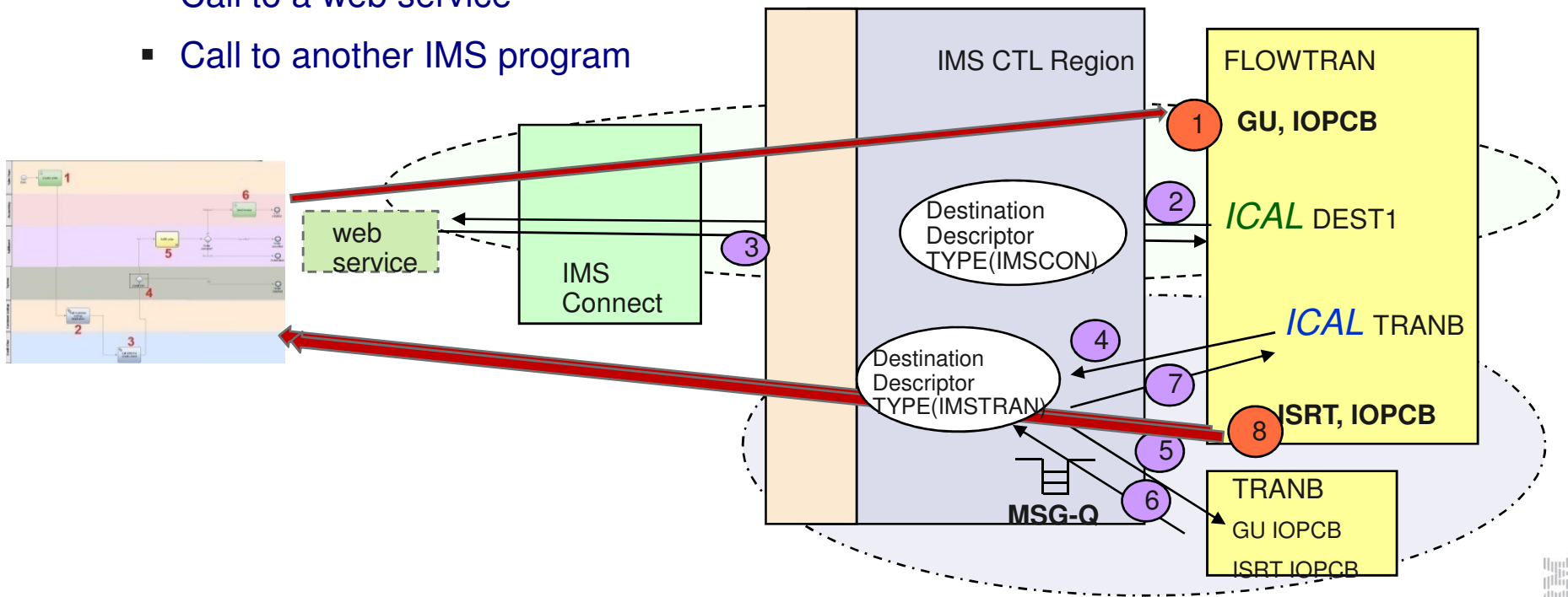
IMS Enhancements

- ICAL to ICAL: Across a single or multiple IMS systems

IMS Enhancements ....

- And even integrating a process to support an external BPM as well as leveraging a rules server

Final Message

- IMS and business process modeling

  - IMS is easily integrated into evolving technical environments
    - E.g., IBM BPM, IBM ODM, …
    - From development to runtime

  - IMS provides interfaces that facilitate enhancing its own internal capabilities
    - Support for internal service flows using the DL/I ICAL
      - To a distributed web service
      - To another IMS transaction in the same or different IMS system
    - Support for the API stubs that call rules in a Rules Server