A Fresh Look at the Mainframe

Unlock the Value of Your Mainframe Assets Using SOA

On Demand Insurance Business Problems

1. **We want to increase revenue by selling insurance polices through external Brokers**

2. We need to process new policy applications quickly and efficiently

**On Demand Insurance
CEO**

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Leverage Existing Investments

> **25% of the world's capital investment is in I/T*. The only way to innovate in a cost-effective manner is to leverage these investments**

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"Many of the I/T assets required to enable an on-demand business already exist and have been supporting the business for years or even decades. Enabling these I/T assets to participate in integrated business processes is key to improving responsiveness".
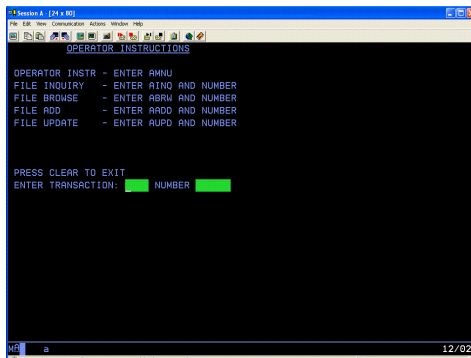
DH Brown Associates, Inc.
Application Transformation: Leveraging Existing I/T Assets to Build Competitive Advantage (September 2004)

* Does not include real estate or government assets

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Existing Investment: ODI Policy Application

OPERATOR INSTRUCTIONS

OPERATOR INSTR - ENTER AMNU
FILE INQUIRY   - ENTER AINQ AND NUMBER
FILE BROWSE   - ENTER ABRW AND NUMBER
FILE ADD   - ENTER AADD AND NUMBER
FILE UPDATE   - ENTER AUPD AND NUMBER

PRESS CLEAR TO EXIT
ENTER TRANSACTION: NUMBER

> **We have invested millions of dollars in this asset**

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Existing application consists of CICS programs accessed via "green screen" terminals.

How do we make this available to external Broker applications?

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ODI Unlock Your Assets on the Mainframe

We want to make portions of this Policy application available to external Insurance Brokers

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You can unlock your existing assets using a Service Oriented Architecture

IBM

The Basics: What is SOA?

… a service?

A **repeatable business task** – e.g., check customer credit; open new account

… service oriented architecture (SOA)?

An IT **architectural style** that supports integrating your business as linked services

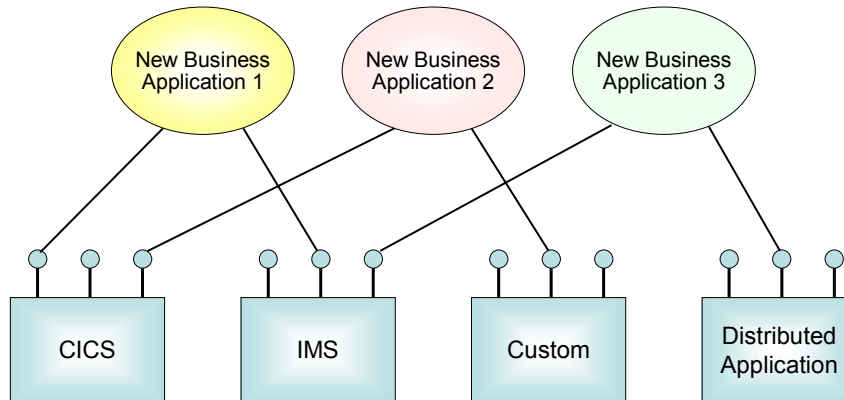"SOA impacts every aspect of IT and business."

Gartner

First Step to SOA

- Expose enterprise assets as services
- Create a rich environment for easy reuse

New Business Application 1

New Business Application 2

New Business Application 3

CICS

IMS

Custom

Distributed Application

Introduction to SOA: Web Services

② *Find service description*

③ *Create client from service description*

① *Create service description (WSDL)*

Service Requester

Client

④ *Runtime Bind to service*

⑤ *Access service* (SOAP/HTTP)

Service Provider

Service Description (WSDL)

Web Service

Web Services Runtime

Web Services Runtime
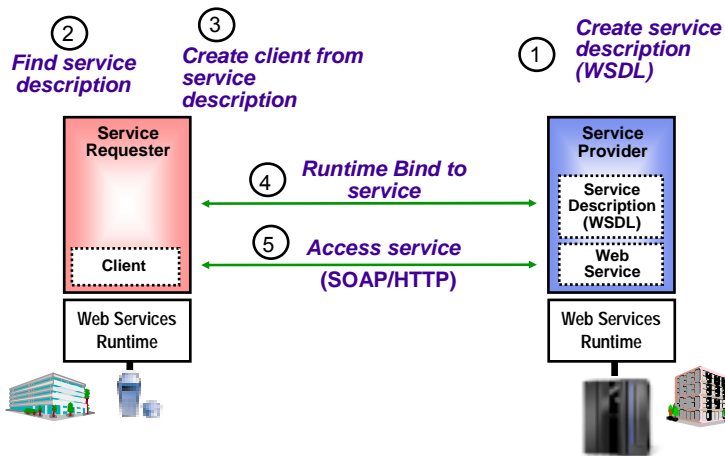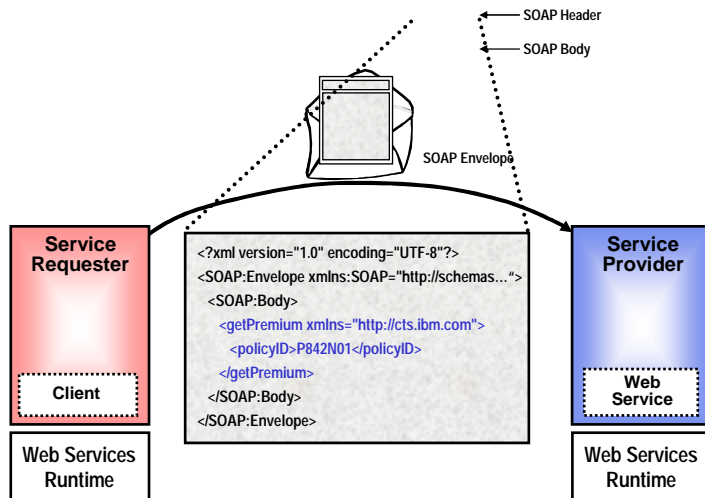
Service Description Defined By WSDL
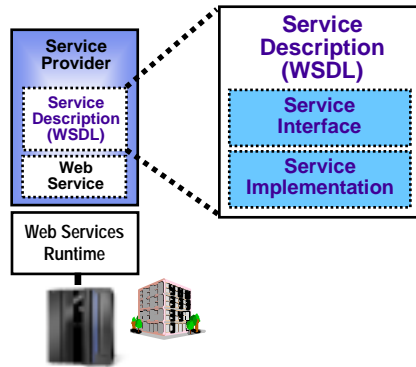
- Web Services Description Language (WSDL) written in XML
  - ▶ Abstract descriptions of operations
  - ▶ Input and output parameters and data types
  - ▶ Implementation language neutral

- Complete Description of a Network Service or Component
  - ▶ What it does
    - − Service Interface
  - ▶ How it communicates
  - ▶ Where it resides
    - − Service Implementation

- Development Time Tool
  - ▶ Provider uses it to document their service
  - ▶ Consumer uses it to generate client code to access service

Service Provider
- Service Description (WSDL)
- Web Service

Web Services Runtime

Service Description (WSDL)
- Service Interface
- Service Implementation

How a Web Service Works at Run Time

SOAP Header

SOAP Body

SOAP Envelope

Service Requester

Client

Web Services Runtime

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:SOAP="http://schemas...">
 <SOAP:Body>
   <getPremium xmlns="http://cts.ibm.com">
     <policyID>P842N01</policyID>
   </getPremium>
 </SOAP:Body>
</SOAP:Envelope>
```

Service Provider

Web Service

Web Services Runtime

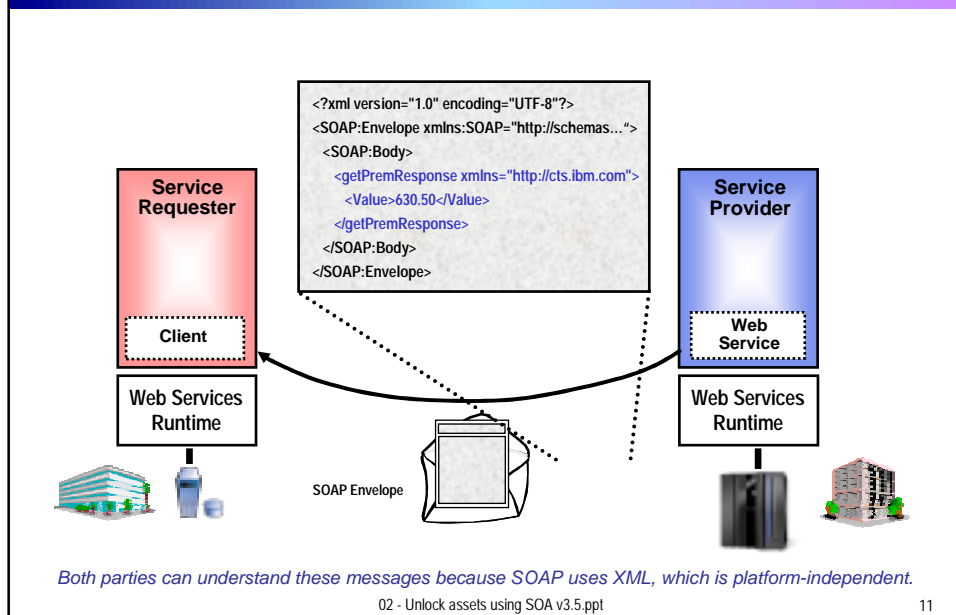# How a Web Service Works at Run Time

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:SOAP="http://schemas…">
 <SOAP:Body>
   <getPremResponse xmlns="http://cts.ibm.com">
     <Value>630.50</Value>
   </getPremResponse>
 </SOAP:Body>
</SOAP:Envelope>
```

Service Requester

Client

Web Services Runtime

Service Provider

Web Service

Web Services Runtime

SOAP Envelope

Both parties can understand these messages because SOAP uses XML, which is platform-independent.

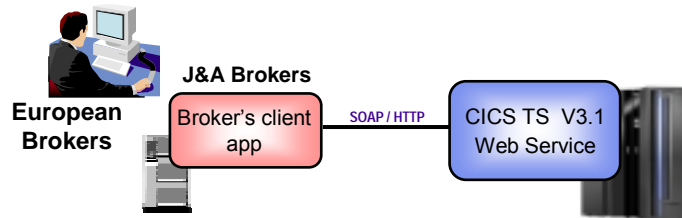02 - Unlock assets using SOA v3.5.ppt

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Exposing CICS Applications as Web Services

So Web Services give me reusability and interoperability. But how do I get my CICS programs to talk Web Services?

CICS TS Version 3.1 has built-in capabilities to expose programs as web services

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DEMO: Broker Calls CICS Program Using Web Services

European Brokers

J&A Brokers

Broker's client app

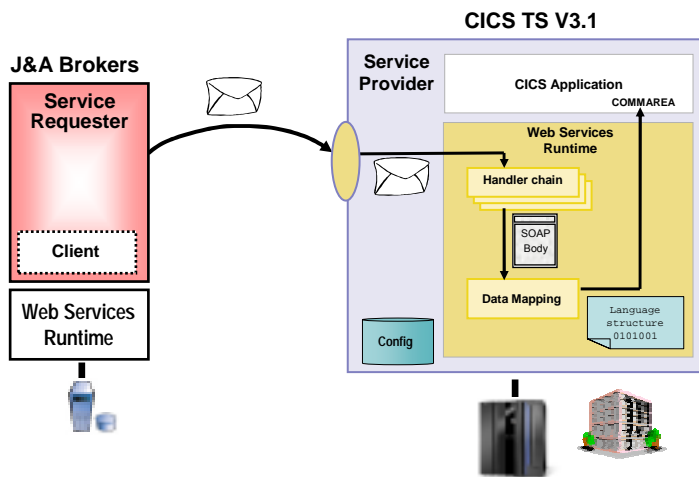**SOAP / HTTP**

CICS TS V3.1 Web Service

- Broker's client application talks to ODI's Policy application using web services

Web Services expose CICS and IMS investments for a new generation of re-use.

How Did the CICS Web Service Work?

1. Receive SOAP request
2. CICS Web Services runtime handles the message
3. Handler chain processes SOAP headers
4. Data Mapping transforms XML into bytes, calls server app

J&A Brokers

Service Requester

Client

Web Services Runtime

CICS TS V3.1

Service Provider

CICS Application

COMMAREA

Web Services Runtime

Handler chain

SOAP Body

Data Mapping

Language structure 0101001

Config

CICS Web Services

- Native Web Services capability offered by CICS
  - ▶ Extends CICS applications directly to a Service Oriented Architecture
  - ▶ A CICS application can now be a Web service provider and requester

- Highlights
  - ▶ Fully integrated into CICS
    - − Resource Definition using CICS admin screen, problem determination, monitoring & statistics
    - − New tooling support for easier application development
  - ▶ Simple configuration and system management

- Rich set of Web services standards supported
  - ▶ SOAP 1.1 and 1.2   to send and receive Web services messages
  - ▶ WS-I Basic Profile 1.0a   for interoperability with between providers and requesters using SOAP
  - ▶ WS-Coordination   extensible coordination framework, and specific coordination of transactions
  - ▶ WS-AtomicTransaction   for transaction coordination
  - ▶ WS-Security   for authentication and encryption of all or part of a message

- SOAP requests can flow over HTTP or WebSphere MQ transports
  - ▶ CICS applications acting as providers or requesters are agnostic to transport mechanism used

Development Steps to Expose
CICS Application as a Web Service Provider

1. Start with COBOL copybook

2. Generate WSDL from copybook

3. Copy files to host file system.

   1. Use standard CICS supplied PIPELINE definition

4. CICS automatically installs other related definitions

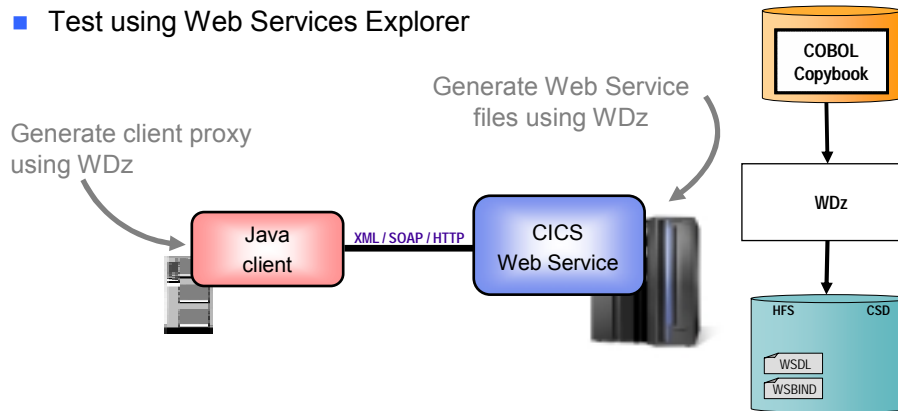5. CICS application is now web service enabled

8
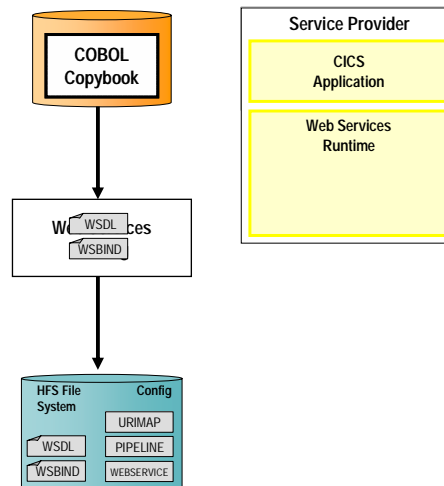
DEMO: Use WebSphere Developer for zSeries (WDz) to Expose CICS Program as Web Service

- Generate WSDL and WSBIND files
- Deploy files to host file system
- Test using Web Services Explorer

Generate client proxy using WDz

Generate Web Service files using WDz

COBOL Copybook

Java client

XML / SOAP / HTTP

CICS Web Service

WDz

HFS   CSD

WSDL
WSBIND

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How About a Sequence of CICS Screens? CICS Service Flow Feature

- Allows you to sequence fine-grained CICS program interactions into a higher level, coarse-grained unit.
  - ▶ This can then be exposed as a web service

- Consists of:
  - ▶ CICS Service Flow Runtime in CICS TS 3.1
    - − Runtime in CICS executes a sequence of terminal or commarea based interactions
  - ▶ Service Flow Modeler in WebSphere Developer for z
    - − Visually design flow
    - − Tool can record flow as user navigates through BMS screens
    - − Use Web Services wizards and test facilities in WDz

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Service Flow Modeler

- Visual Designer in WDz
  - ▶ Wire CICS applications together into a reusable flow
  - ▶ Wire sequence of BMS screens into a reusable flow
- Expose flow as web service
  - ▶ Can be called from other larger business process flows
- CICS deployment
  - ▶ Deploy to Service Flow Runtime in CICS TS 3.1

Service Flow Modeler

Deploy

CICS TS 3.1

CICS Service
Flow Runtime

Flow

Screen | API

EIS
Applications
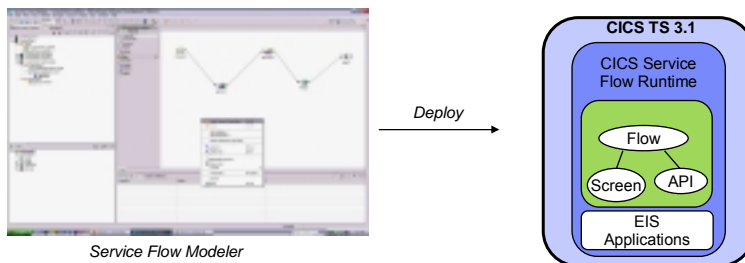
How About IMS Assets?
Use the IMS SOAP Gateway

- Integrates IMS assets into SOA by providing a standard Web Services interface
  - ▶ Expose your IMS application as a web service with easy deployment and configuration
    - − No programming needed

- Tooling support
  - ▶ IBM WebSphere Developer for zSeries (WDz) generates Web Service artifacts like WSDL and XML converters
    - − From COBOL copybook of IMS application

- Transforms XML data without changing IMS application
  - ▶ IMS Connect XML Adapter transforms XML data
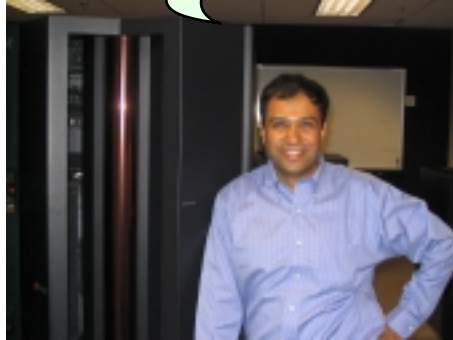   - − No need to modify the IMS application code

Business Problem Solved

We are getting hundreds of new customers through our external brokers

**On Demand Insurance
CEO**

Web Services allowed us to quickly unlock our core application assets for reuse

**On Demand Insurance
CIO**

On Demand Insurance Business Problems

1. We want to increase revenue by selling insurance polices through external Brokers

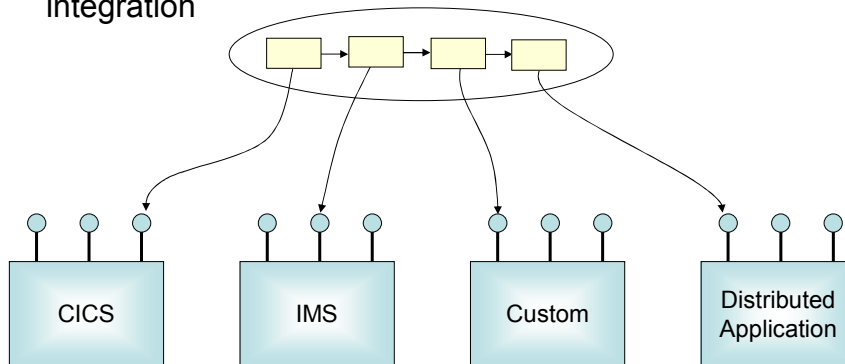2. **We need to process new policy applications quickly and efficiently**

**On Demand Insurance
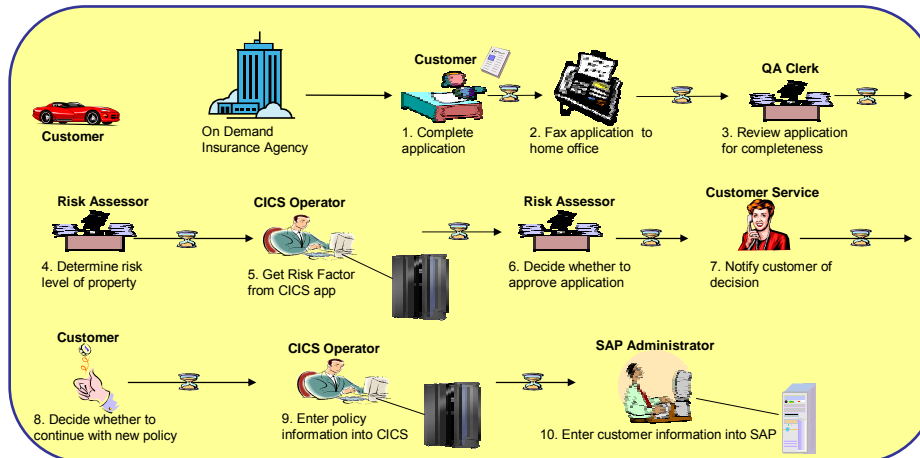CEO**

Second Step to SOA

- Combine exposed services to innovate new cross-system business functions
- Use IBM Middleware on System z to quickly achieve business process integration, portal integration, and data integration

| CICS | IMS | Custom | Distributed Application |

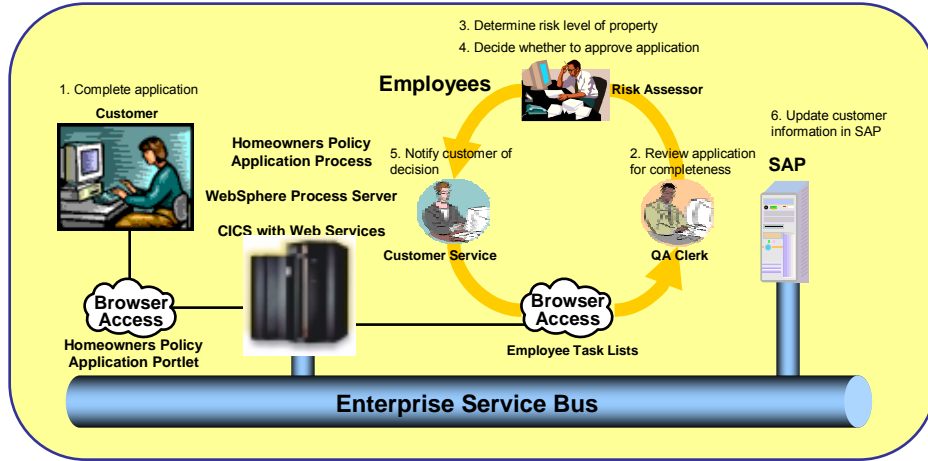## Current Homeowners Policy Application Process

- Customer must visit an agent
- Paper-based process
- Delays between each step
- Limited accountability

- Limited monitoring of the process
- Manual data entry results in errors
- Expensive
- Unhappy customers

Desired Online Process

3. Determine risk level of property
4. Decide whether to approve application

1. Complete application
Customer

Employees   **Risk Assessor**

6. Update customer information in SAP

Homeowners Policy Application Process

5. Notify customer of decision

2. Review application for completeness   **SAP**

WebSphere Process Server

CICS with Web Services

Customer Service   **QA Clerk**

Browser Access   **Browser Access**

Homeowners Policy Application Portlet   **Employee Task Lists**
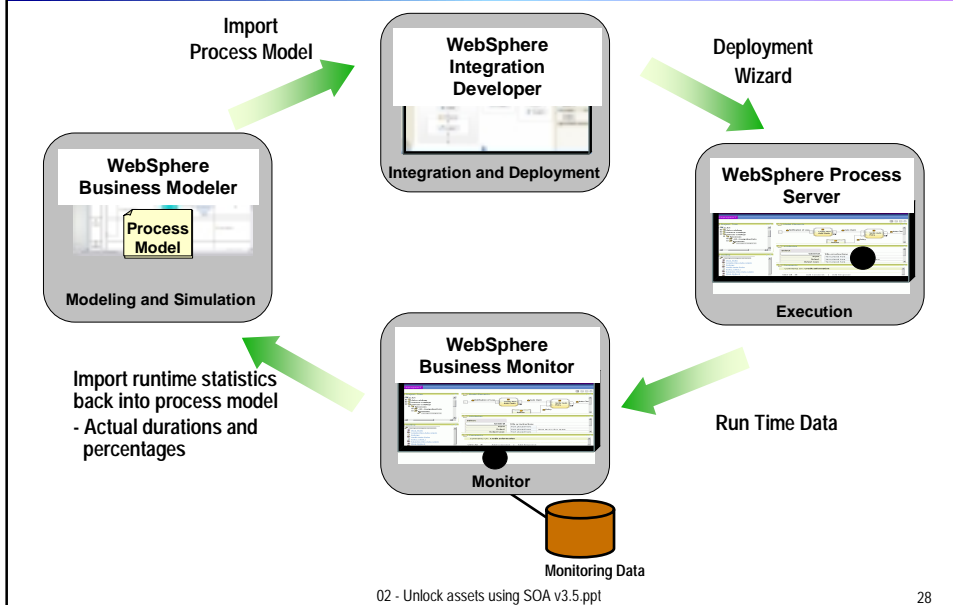
Enterprise Service Bus

- Customer can apply over the Internet
- Automated process
- No delays between steps
- Always know status of each application

- Process monitoring provided by server
- SAP and CICS are automatically updated without re-entering data
- Reduce time and costs

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Closed Loop For Continuous Improvement

Import Process Model

WebSphere Integration Developer

Deployment Wizard

Integration and Deployment

WebSphere Business Modeler

Process Model

Modeling and Simulation

WebSphere Process Server

Execution

Import runtime statistics back into process model
- Actual durations and percentages

WebSphere Business Monitor

Monitor

Run Time Data

Monitoring Data

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Model the Desired Online Process
What Will Be the Steps in Our Business Process?

Solution: WebSphere Business Modeler
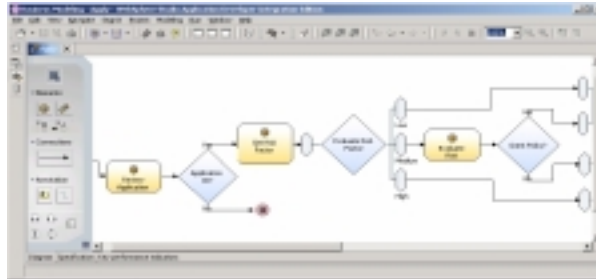
- Designed for a business modeler
- No programming required
- Graphically design the way processes will work
  - ▶ Drag & Drop to define process flow

- Include both human and automated steps
- Business requirements are clearly defined and documented

Can help define and predict the performance of our new business process before we actually build it.


Use WebSphere Integration Developer to Build the Process

- Graphically describe business process flow in Business Process Execution Language (BPEL)

- Drag and drop services into process flow (automatic binding)

- Automatic human workflow support

- Built-in Unit Test Environment

- Built-in Process Debugger

- Deploy to runtime server

- Flow may be invoked as web service, EJB, or message driven bean
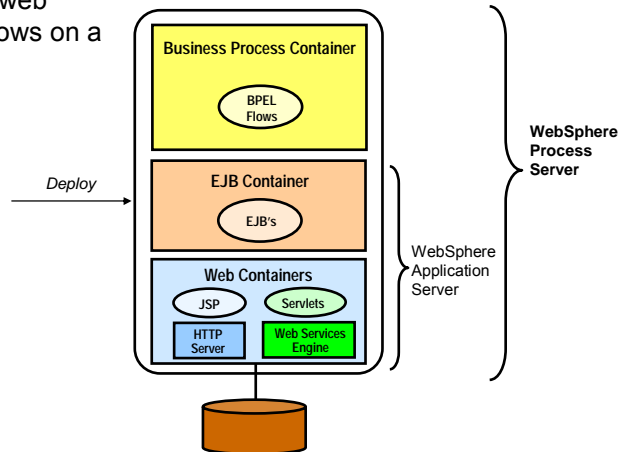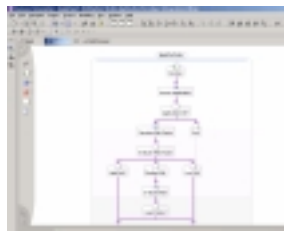
Process from Modeler (in BPEL)
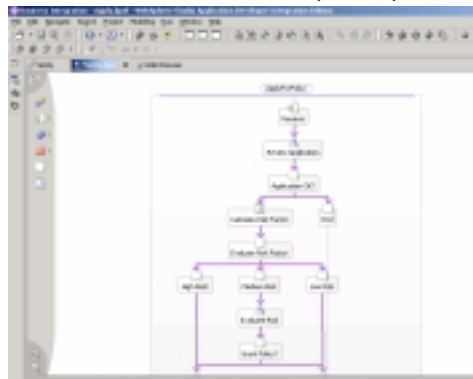
The Completed Process Runs on WebSphere Process Server (WPS)

- The completed BPEL process can be deployed easily to WPS

- WPS supports J2EE, web services, and BPEL flows on a unified code base

Deploy

Business Process Container

BPEL Flows

EJB Container

EJB's

Web Containers

JSP   Servlets

HTTP Server   Web Services Engine

WebSphere Application Server

WebSphere Process Server
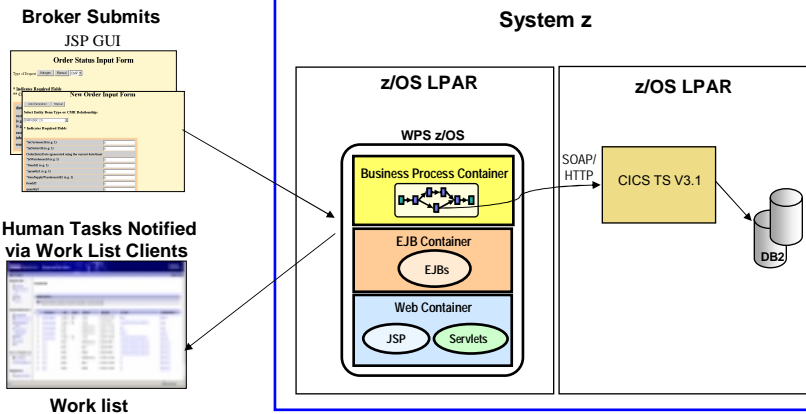

WebSphere Process Server - Highlights

- A single Process Integration platform
  - ▶ Reduces complexity and administration cost

- WebSphere Application Server Foundation
  - ▶ Clustering, failover, high availability and robust platform
  - ▶ Single administration environment
  - ▶ Common Event Infrastructure – Process Management

- Service Oriented Architecture platform
  - ▶ A uniform invocation programming model
  - ▶ A uniform data representation model (Business Objects)
  - ▶ Powerful tools to build and reuse standard components

- Powerful Staff Components for Human Workflow
  - ▶ Participating / Originating / Ad-Hoc Tasks
  - ▶ Multi-level escalation
  - ▶ Client components out-of-the box

- Business Processes
  - ▶ WS-BPEL standard

- Business State Machines, Business Rules & Transformations
  - ▶ Advanced services to build integration solutions

WebSphere Process Server Version 6 Runs Natively on System z

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How ODI Deployed the New Process – Run Process Server on System z

Broker Submits

JSP GUI

Order Status Input Form

New Order Input Form

Human Tasks Notified via Work List Clients

Work list

System z

z/OS LPAR

WPS z/OS

Business Process Container

EJB Container

EJBs

Web Container

JSP   Servlets

z/OS LPAR

SOAP/HTTP

CICS TS V3.1

DB2

ODI's new business process inherits qualities of the platform: Reliability, Availability, Scalability, Security…

System z is the Best Platform for Your Online Business Operations

- ■ The capabilities of System z provide the best Quality of Service for implementing SOA
  - ▶ High Availability/Disaster Recovery
  - ▶ Security/Encryption
  - ▶ Scale/Clustering
  - ▶ Virtualization and Workload Management
  - ▶ Lower cost administration

We will cover these built-in attributes of System z through the day…

IBM Provides Extensive Support for SOA Solutions on System z

- Tools to create and use services quickly

- Service combining frameworks to integrate services into applications
  - ▶ Deliver services to user desktops
    - – WebSphere Portal Server
  - ▶ Assemble services into business processes
    - – WebSphere Process Server
  - ▶ Combine multiple data services into a single data service
    - – WebSphere Information Integrator

- Management tools for your SOA environment

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Summary

Unlock the value of your System z assets using a Service Oriented Architecture. SOA gives you reuse and flexibility. IBM provides extensive support for SOA. In fact, System z is an ideal platform for implementing SOA.

IBM

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