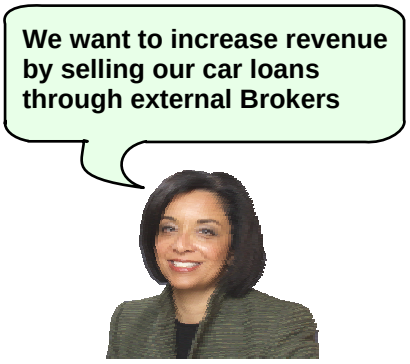
The Modern Mainframe… At the Heart of Your Business

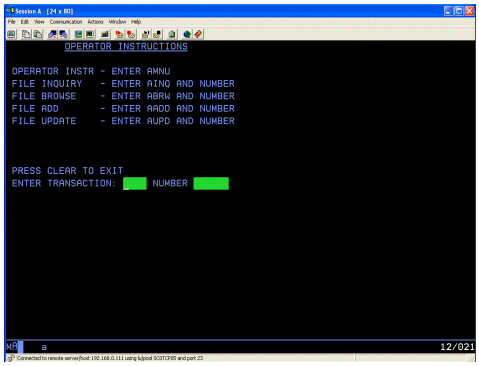
Using SOA to Build Your Next Generation Solution

Service Oriented Finance's Business Problem



Service Oriented Finance CEO

Existing CICS Investment: SOF Customer Management System



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

How do we make this available to external Broker applications?

We have invested millions of dollars in this asset

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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

IBM

"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

Use SOA to Extend Your Mainframe Assets

We want to make portions of this application available to external Loan Brokers

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You can extend 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)?

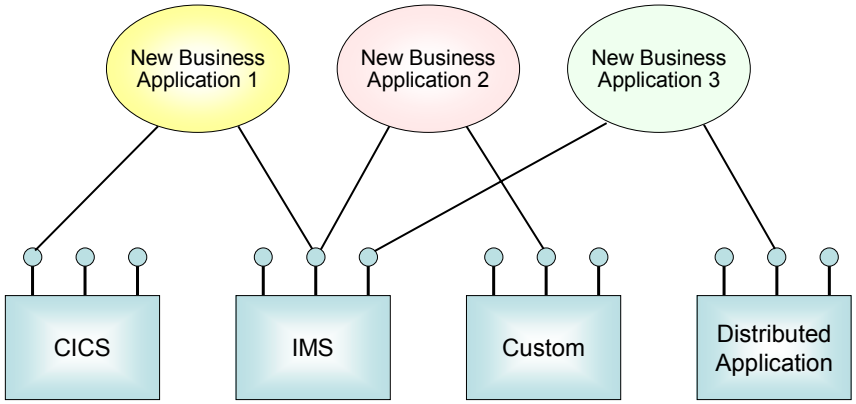
An IT **architectural style** that supports integrating your business as linked services

"SOA impacts every aspect of IT and business."

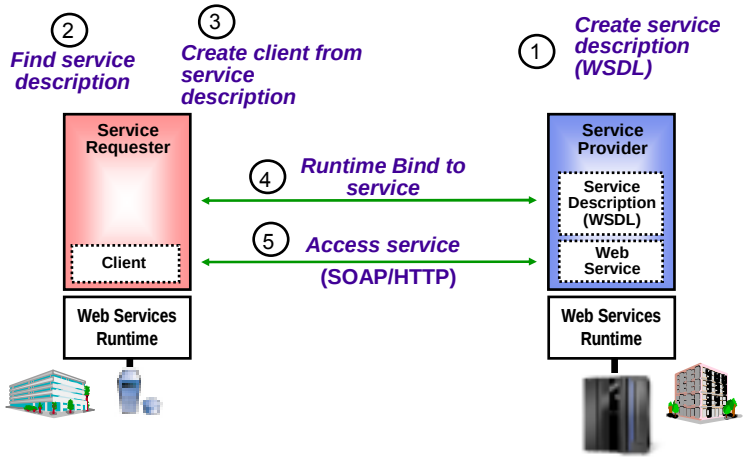
Gartner

Steps to SOA

- Expose enterprise assets as services
- Create a rich environment for easy reuse
- Combine services to create new applications



Introduction to SOA: Web Services



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?

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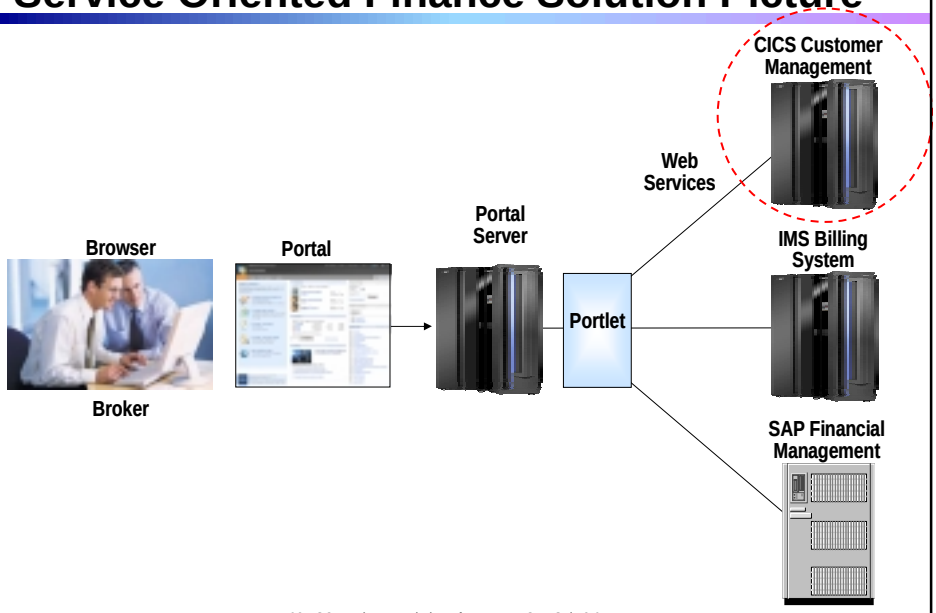
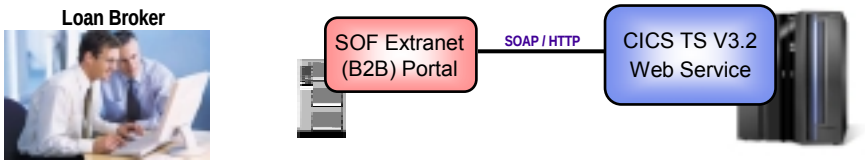
CICS TS Version 3.2 has built-in capabilities to expose programs as web services

IBM

Service Oriented Finance Solution Picture



DEMO: Broker Calls CICS Program Using Web Services

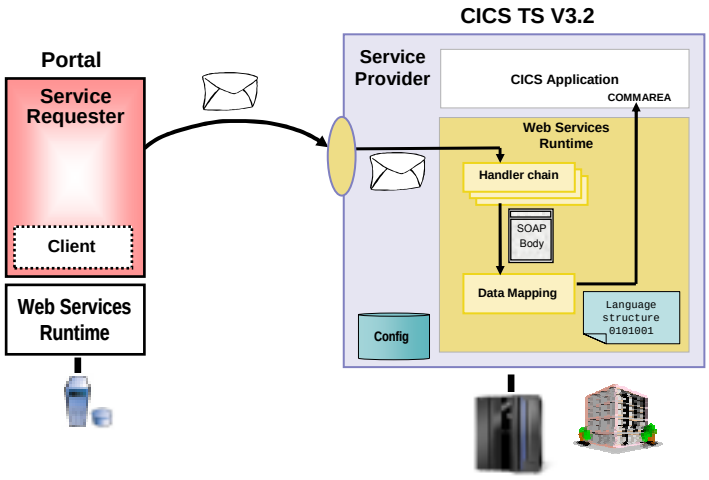


- Loan Brokers use the SOF Portal. The Portal talks to SOF's Loan application using web services

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



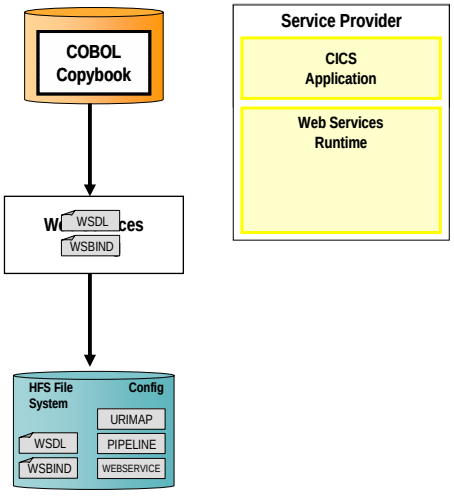
CICS Web Services

- Native Web Services capability offered by CICS
  - A CICS application can now be a web service provider and requester
  - Fully integrated into CICS
    - Resource definition using CICS admin screen, problem determination, monitoring & statistics
    - New tooling support for easier application development
  - SOAP requests can flow over HTTP or WebSphere MQ transports

- Rich set of Web services standards supported
  - SOAP 1.1 and 1.2 to send and receive web service messages
  - WS-I Basic Profile 1.0 for interoperability with between providers and requesters
  - WS-Coordination transaction coordination
  - WS-AtomicTransaction
  - WS-Security for authentication and encryption of messages

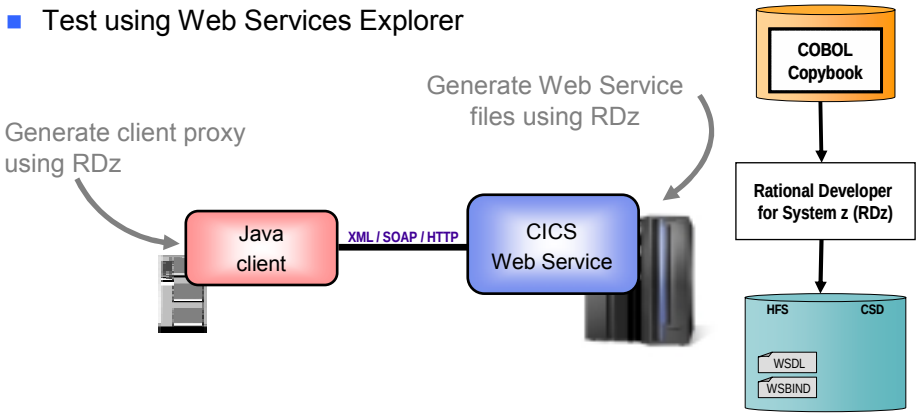
Development Steps to Expose CICS Application as a Web Service Provider

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



DEMO: Use Rational Developer for System z to Expose CICS Program as Web Service

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



Bank of Montreal: Reuse Existing Services

Challenge: Increase Efficiency and Customer Satisfaction

BMO Financial Group

Delivering Business Value:

- Exposed CICS transactions as web services
- New front-end CRM application provided cross-sell and up-sell opportunities
- Revitalized customer relationship management across multiple banking channels

Through greater IT flexibility:

- Reused existing IT assets through service-enablement
- Modeled options for new system to support hundreds of transactions per second
- Built service-oriented applications more easily

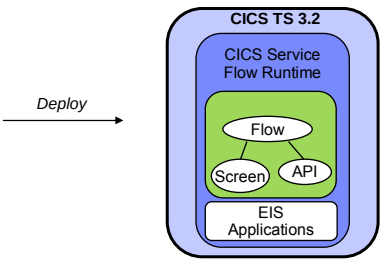
How About a Sequence of CICS Screens? CICS Service Flow Feature

- 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 3.2
    - Runtime in CICS executes a sequence of terminal or commarea based interactions
  - Service Flow Modeler in Rational Developer for z
    - Visually design flow
    - Tool can record flow as user navigates through BMS screens
    - Use Web Services wizards and test facilities in RDz

Service Flow Modeler

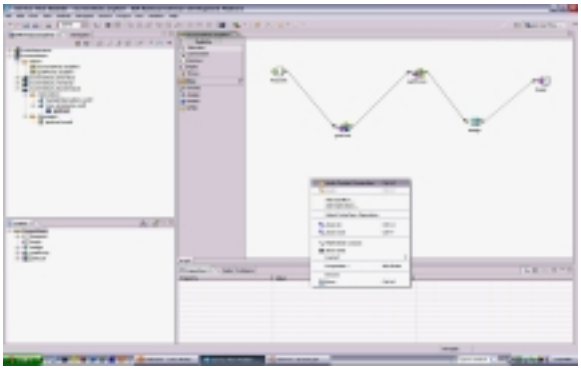
- Visual Designer in RDz
  - Wire CICS applications together into a reusable flow
  - Wire sequence of BMS screens into a reusable flow
- Expose flow as web service
  - Can be called from other larger business process flows
- CICS deployment
  - Deploy to Service Flow Runtime in CICS TS 3.2

Service Flow Modeler

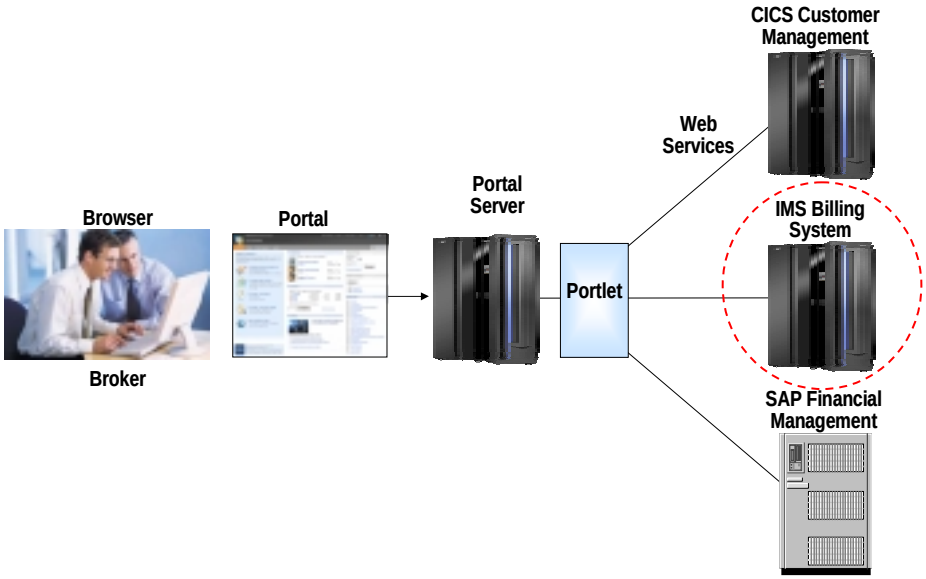


DEMO: Service Flow Modeler

- Use Visual Designer in RDz
  - Record Screen interactions
  - Wire CICS programs together



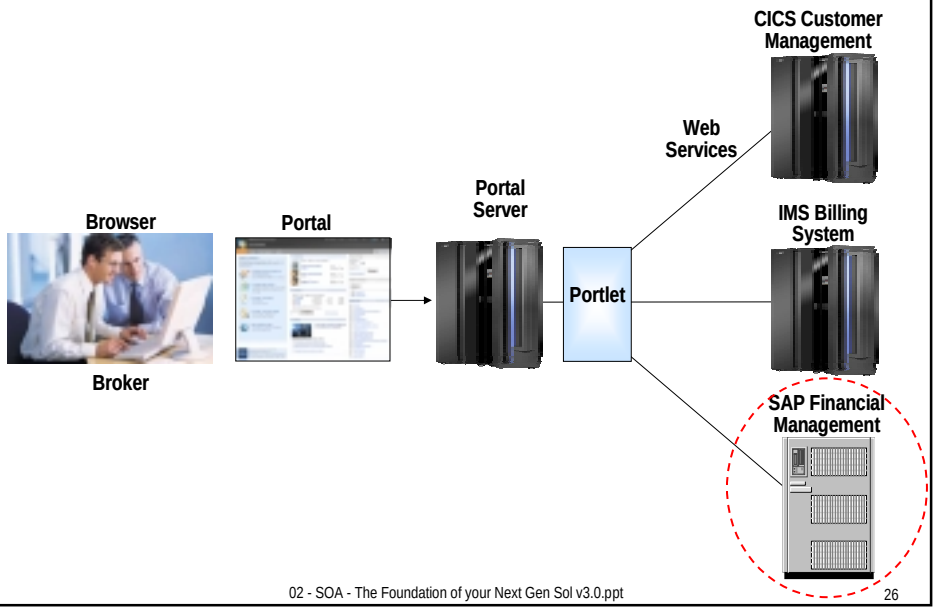
Service Oriented Finance Solution Picture



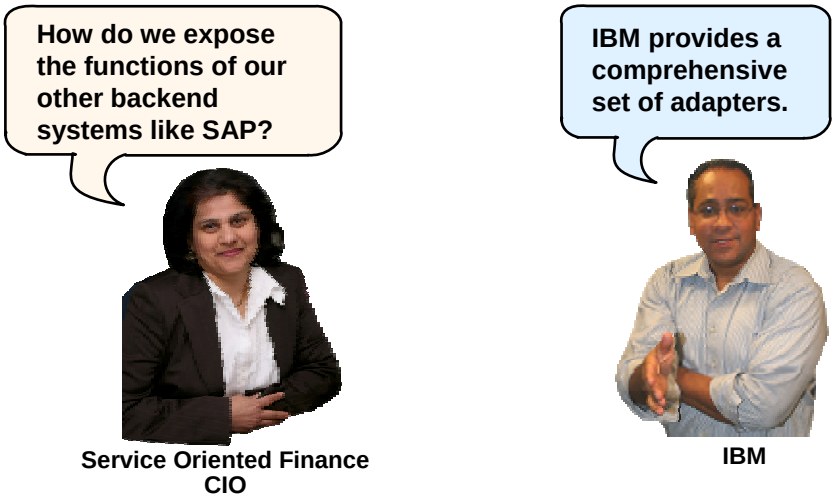
What About IMS Assets? Use the IMS SOAP Gateway

- 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 Rational Developer for System z 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

Service Oriented Finance Solution Picture



What About Other Enterprise Assets without Native Web Services Capabilities?



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What Do Adapters Provide?

- Provide a consistent framework for access to back-end systems and technologies
  - Translates an abstracted interface into target-specific protocols, APIs or data formats
  - Abstracted interface encapsulates business functions and events in the form of business objects
- Consistent configuration, deployment, and administration
- A standardized framework enables WebSphere development tools to generate code that would otherwise be manual with third party adapters

IBM Adapter Portfolio

Adapter Category			
Application	• **Ariba Buyer** • Clarify CRM • **eMatrix** • **i2** • **JD Edwards OneWorld**	• **MetaSolv Applications** • **Oracle Applications** • **PeopleSoft Enterprise *** • **Portal Infranet**	• **SAP Exchange Infrastructure** • **SAP Software *** • **Siebel eBusiness Applications *** • **SunGard FRONT ARENA**
Technology	• **COM** • **CORBA** • Complex Data • EDI • **Enterprise Java Bean** • DTS • E-mail • Exchange	• Fix Protocol • **Flat Files *** • Lotus Domino • Healthcare Protocols • HTTP • **i-Series** • **JDBC *** • JMS	• SWIFT • TCP/IP • **Web Services** • WebSphere MQ • WebSphere Message Broker • WebSphere MQ Workflow • **XML**

Adapter development kit available for developing custom adapters

Notes:
Adapters in **bold** can introspect target application/technology
* Both Java Connection Architecture (JCA) and Java Message Service (JMS) adapter versions provided
** Only available as a Java Connection Architecture (JCA) adapter

Business Problem Solved

We are getting hundreds of new customers through our external brokers

Service Oriented Finance CEO

SOA allowed us to quickly unlock our core application assets for reuse

Service Oriented Finance CIO

Service Oriented Finance's Technical Challenges

1. How can Brokers access our existing car loan application?
2. **How do I optimize the existing process so we are ready to handle a large increase in the number of car loan requests?**

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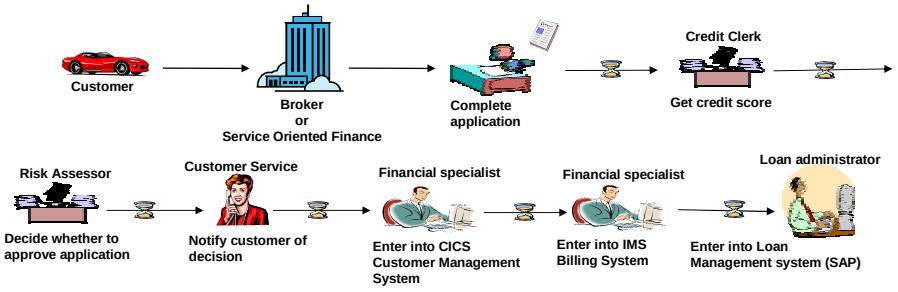
Current Process for New Car Loans

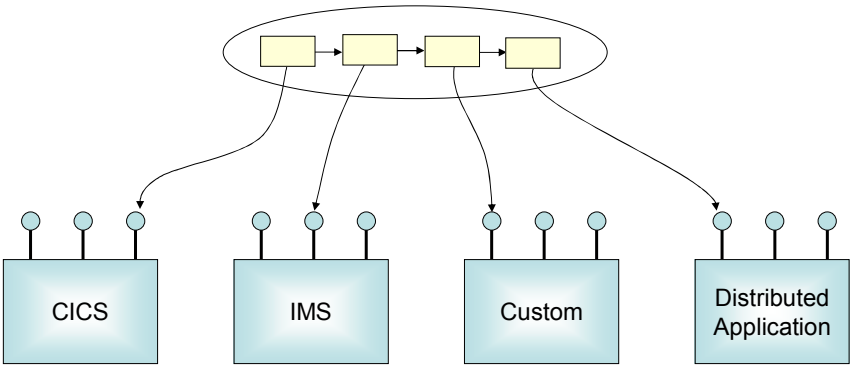


Reasons current process isn't ready for increased amount of business:

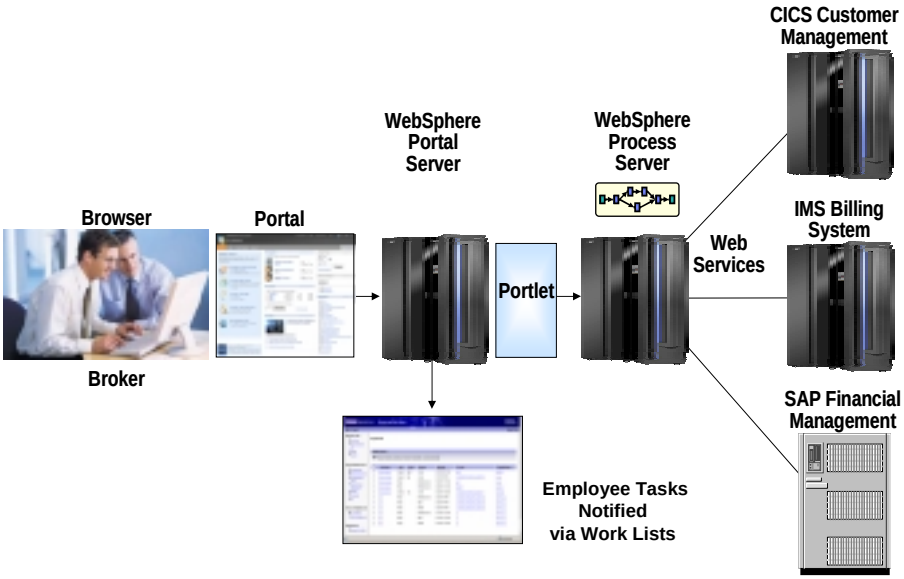
- Manual process won't scale
- Manual data entry results in errors
- Multiple manual steps makes it difficult to determine status of any particular loan request

Next Step to SOA

- Combine exposed services to innovate new cross-system business functions
- Use IBM Middleware to quickly implement next generation business process



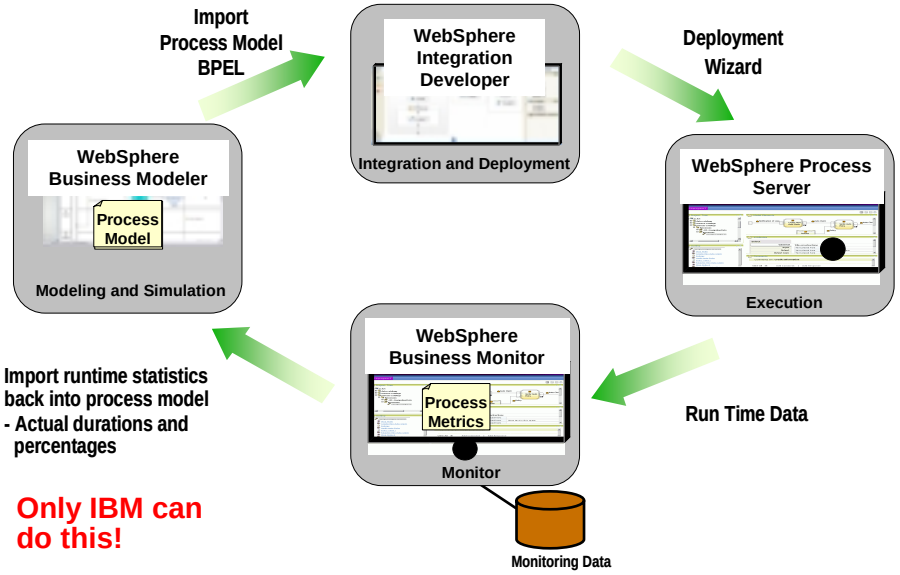
Service Oriented Finance Solution Picture



WebSphere Integrated Framework for Next Generation Process Management

1. **Model** the solution using **WebSphere Business Modeler**
   - Verify that proposed solution will meet the business objectives.
   - Gain agreement with executives, business owners, and development
2. **Develop** (assemble) the solution using **WebSphere Integration Developer**
   - Develop Loan Application solution
   - Implement Key Performance Indicators to measure business results
3. **Deploy** the solution onto **WebSphere Process Server**
   - Deploy to integration server that supports all aspects of integration
   - Execute on server that is reliable, scalable, secure, and based on open standards
4. **Manage** the deployed solution using **WebSphere Business Monitor**
   - Monitor processes to identify and fix problems, delays
   - Review Key Performance Indicators to ensure business objectives are met

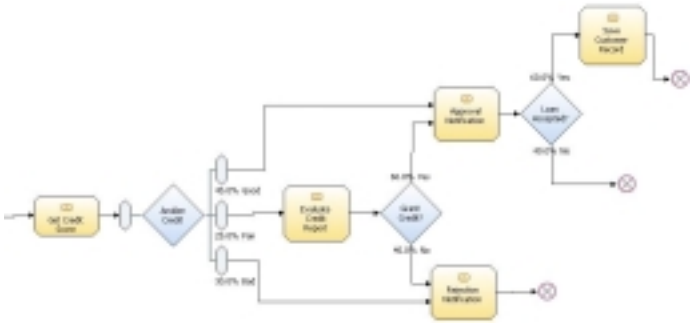
WebSphere Integrated Products for Business Process Management



Only IBM can do this!

Will the New Process Meet Business Objectives? Model the New Process

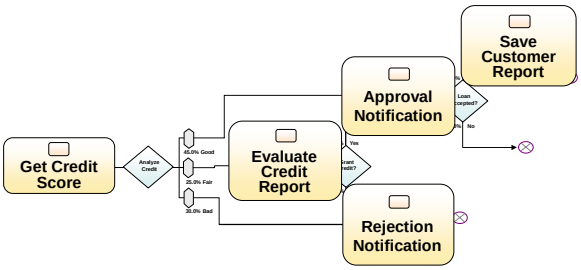
Solution: WebSphere Business Modeler



- Clearly define and document business requirements
- Graphically design the way processes will work
- Can include both human and automated steps

- Model the things that affect performance
  - Tasks, costs, times, resources
- Model the things that measure performance
  - Key Performance Indicators (KPIs)
- Simulate your model before it is developed
  - Allows you to identify bottlenecks
- Assess achievement of business objectives

Model Flow Needs to be Completed with Programming Assets



- Model is converted into a structured language (BPEL) flow
  - WebSphere Business Modeler generates BPEL
- Programmer uses WebSphere Integration Developer
  - Imports BPEL from modeler
- Model now needs to be completed by programmers to provide:
  - Web service for Get Credit Score
  - Service for updating CICS, IMS and SAP
  - Assign role for each human step
  - Data maps for each step
  - Automatically generate executables for Deployment to WebSphere Process Server (via EAR)

Use WebSphere Integration Developer to Build the Process

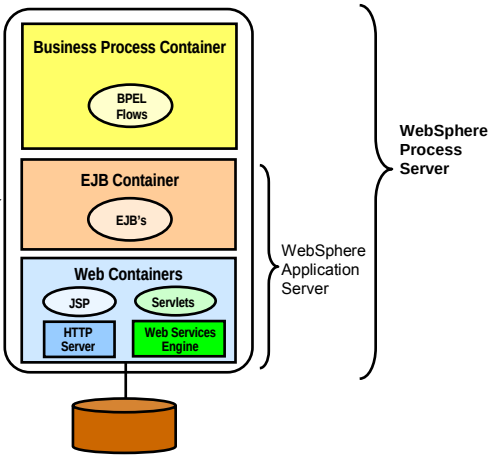
- Graphically describe business process flow in Business Process Execution Language (BPEL)
- Drag and drop services into process flow (automatic binding)
- Automatic human workflow support
- Built-in Unit Test Environment
- Built-in Process Debugger
- Generate and deploy to runtime server
- Flow may 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



WebSphere Process Server - Highlights

- Service Oriented Architecture platform
  - A single integrated platform
  - A uniform invocation programming model
  - A uniform data representation model (Business Objects)
  - Powerful tools to build and reuse standard components
- WebSphere Application Server Foundation
  - Clustering, failover, high availability and robust platform
  - Single administration environment
- Business Processes
  - WS-BPEL standard
- Powerful Staff Components for Human Workflow
  - Participating / Originating / Ad-Hoc Tasks
  - Multi-level escalation
  - Client components out-of-the box
- Business State Machines, Business Rules & Transformations
  - Advanced services to build integration solutions

Run the Process on System z

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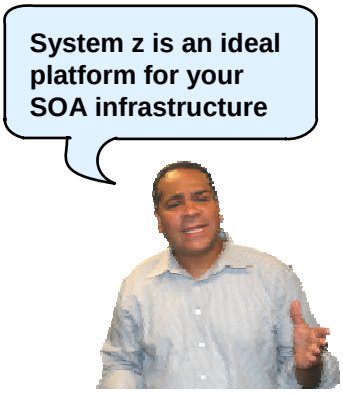


IBM

Why SOA on System z?
1. Qualities of Service

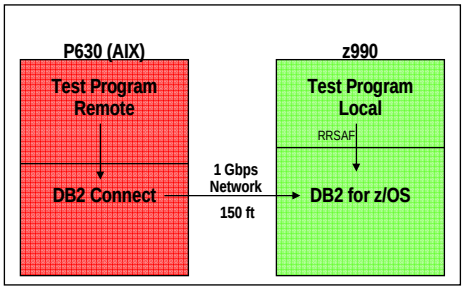
- An effective SOA implementation requires very high Quality of Services (QoS) from the underlying environment
  - Continuous Availability/Disaster Recovery
  - Scalability and Clustering
  - Rock solid Security
  - Workload Management to handle peak demand
- *These are fundamental characteristics of System z, making it an ideal platform to deploy an SOA solution*
- IBM's core SOA framework runs on z/OS
  - WebSphere Application Server
  - WebSphere Process Server
  - WebSphere Portal Server
  - WebSphere Enterprise Service Bus

Why SOA on System z?
2. Co-location

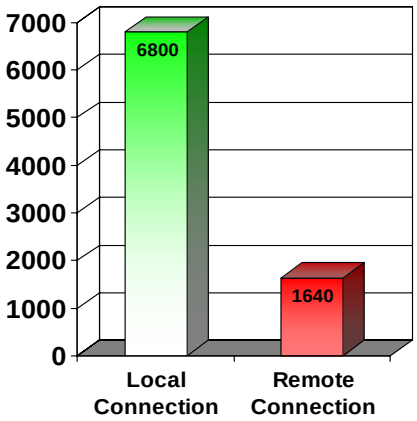
- Typically the mainframe already houses the core applications and data that provide a competitive advantage to the business
  - Quickly expose them as services, and continue the QoS the business depends on
- Having the Process Server and Enterprise Service Bus in close proximity to the assets they access provides better performance and throughput
- HiperSockets technology means less network overhead
  - Memory to memory communication

Consolidated Environments Maximize Throughput
IBM study shows affects of network latency on SQL processing

Test Configuration



Results: SQL Statements / Second

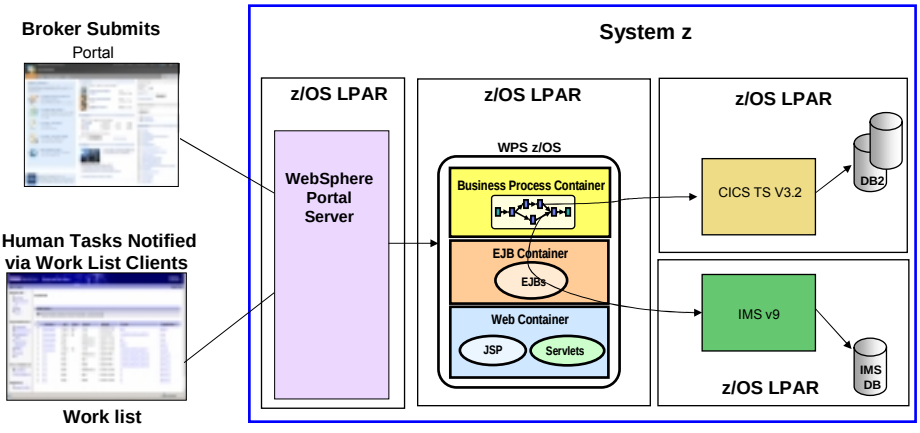


Why the big difference in SQL throughput?

- Elimination of network latency incurred by remote database connections increased SQL throughput **4x!**
- Hipersockets provide this benefit for consolidated applications on zLinux

IBM Study: "Local versus Remote Database Access: A Performance Test", 2005
http://publib-b.boulder.ibm.com/abstracts/redp4113.html

Service Oriented Finance Runs its Next Generation SOA Solutions on System z



The new business process inherits the qualities of the platform: Reliability, Availability, Scalability, Security…

Summary

Unlock the value of your System z assets using a Service Oriented Architecture.

System z is an ideal platform for implementing Next Generation SOA Solutions.

IBM