

Information On Demand EMS Version 10

## Web Services Positioning

• **Definition:**

- ◆ **Web Service**
  - A type of service
  - Software component (*callable piece of code*) that is capable of being accessed (*described, published and located*) via *standard* network protocols such as *SOAP over HTTP* - independent of platforms or programming language
- ◆ **WSDL - Web Services Description Language**
  - XML document describing network services, e.g., what a Web Service can do, where it resides, and how to invoke it
    - Follows an open standard

The entire industry is agreeing on one set of standards !!

**3 basic components:**

- Service Provider
- Service Broker
- Service Requestor

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## The Challenge

- Figuring out how to access IMS
  - ◆ “Exposing” the IMS resources as web services
- Deciding how to create the web service

**REQUIREMENTS**

- **Access to IMS transactions**
  - Direct connection model
  - Messaging and Queuing model
- **Access to IMS data**
  - Inquiry (read-only) or Update
- **Access from IMS applications**
  - Outbound capabilities
- **Replicating IMS data**

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## IBM Solutions

**Toolkits that generate web services, EJBs, JSP, etc. for IMS, CICS, DB2**

WSAD-IE

→

RAD

WebSphere Studio Application Developer Integration Edition      Rational Application Developer

( both include the IMS Connector for Java )

RAD

**WID**

**WebSphere® Integration Developer:** Eclipse technology-based tooling that enables rapid assembly of business solutions based on a composite application-development framework

RAD

**WDz**

**WebSphere Developer for zSeries:** Common workbench and an integrated set of tools that supports end-to-end, model-based application development

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## IMS Architecture Foundations


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## IMS Integration Suite – What is it?

- IMS middleware functions and tools for On Demand Integration
  - ◆ Enable Connectivity to IMS TM and IMS DB
  - ◆ Require IMS V9 +
  - ◆ Enhancements in IMS V10
- Generally Available
  - ◆ <http://www-306.ibm.com/software/data/ims/toolkit/>


## IMS Integration Suite – What is available?

- IMS TM - IMS Connect
  - ◆ IMS TM Resource Adapter
    - IMS Connector for Java
  - ◆ IMS SOAP Gateway
  - ◆ IMS MFS Web Support
- IMS DB
  - ◆ IMS DB Resource Adapter
    - IMS JDBC Connector
  - ◆ IMS DLIModel utility
  - ◆ IMS XML DB

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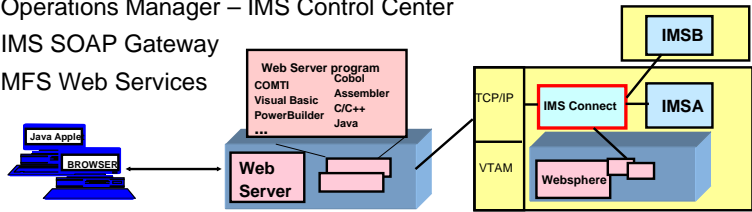
## Access to IMS transactions

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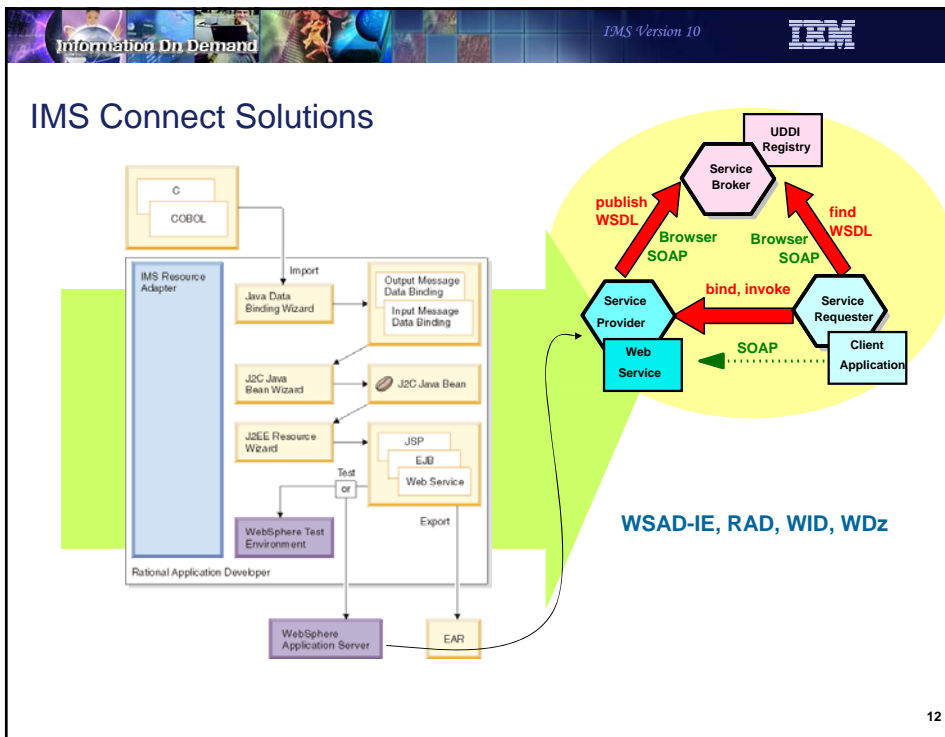
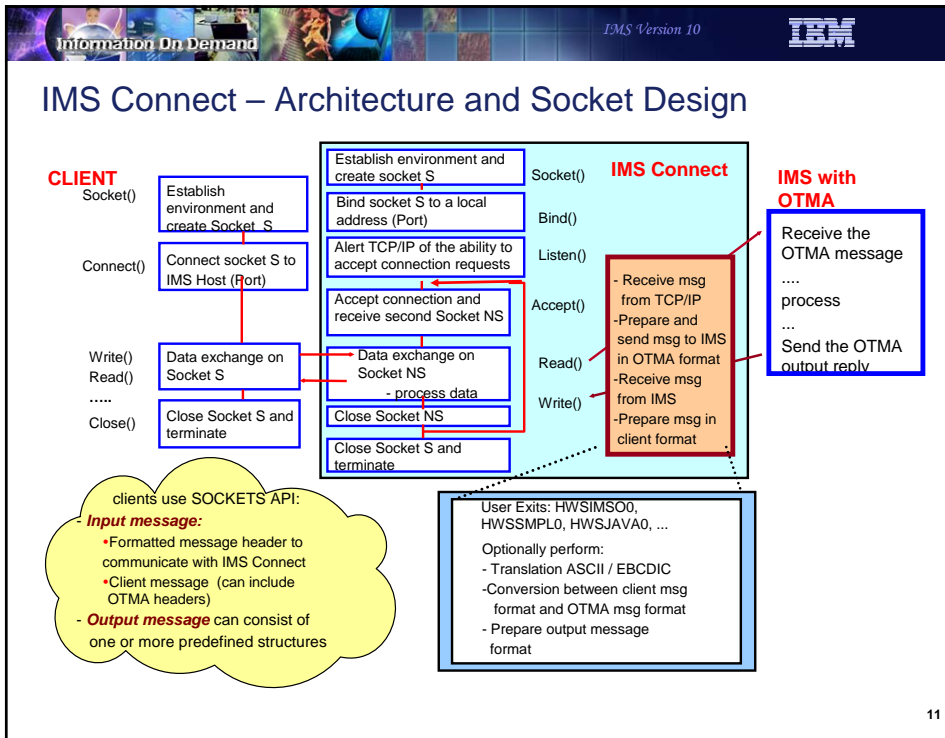
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### Architecture Foundation - IMS Connect

- A capability that provides connectivity support between TCP/IP applications and IMS transactions – Integrated into IMS V9
  - ◆ Configured on a z/OS server
- **Benefits and Value**
  - ◆ Supports TCP/IP sockets access to IMS transactions and commands
  - ◆ Provides a general purpose and structured interface
  - ◆ Provides a strategic base for new connection technologies
    - Operations Manager – IMS Control Center
    - IMS SOAP Gateway
    - MFS Web Services



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## IMS Connect Solutions

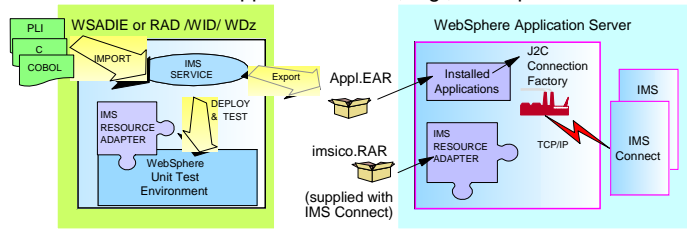
- IMS Integration Suite
  - ◆ IMS TM Resource Adapter
  - ◆ IMS SOAP Gateway
  - ◆ IMS MFS Web Support
- Write your own clients
- Other Vendor solution



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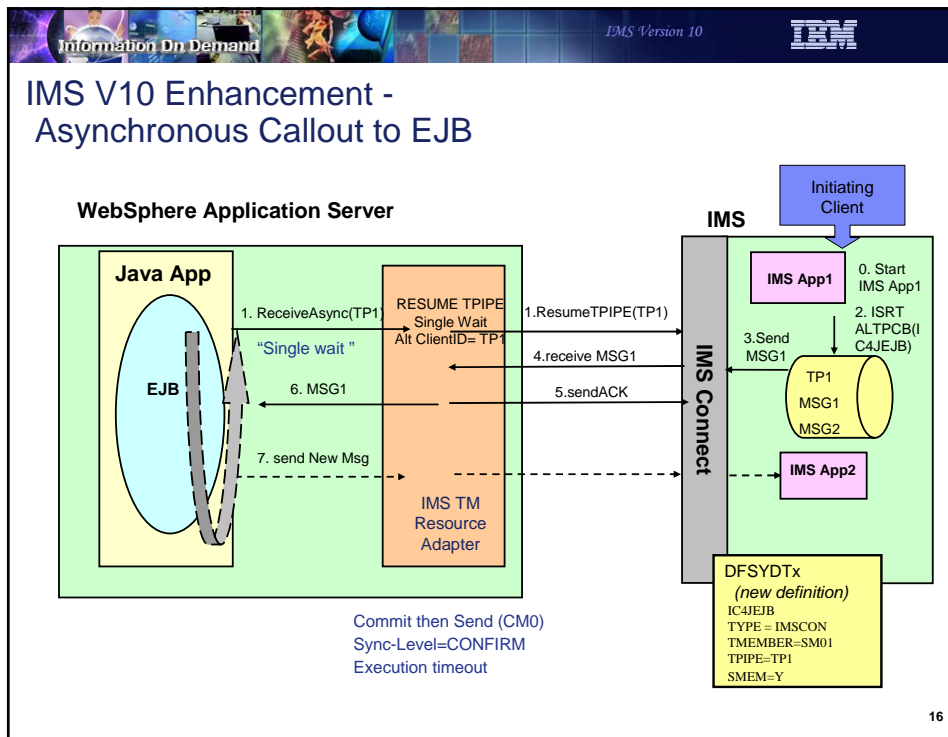
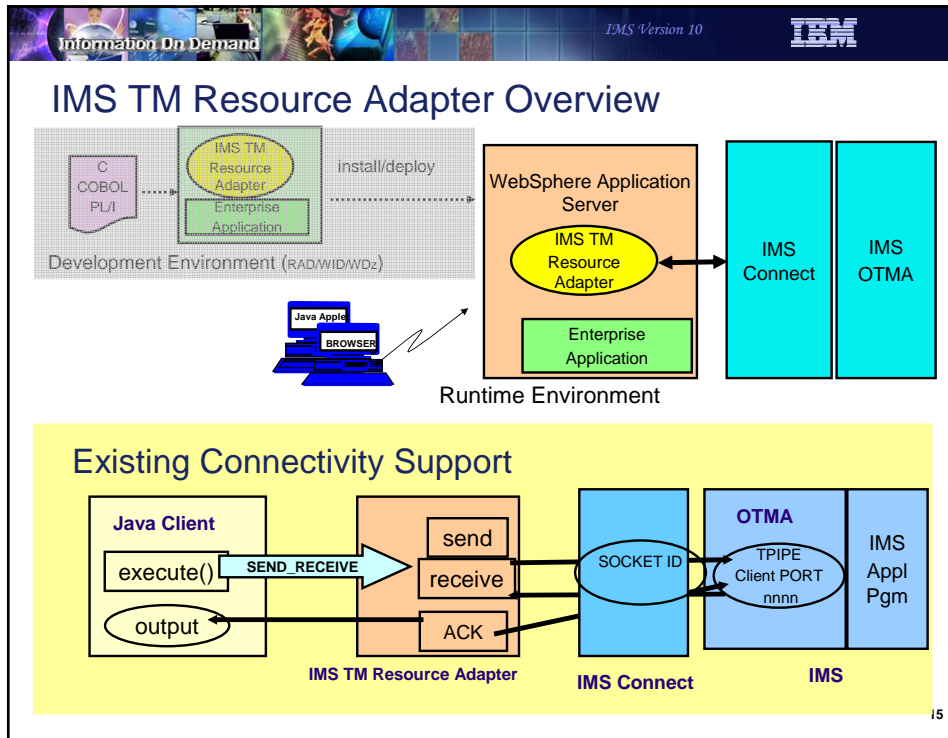
## IMS Integration Suite - IMS TM Resource Adapter

- **Previously called IMS Connector for Java**
  - ◆ Supports the development of J2EE applications, Web services, and business processes
    - **Development component**
      - Delivered with WebSphere Studio Application Developer Integration Edition (WSAD-IE) or Rational Application Developer (RAD), WID, WDz
    - **Runtime component**
      - Must be installed into an application server, e.g., WebSphere




**IMS Connector for Java = IMS Resource Adapter = WebSphere Adapter for IMS**

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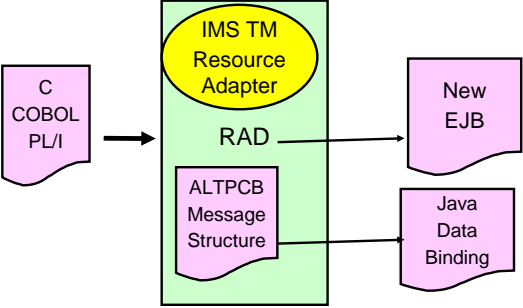





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## IMS V10 Enhancement - Asynchronous Callout to EJB ...

- Development Environment
  - ◆ RAD tooling
    - Generates Java Data Bindings for ALTPCB message structure
      - Provides data conversions to Java

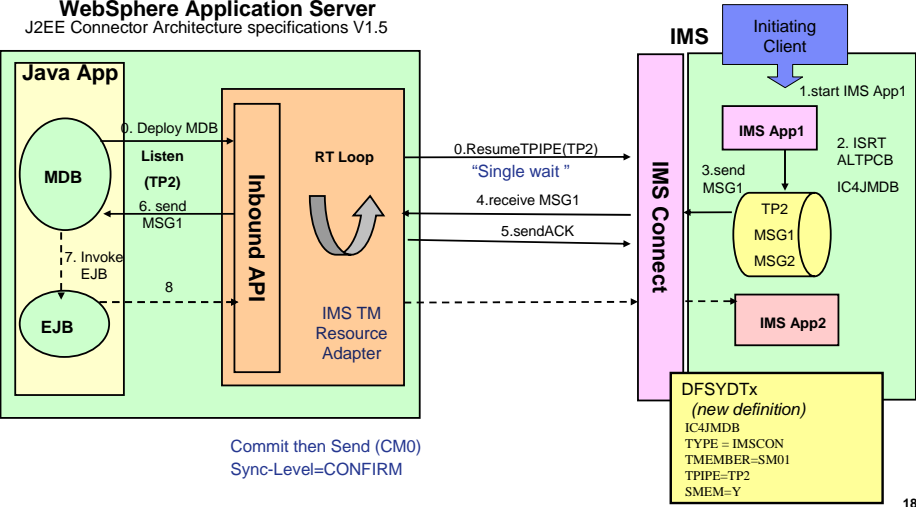


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## IMS V10 Enhancement - Asynchronous Callout to MDB

**WebSphere Application Server**  
J2EE Connector Architecture specifications V1.5

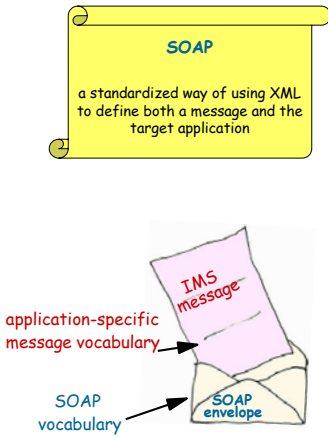


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## IMS Integration Suite - IMS Soap Gateway

- **IMS Soap Gateway**
  - ◆ Uses SOAP messages to support end-to-end integration between IMS transactions and
    - Microsoft .Net & Java applications
    - Any third party applications, e.g. SAP XI
    - RYO applications
  - ◆ Provides HTTP/SOAP transport and processing
    - SOAP envelope and headers handled by the gateway
  - ◆ Utilizes WebSphere Developer for z/Series tooling to create converters for transforming XML messages to COBOL data and vice versa
    - No need to change existing IMS application code

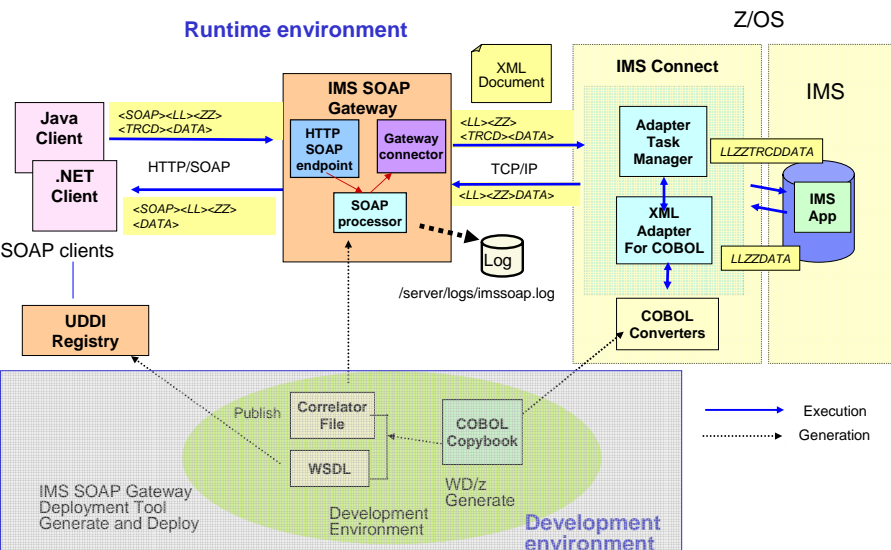


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## IMS SOAP Gateway ...

**Runtime environment**



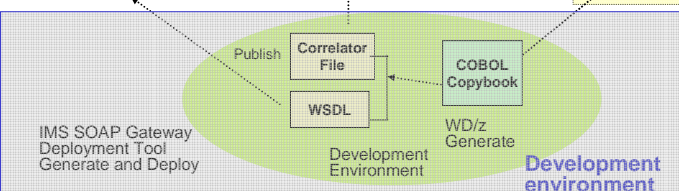
**Z/OS**

IMS Connect

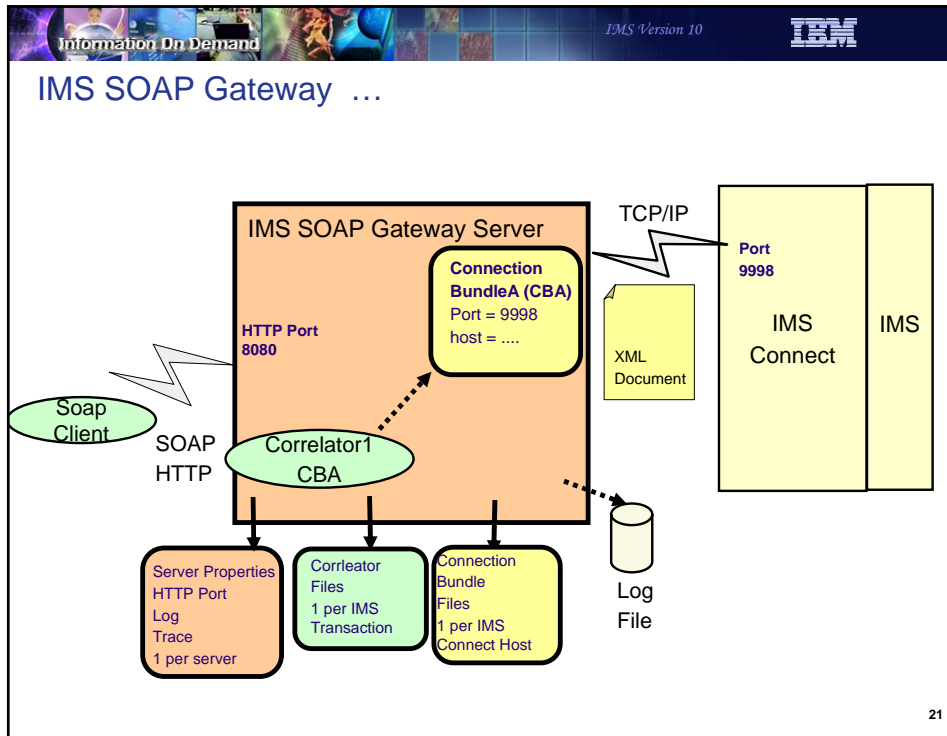
IMS App

COBOL Converters

**Development environment**



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## IMS SOAP Gateway Deployment Utility

- The Deployment Utility has the following Options.

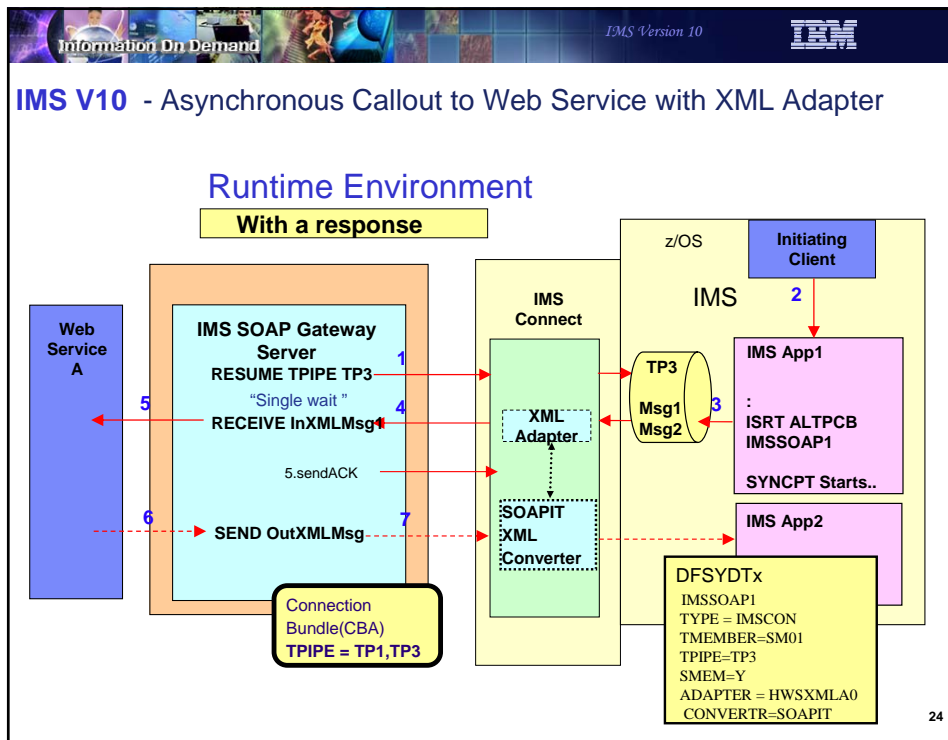
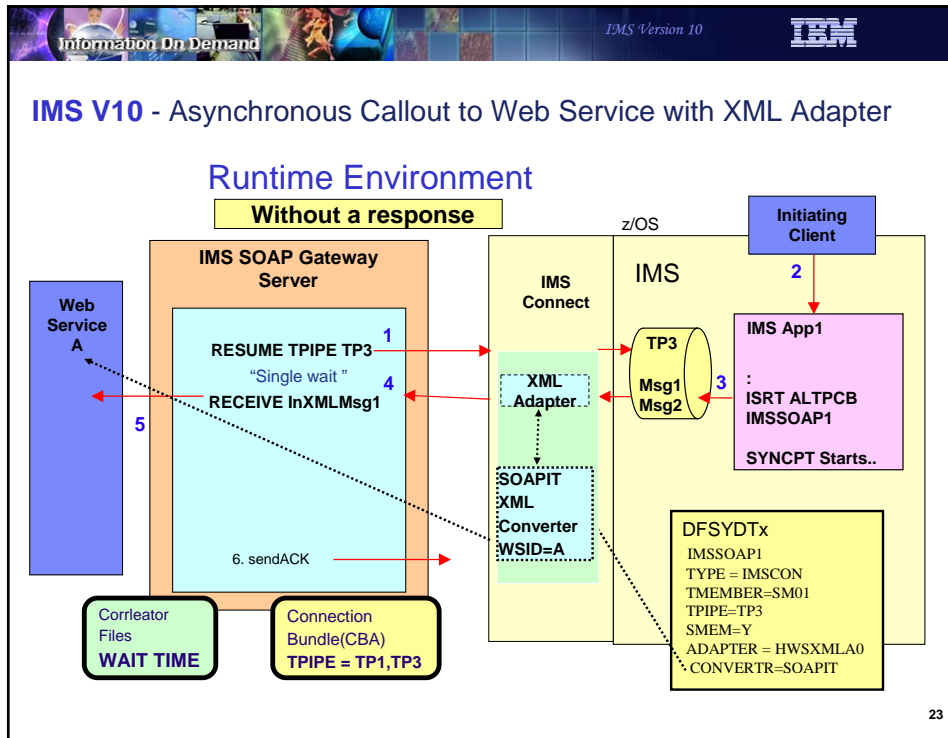
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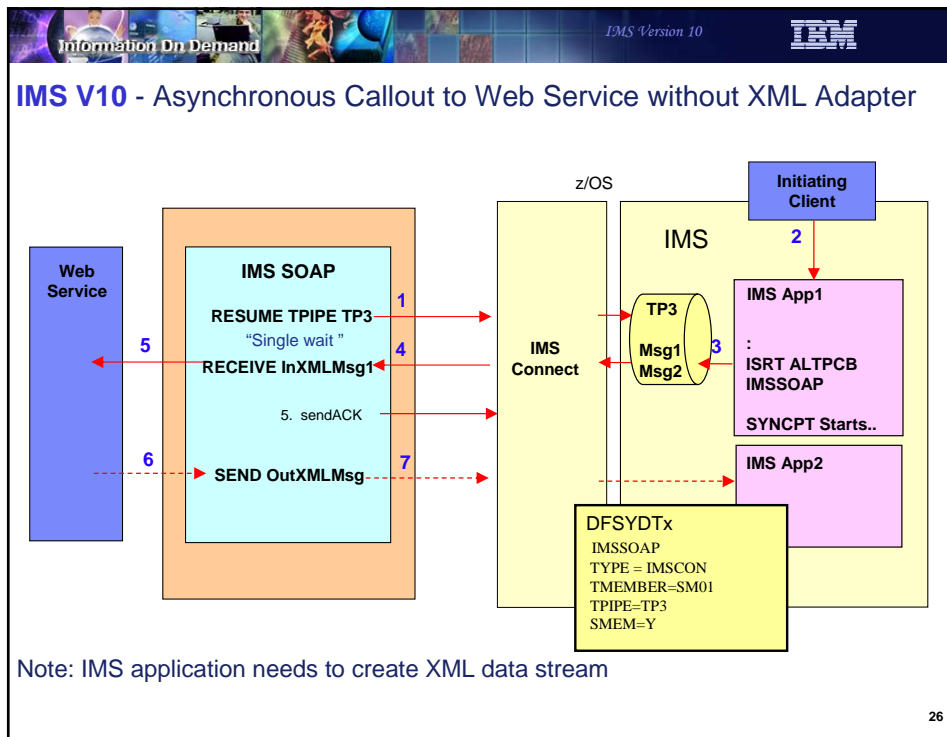
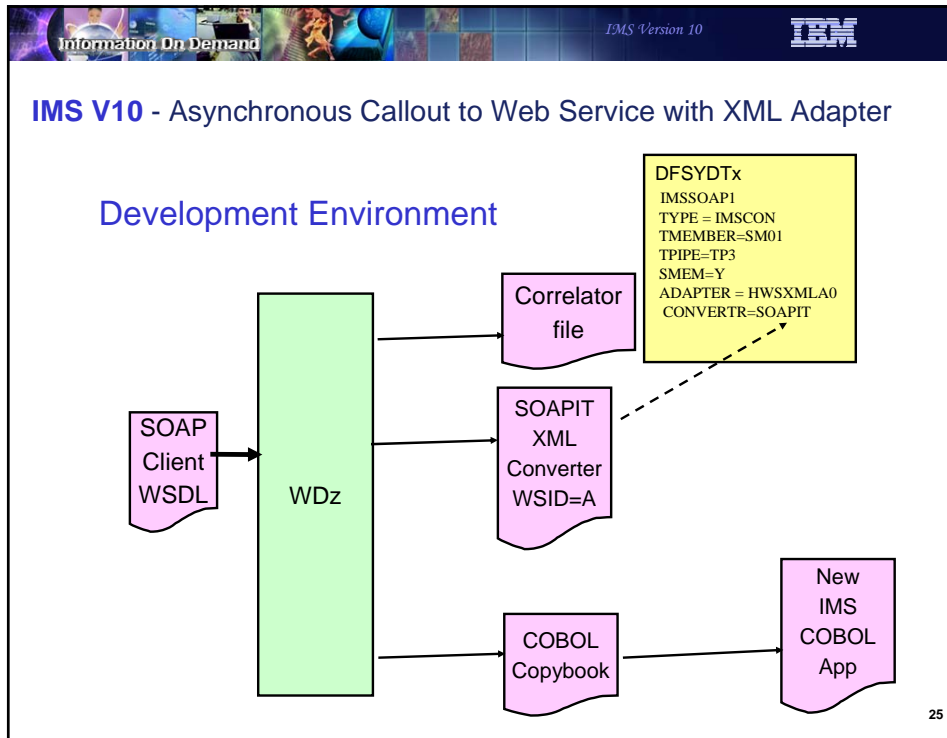
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Enable your IMS application as a Web Service :
Task 1: Enable your IMS application as a Web Service from start to finish

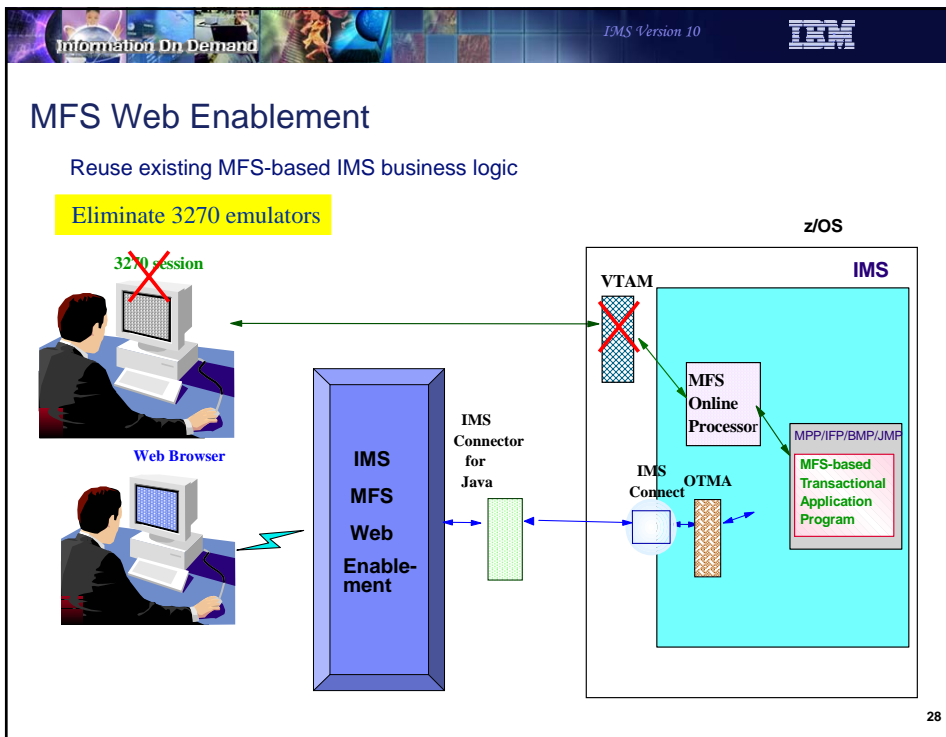
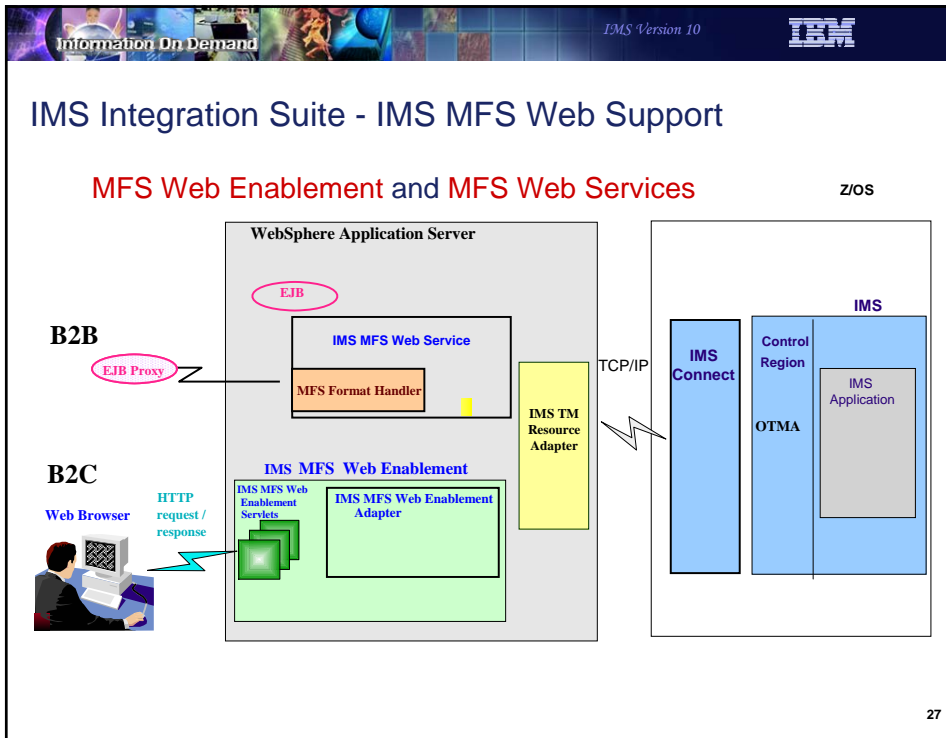
Administrative tasks :
Task 2: Start IMS SOAP Gateway
Task 3: Stop IMS SOAP Gateway
Task 4: Update IMS SOAP Gateway properties
Task 5: Create, Update or View correlator properties for Web Service
Task 6: Create, Update, Delete or View connection bundle
Task 7: Deploy the WSDL file
Task 8: Generate Java client code
Task 9: Undeploy Web Service
Task 10: Exit deployment utility
=====
> Enter your selection here:

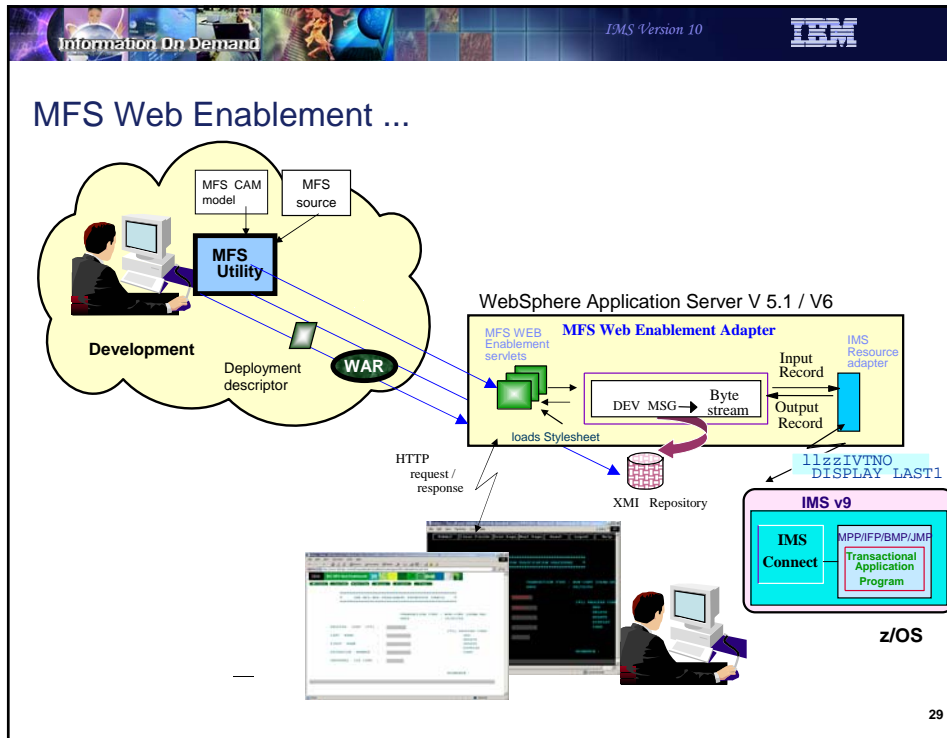
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## MFS Web Enablement Functional Overview

- Provide **B2C** solution to web-enable existing MFS-based IMS business logic.
- Maintain conversational iterations.
- Provide simple and user-friendly user-interface development tool
- Render displays on new modern devices, e.g. browsers


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## IMS MFS Web Support

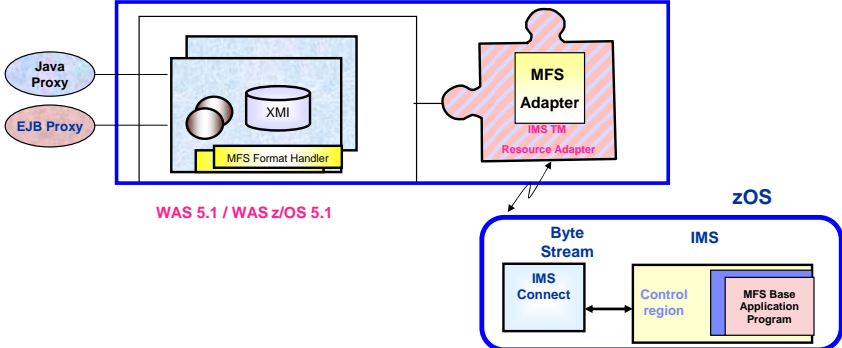
- IMS MFS SOA
  - ◆ Replaces IMS MFS Web Services solution
    - Dependent on IMS TM Resource Adapter and IMS Connect
  - ◆ RAD/WID/WDz development environments
    - Migrate from WSAD-IE



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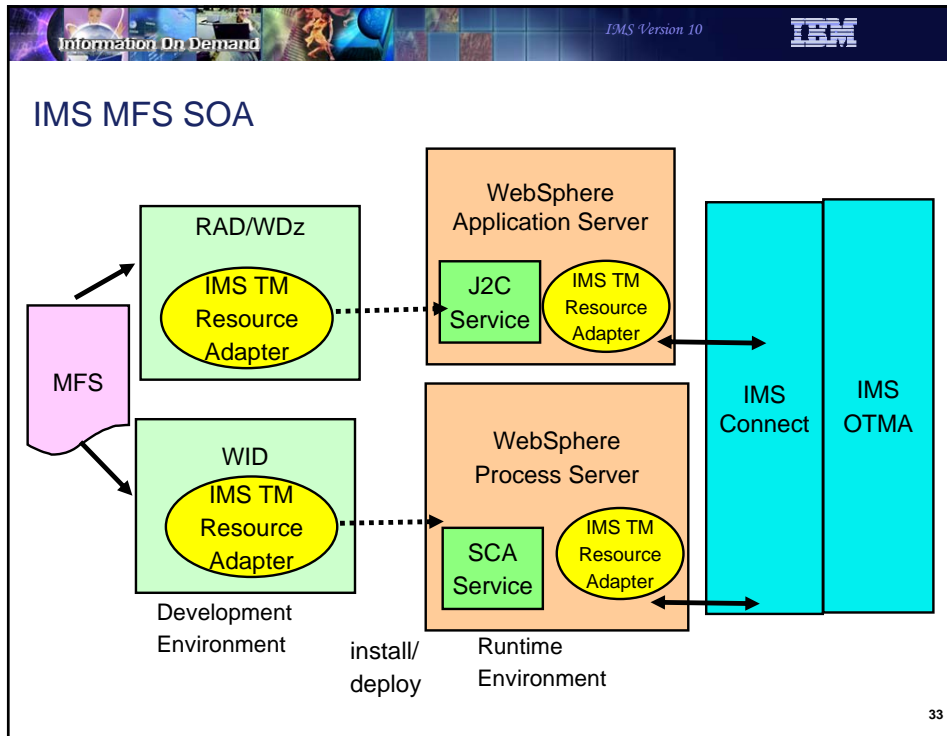
## IMS MFS Web Services - Current


- Capability that allows users to
  - ◆ Define a service from an MFS source file, publish the service, deploy it to WebSphere Application Server (WAS), and make it available as an EJB or a Java service.



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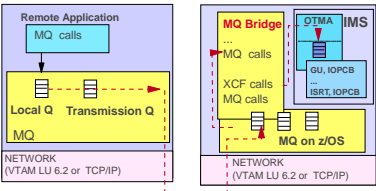


- Information On Demand IMS Version 10 
- ## Architecture Foundation - Messaging and Queuing
- Messaging and Queuing Model (transactions)
    - ◆ Characteristics
      - Processing occurs whether or not a connection is made
        - Assured delivery of messages (inbound/outbound) when components and/or network are available
    - ◆ Support
      - WebSphere MQ (MQSeries)
        - Remote program is not sensitive to the network type
          - MQ provides its own high-level standard API
          - Same applications can be deployed on TCP/IP or SNA
        - Supports the use of MQ API
        - Supports the use of JMS (Java Message Service) API
          - Messaging standard that allows application components based on J2EE to create, send, receive, and read messages
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## WebSphere MQ Family

- **Benefits**
  - ◆ Provides a programming interface that can be deployed across multiple platforms on different types of networks
- **IMS Support**
  - ◆ **Adapter** – uses the IMS External Subsystem interface
    - Supports the use of explicit MQ calls in the IMS application
  - ◆ **Bridge** – uses the OTMA interface
    - Takes advantage of the DL/I call interface in the IMS application



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## Comparing Solution Types – IMS Connect vs MQ

**▲ Direction Connection**

- Natively synchronous (connection-oriented), supports asynchronous (connectionless)
- Direct correlation between input and output
- Potential issues with program-to-program switches when spawning multiple transactions
- Easily supports IMS conversational transactions (relatively transparent)
- Designing for failure:
  - ▶ If connection can not be made, try later
  - ▶ Decide what to do when the connection breaks - understand IMS actions

**▲ Messaging and Queuing**

- Natively asynchronous (connectionless), simulates synchronous (connection-oriented)
- Need to consider how to correlate output to input
- Easily supports program-to-program switches even when spawning multiple transactions
- Requires keeping track of the conversation id to continue an IMS conversation
- Designing for failure:
  - ▶ No knowledge of whether entire connection path is available
  - ▶ Handle Late reply messages and the dead letter queue

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## Access to IMS data

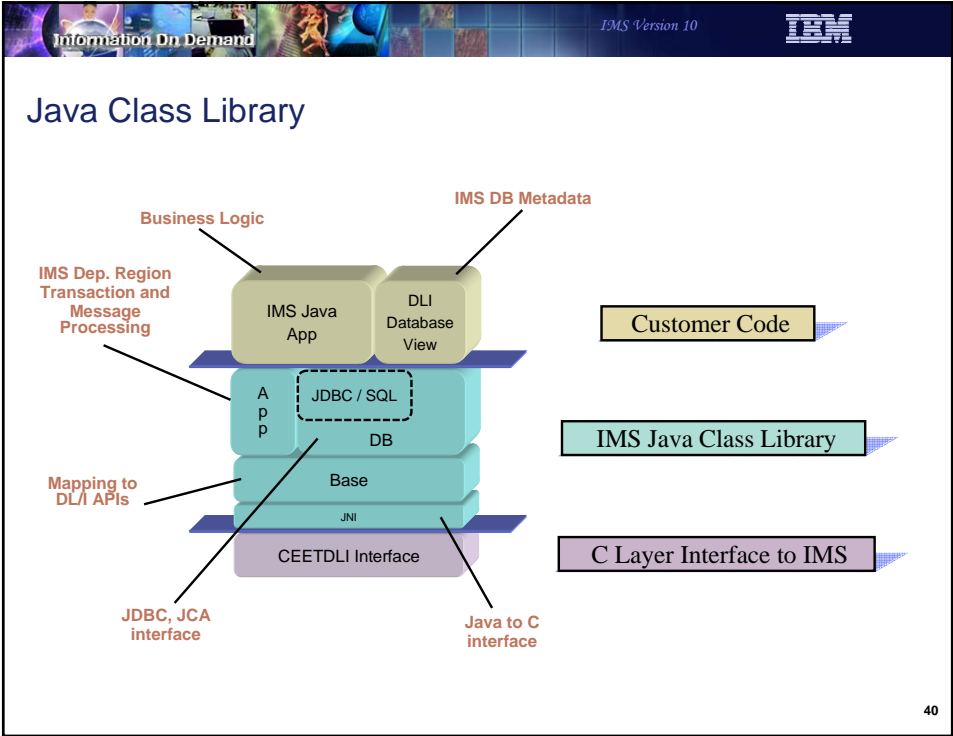
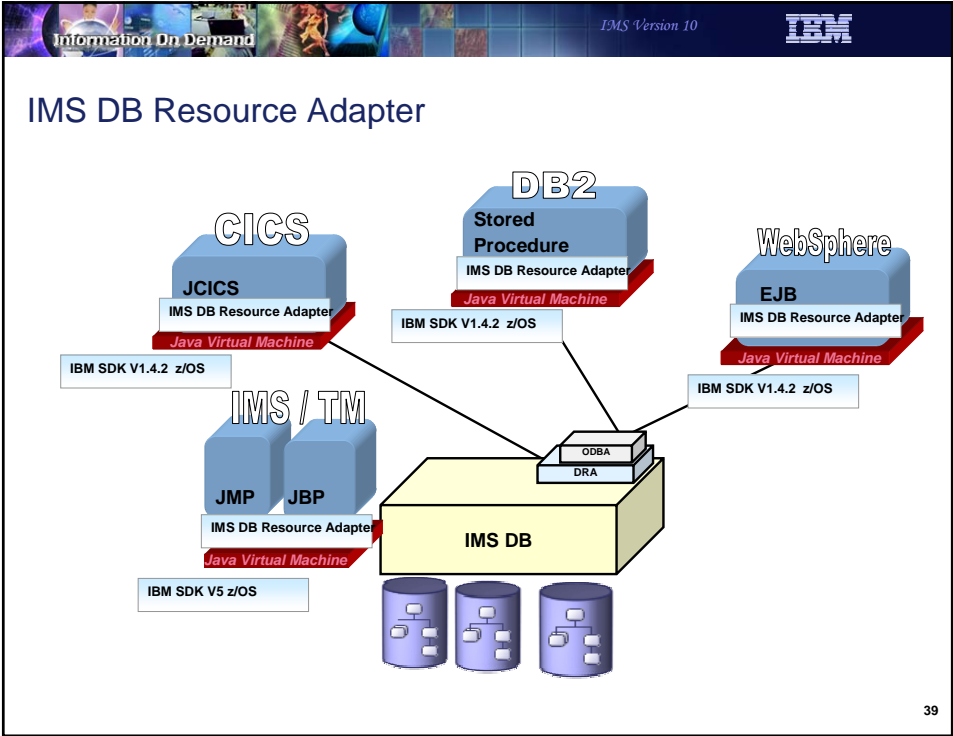
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### Application Requirement – Access to Data

- Direct Connection (database)
  - ◆ Characteristics
    - Access to data without invoking an IMS transaction
  - ◆ ODBA interface (Open DataBase Access)
    - Programs that issue database calls must reside on the same MVS as IMS
  - ◆ **IMS Integration Suite - DB interfaces**
    - IMS DB Resource Adapter
      - IMS Java with JDBC support
      - IMS DLIModel utility
    - IMS XML DB

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## IMS Solutions

- JDBC access to IMS DB with the IMS DB Resource Adapter
- WebSphere z/OS and IMS Java support
- Support with IMS V9 – IMS Java Remote Data Services

CM: container managed (supports global transaction semantics)  
 BM: bean managed (supports local transaction semantics)

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## DLIModel Utility - IMS V10 Enhancements

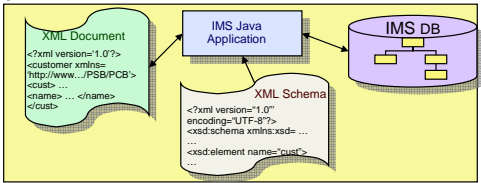
**NEW (V10)** enhancements include:

- XMI (HFS)
- XML Schema(s) (HFS)
- IMS Java Metadata classes (HFS)
- IMS Java Report (HFS)
- NEW GSAM Metadata (V10)

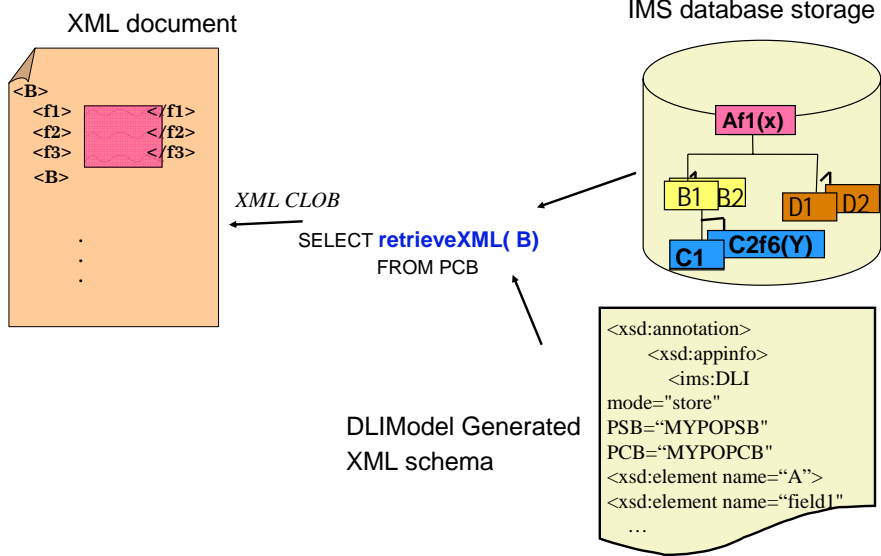
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## XML Database - IMS V9


- Storage and retrieval of XML documents in IMS databases
  - ◆ Composition of XML documents from existing IMS databases
    - Creation of IMS segments from XML documents (decomposition)
    - Intact storage of XML documents (without decomposition)
  - ◆ Tooling assistance to define metadata for mappings
  - ◆ IMS Java application programming support
- Benefits
  - ◆ Easy exchange of data between IMS databases and XML documents
    - Existing IMS databases may be used to create XML documents
    - Existing applications are unaffected



## IMS DB Resource Adapter XML V9 API

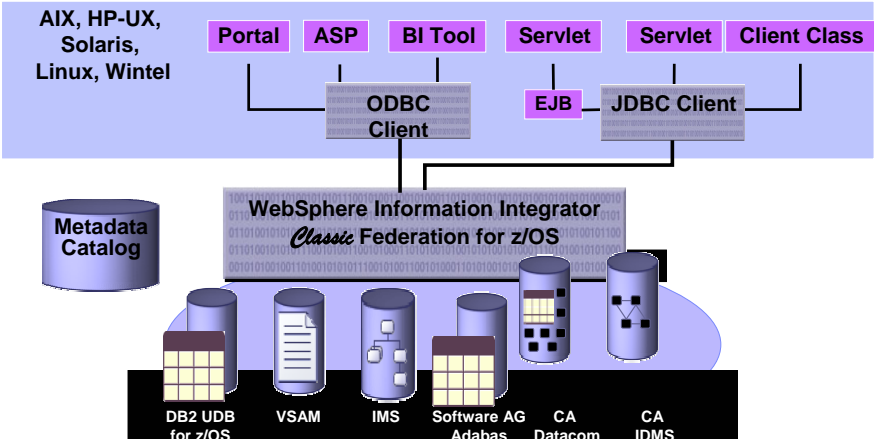





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## WebSphere Solutions ...

- WebSphere Information Integrator *Classic Federation* (WSIICF) ...
  - ◆ <http://www-306.ibm.com/software/data/integration/iicf/support.html>



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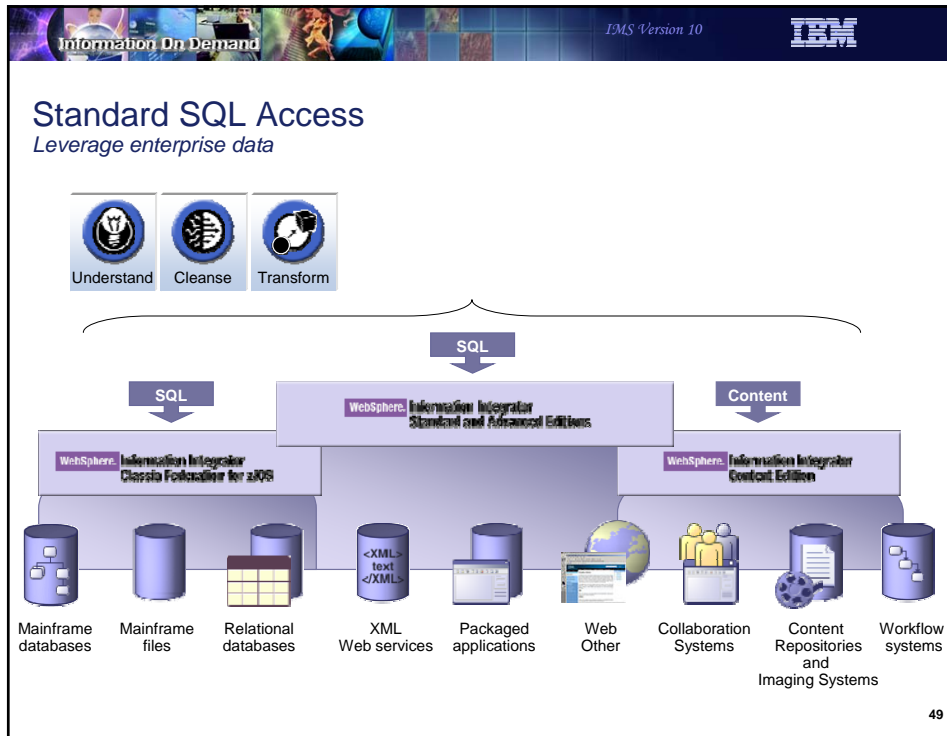
## Outbound Access

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## Positioning IMS applications as service consumers

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- ## Accessing Other Environments
- IMS applications can “explicitly” code communication interface calls
    - ◆ TCP/IP sockets support
      - Standard sockets api - C, Java
      - Extended sockets EZASOKET api - Cobol, PL/I, ...
      - BPX1xxx CALL api - Assembler
    - ◆ APPC calls
    - ◆ MQ calls
    - ◆ SQL calls to DB2 stored procedures
  - IMS Integration Suite asynchronous capabilities
  - IMS Java application capabilities
    - ◆ Standard Java classes
      - HTTP, etc.?
  - Enterprise Cobol For z/OS V3.2 or later
    - ◆ Interoperability with IMS Java
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## Pushing Data Out

- IBM solutions
  - ◆ IMS Architecture capability – Data Capture Exit
    - Supports
      - Synchronous capability
        - Extension to the IMS application as an exit routine (no change to application)
        - ISRTs ALTPCB, db calls, MQ calls, Socket calls, etc.
      - Asynchronous capability
        - Data Capture Log records – x'99'

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## Pushing Data Out ... WS II Classic Event Publisher

- ◆ WebSphere Information Integrator Classic Event Publisher for IMS (5655-M38)
  - [http://www-306.ibm.com/software/data/integration/iicep/edition\\_ims.html](http://www-306.ibm.com/software/data/integration/iicep/edition_ims.html)
  - *Leverages the IMS Data Capture architecture*
    - Captures changes made to IMS files using an IMS logger exit
      - Captured changes are reformatted into a relational data format
    - The relational format data is packaged as a self-describing XML message
    - The XML messages are published to WebSphere MQ

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## Pushing Data Out ... WS II Classic Event Publisher ...

| Function   | Usage  |
|--|--|
| <ul style="list-style-type: none"> <li>• Capture data events in real time</li> <li>• Publish these data events:               <ul style="list-style-type: none"> <li>◆ to a message queue for widespread delivery</li> <li>◆ in XML format for widespread use</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Application to application messaging</li> <li>• Event streaming</li> <li>• Change-only data distribution</li> </ul> |

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## Summary

- The message:
  - ◆ **IMS continues to be a premier server**
    - Architected interfaces support standard access from the web
  - ◆ **New interfaces, products and tools from a variety of vendors provide access to IMS transactions and data**

- **Extremely High Availability and Overall Reliability**
- **Massive end-to-end Scalability**
- **Capacity on Demand**
- **Rock Solid Security**
- **Higher Utilization and Balanced System Design**
- **Advanced Virtualization Capabilities**
- **Highly Manageable, Responsive and Autonomic via Workload Manager and Intelligent Resource Director**
- **Utilizes Open and Industry Standards**
- **World-class Integrated Support**

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