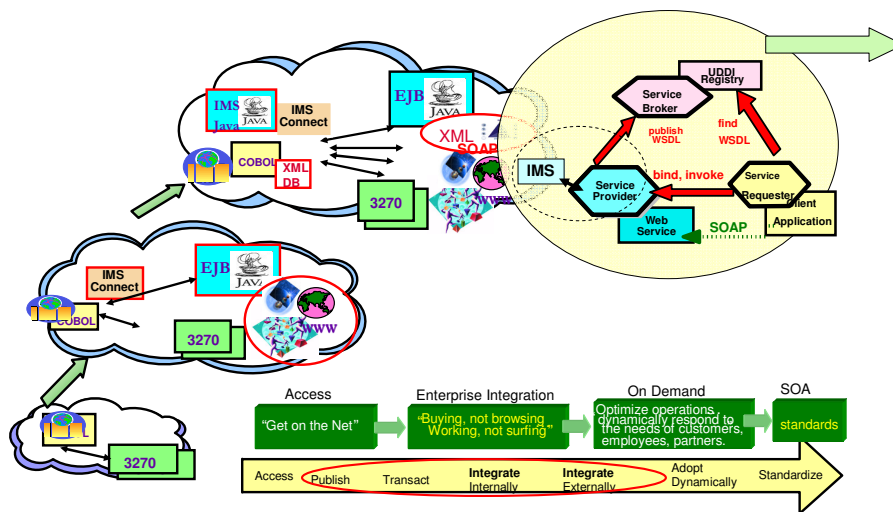




SOA Access To and From IMS



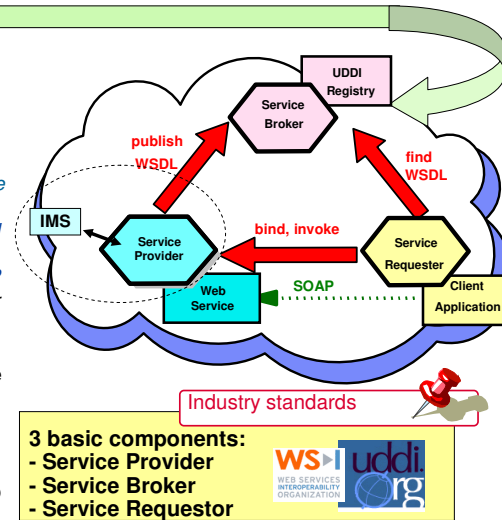
The IMS evolution ...



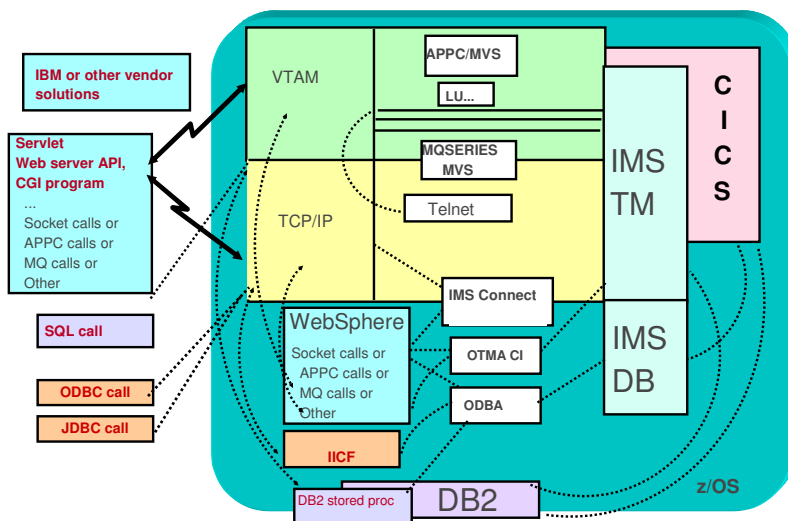
... To SOA and Web Services

- Definition:**

- Web Service**
 - Standards-based 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
- Web Services Description Language (WSDL)**
 - 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

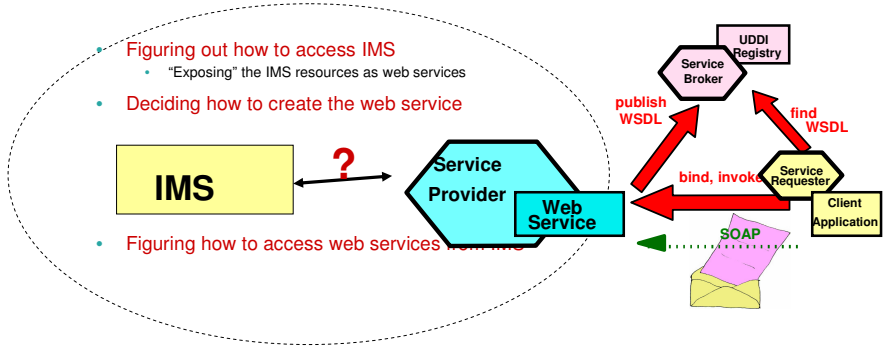


Leverages existing Architecture Foundations



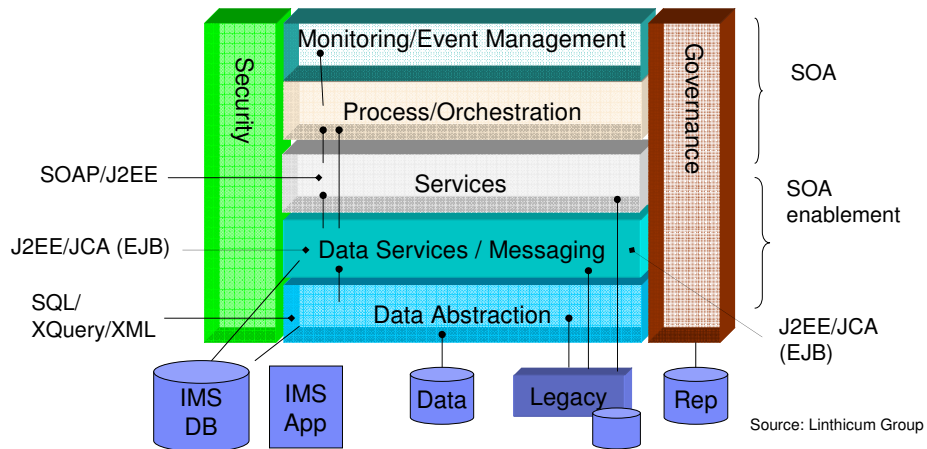
The Challenge - SOA Enablement

- REQUIREMENTS**
- Provide access to IMS resources as web services
 - Provide access from IMS transactions to web services



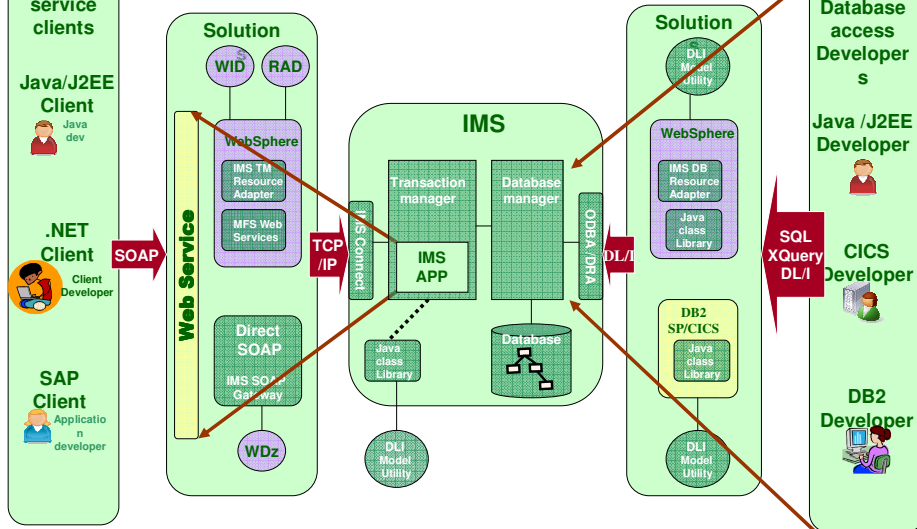
IMS Solutions provide SOA Enablement

- Tooling can be used for the SOA higher layers
- Assets projected into the lower layers can be “pulled” higher



Source: Linthicum Group

To Provide a variety of new IMS Solutions



Accessing IMS resources (IMS as a service provider)

How do you choose a solution?

- **By understanding your requirements:**

- **The Environment - SNA or TCP/IP**
 - Different solutions by network type

- **Application requirements**

- Access to IMS transactions

- **Direct connection model Characteristics**
 - Processing begins only if connections can be established
 - Immediate notification of problems

- **Messaging and Queuing model Characteristics**
 - Processing occurs whether or not a connection is made
 - Assured delivery of message when path is available

- Access to IMS data
- Replicating IMS data
- Access from IMS applications

- **Development requirements**
 - Programming language
 - Toolkits

First define your requirements



There are a variety of solutions

9

Solutions

Many vendors, many solutions - Good News for IMS !!!

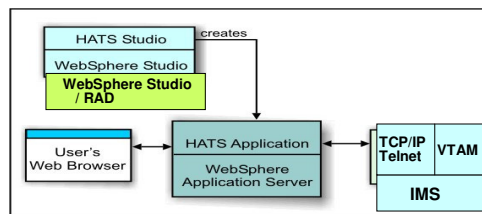
- Crossplex e3270 Emulation - SolTouch Systems Inc.
http://www.softouch.com/cpx_prod/index.html#
- HOBLINK TE - <https://webshop.hob.de/scripts/produkte.php>
- Host Access Transformation Services - IBM
<http://www.ibm.com/software/websevers/hats/>
- Jacada - <http://www.jacada.com>
- Resqnet - <http://www.resqnet.com>
- Web 390 for OS/390 and MVS - Information Builders
<http://www.informationbuilders.com/products/web390/pdf/web390.pdf>
- IONA Mainframe Integrator for IMS - <http://www.iona.com>
- iWay Adapter for IMS/TM
http://www.egeneration.com/iwaydocs/iway55/5.5.001/iw55_ims.pdf
- Sybase XJS 390 Enterprise Integrator 3.8
<http://www.sybase.com/detail?id=1018620>
- webMethods 6 Mainframe Integration - <http://www.webmethods.com>
- BMC Energizer for IMS Connect - <http://www.bmc.com/>
- IMS Connect Extensions - http://www.fundi.com.au/pr_ims_ce.html
- Seagull LegaSuite for IMS
<http://www.seagullsoftware.com/products/ims/runtime-architecture.html>
- IBM - IMS Connect
<http://www-306.ibm.com/software/data/ims/connect/index.html>
- IBM - MQ Bridge - <http://www-306.ibm.com/software/integration/wmq/>
- BEA eLink Adapter for Mainframe TCP - BEA Systems
<http://e-docs.bea.com/elinke/mainfram/tcp/v32/pdf/luxug.pdf>
- NEON Systems Shadow Interface™ for IMS/TM - Neon Systems Inc.
<http://www.neonsys.com>
- IMS Server Adapter OTMA Plug-IN - IONA (uses OTMA C/I)
http://www.iona.com/support/docs/orbix/mainframe/6.0/ims_admin/OTMAConfig2.html#302847
- Informatica PowerExchange for IMS
http://www.informatica.com/products/powerexchange/supported_platforms/ims/infa_px_ims_120204.pdf
- Attachmate - Synapta Services Builder for IMS
http://www.attachmate.com/NR/rdonlyres/2FFC7D0A-9744-4996-95CE-18AFCCE0B4F7/0/tp_ssb_transactionaccess.pdf
- Compsys Connector for IBM IMS
[http://www.compsys.de/pdf/connector_ims_datasheet\(en\).pdf](http://www.compsys.de/pdf/connector_ims_datasheet(en).pdf)
- Microfocus Mainframe Express (MFE) IMS Connect interface
http://www.microfocus.com/mfnewsletter/20040601_004.asp
- MicroSoft Transaction Integrator
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/his_2004/main/html/his_planning_for_transaction_integrator_node_gp/h.asp
- NetManage OnWeb Connectors
http://www.ftp.com/products/pdf/datasheets/OnWeb_Connectors2_3-05.pdf
- SeeBeyond eWay Intelligent Adapter for IMS
http://goldstar.seebeyond.com/support/support/docs/4.5.4/eWay_Intelligent_Adapters/IMS_eWay_Monk.pdf
- Oracle Access Manager for IMS
<http://www.wisc.edu/dmt/am4ims.html>
- MQ offerings -
<http://www-306.ibm.com/software/integration/mqfamily/directory/bridges.html#11>
- Attunity Connect - <http://www.attunity.com/Products/AttunityConnect.Asp>
- eWay™ Intelligent Adapters 5 - SeeBeyond
<http://www.seebeyond.com/software/eway.asp>
- GT Software - Ivory Data Access
<http://www.gtsoftware.com/content.asp?page=IMS%20or%20DL1%20Data%20>
- AccessIMS Adapter for Sonic ESB - Sonic Software
http://www.sonicsoftware.com/products/docs/adapter_esb_ims.pdf

... and many more

10

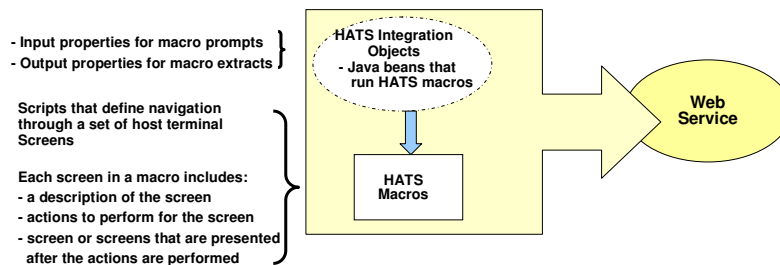
Direct Connection Model - 3270 emulation

- **Benefits and value**
 - Straightforward and simple
 - Traditional IMS communication model
 - Leverages standard TCP/IP Telnet (TN3270) capabilities
- **IBM's Host Integration Solution - Host Access Transformation Server (HATS)**
 - Out of the box - transforms 3270 data streams to HTML
 - Provides customization and access to multiple hosts
 - Access provided as Java Applets or as Host Servlets
 - Supports the creation of Web Services



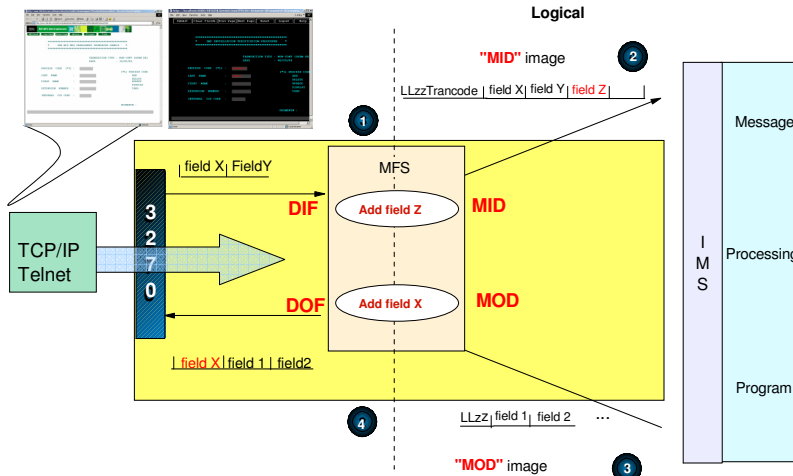
Direct Connection Model - 3270 emulation ...

- **HATS**
 - Toolkit
 - Provides a set of wizards and editors that create J2EE applications
 - Runtime
 - Provides connection management
 - *The runtime program is packaged within the J2EE application built by the toolkit*



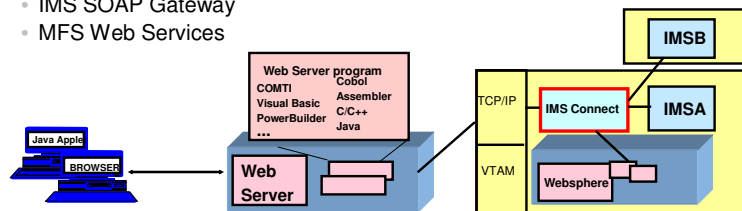
Direct Connection Model - 3270 emulation ...

3270 emulation solutions continue to invoke MFS

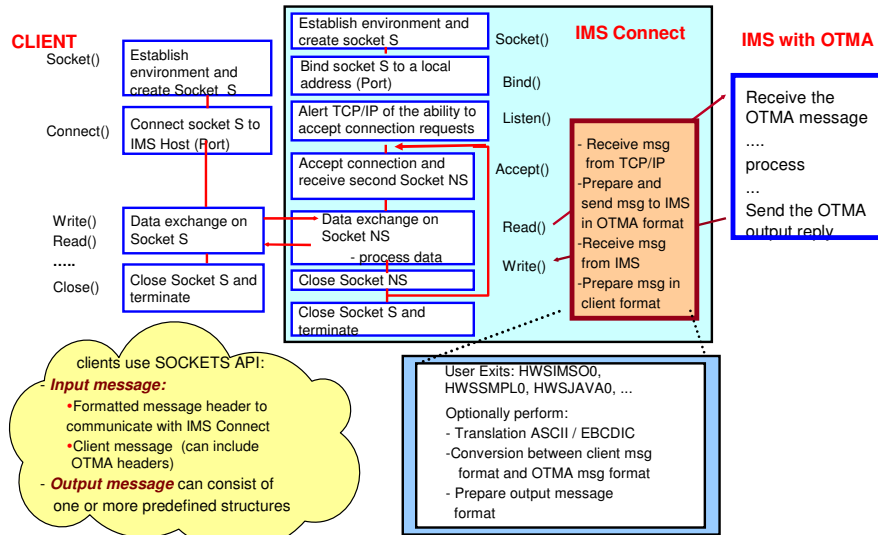


Architecture Foundation - IMS Connect

- 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



IMS Connect – Architecture and Socket Design



IMS Connect Solutions

- IMS Connect provides the IMS interface for TCP/IP solutions

- ◆ IMS Integration Suite

- Require IMS V9 + with enhancements in IMS 10

- General Availability

- <http://www-306.ibm.com/software/data/ims/toolkit>

- IMS TM Resource Adapter
- IMS SOAP Gateway
- IMS MFS Web Support

- Write your own clients

- Other Vendor solutions

existing IMS transactions can be integrated into the service-oriented architecture by implementing a Web service as a front-end access-point interface



IMS TM Resource Adapter ...

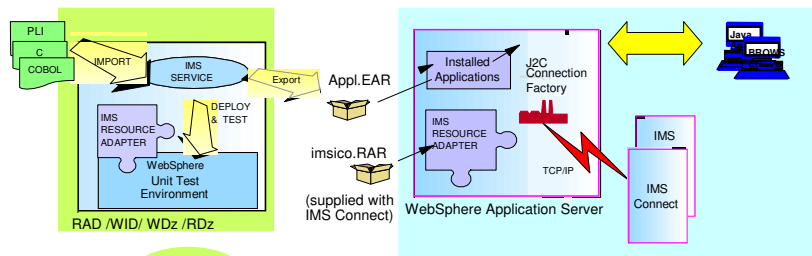
- Supports the development of J2EE applications, Web services, and business processes that can interface with IMS Connect

Development component

- Rational Application Developer (RAD), WID, WDz, RDz

Runtime component

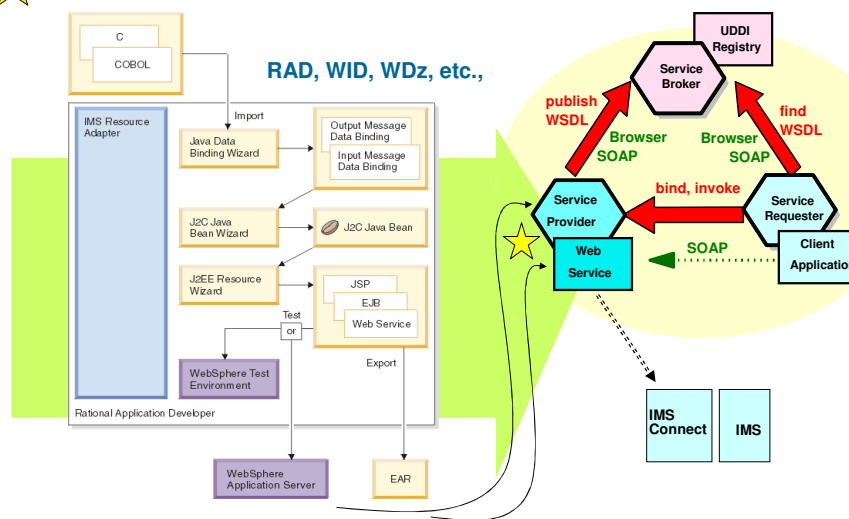
- Must be installed into an application server, e.g., WebSphere



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

IMS Integration Suite - IMS TM Resource Adapter

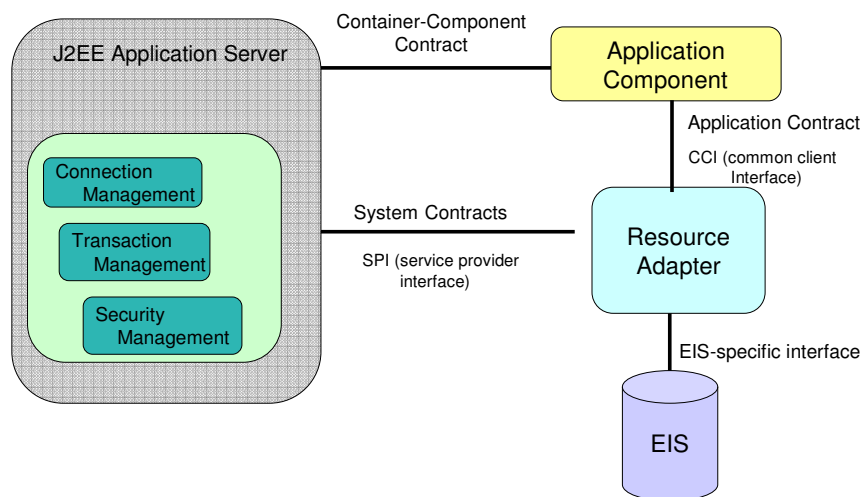
- Assists in the generation and execution of EJBs, web services, etc.,



IMS TM Resource Adapter - J2EE and JCA

- J2EE and JCA are the products of the Java Community Process
- J2EE Platform
 - Provides a reusable component model
 - Provides transaction and security management
 - Shares the platform independence approach of Java
- Connection Architecture (JCA)
 - Offers a standard interface between a J2EE application server and any EIS (Enterprise Information System, e.g., IMS)
 - Common interface to "connect" to an EIS via a resource adapter

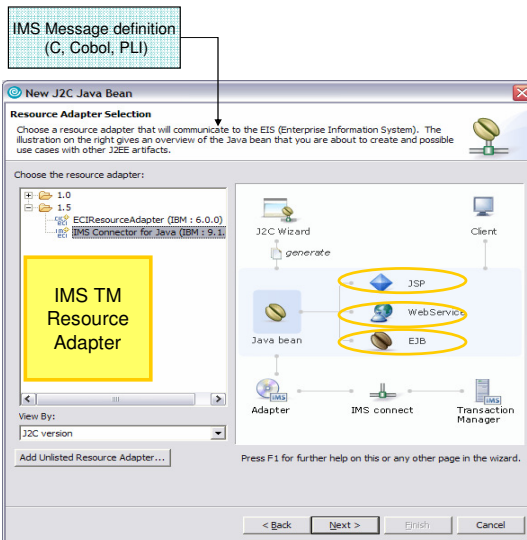
J2EE/JCA Architecture



IMS TM Resource Adapter Capabilities

- **Supports J2EE Connection Architecture (JCA) 1.0 & 1.5**
 - **Supports various types of interactions and programming models with IMS**
 - Invokes IMS transactions or commands
 - Conversational and non-Conversational
 - MFS, COBOL, C, PLI, Java
 - Send Recv, Send Only
 - Retrieve Asynchronous output
 - Options for handling undelivered output messages: purge or reroute
 - Single no wait, single wait
 - Alternate Client ID
 - Commit mode 1 or 0 processing
 - SyncLevel none or Confirm
- **Connection Management**
 - Connection pooling
 - TCP/IP and Local Option connections
 - Handles execution or socket timeouts
 - **Transaction Management**
 - Global z/OS RRS transaction support and Distributed XA transaction support with Two Phase Commit (i.e. SyncLevel Syncpt)
 - **Security Management**
 - J2EE EIS Sign-on
 - SSL, RACF key ring
- **Enhancements in complex environment**
 - Sysplex distributor environment
 - zWAS 64 bit support

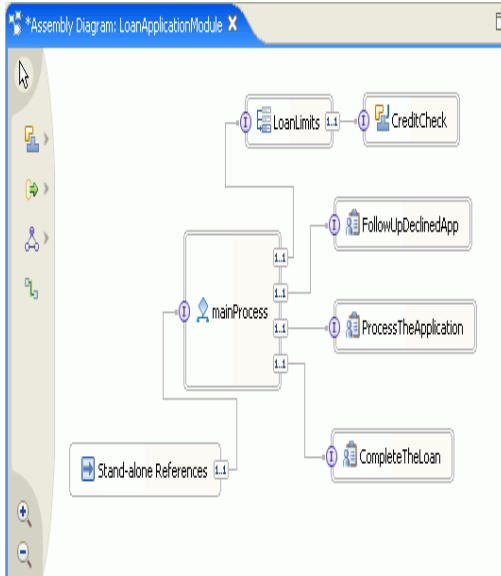
IBM Rational Application Developer (RAD)



WDz and RDz
- Integrate RAD

- **Easy-to-use application development tool**
- **Graphical and source editors**
- **Helps modernize your IMS application**
 - Parse existing IMS application source and generates J2EE app and Web Service
 - No need to change IMS application

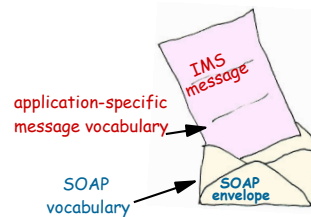
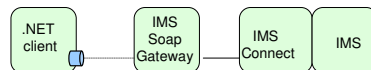
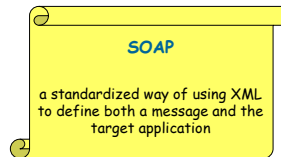
IBM WebSphere Integration Developer (WID)



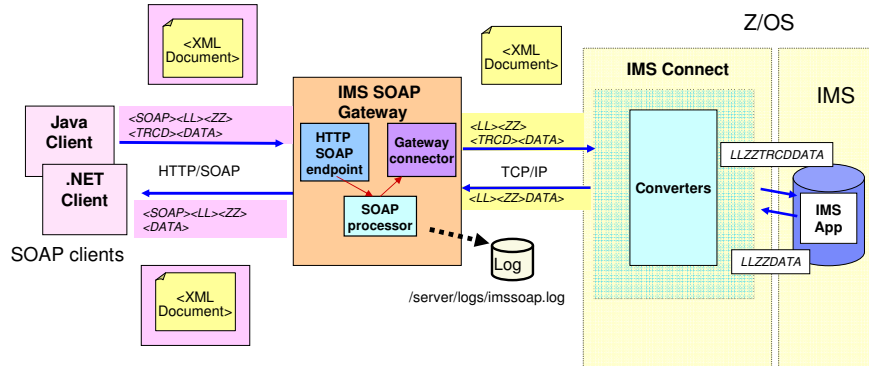
- Simplify and accelerate the development of integrated applications
 - Put together the individual services into a flow
- Implements Service Component Architecture technology and business process choreography
- Industry-standard service-oriented architecture

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 IMS messages and vice versa
 - No need to change existing IMS application code

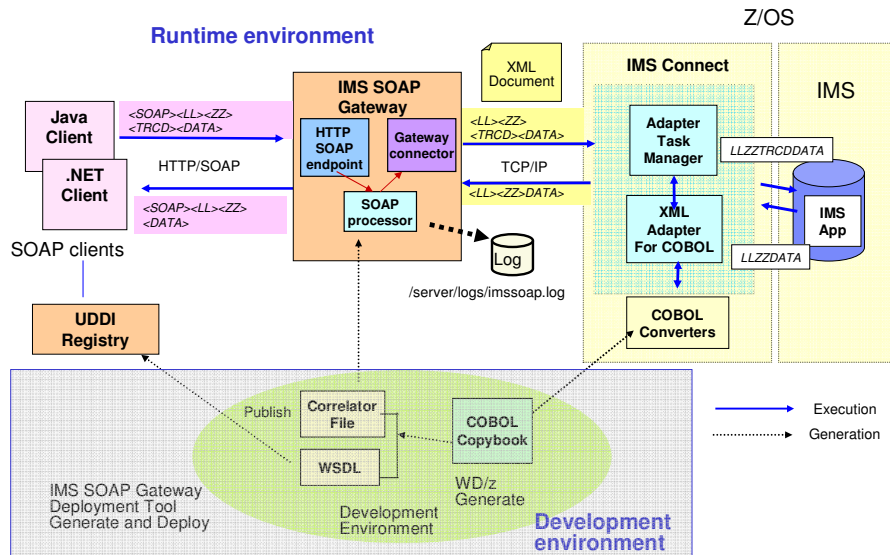


IMS SOAP Gateway Overview ...



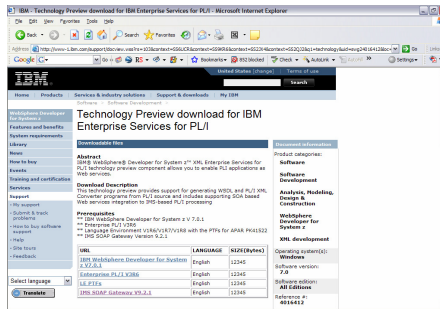
- A direct web service solution for IMS
 - Lightweight
 - Does not need a J2EE server

IMS SOAP Gateway ...



PL/I support for the IMS Soap Gateway

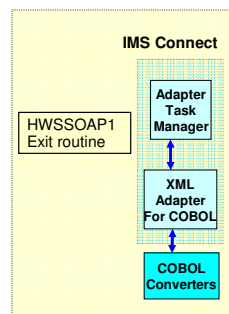
- Technology preview download
 - http://www-1.ibm.com/support/docview.wss?rs=103&context=SS6UCR&context=SS9KR6&context=SS2JX4&context=SS2QJ2&q1=technology&uid=swg24016412&loc=en_US&cs=utf-8&lang=en



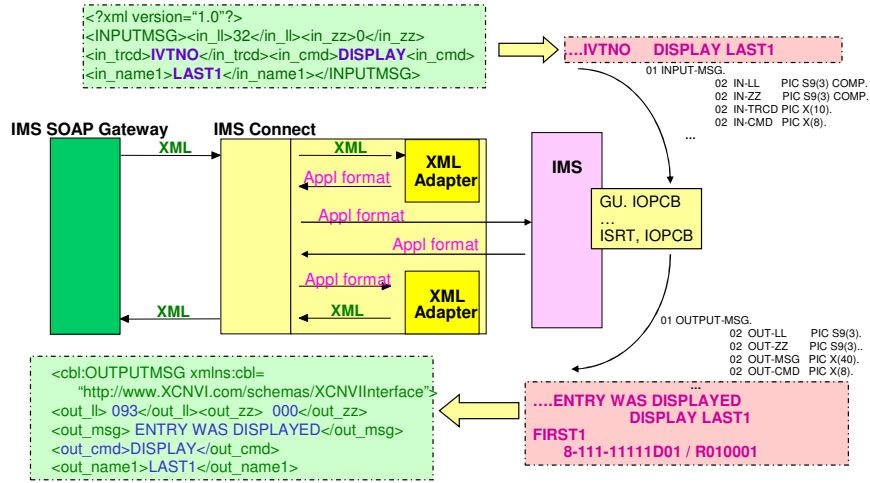
- support for generating WSDL and **PL/I XML Converter** programs from PL/I source
- Support for SOA Web services integration to IMS-based PL/I processing

XML Conversion Support

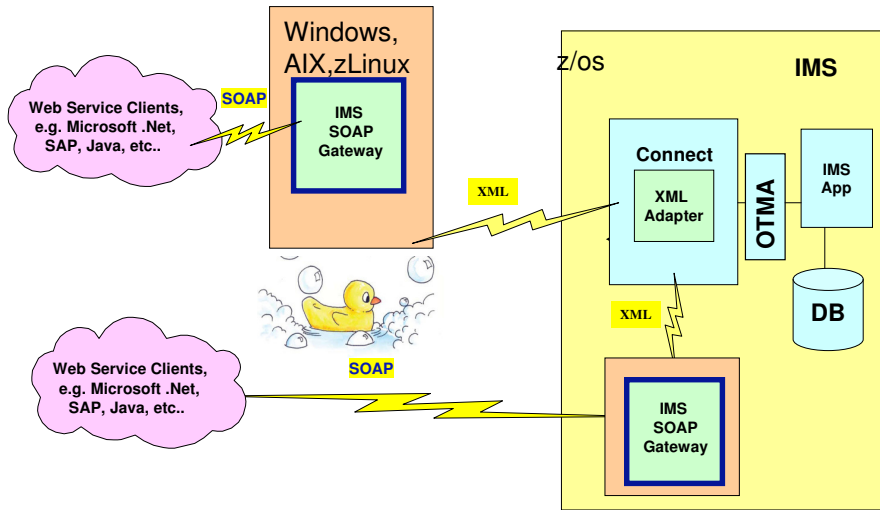
- **XML converter routines**
 - Cobol / PLI source code
 - Provide the information needed to perform conversion from tagged data to a byte stream
 - Unique to each message definition
 - Can be generated by WDz toolkit
 - Compiled and bound into file that is concatenated into IMS Connect STEPLIB
- **Without converter routines in IMS Connect**
 - IMS application will need to perform the conversion



IMS Soap Gateway Example

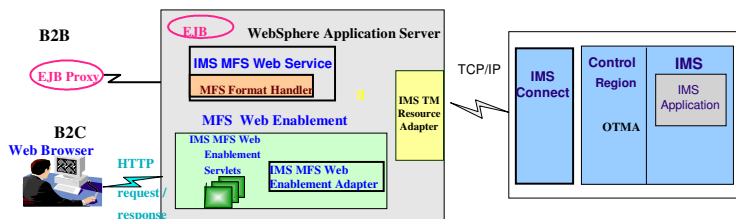


IMS SOAP Gateway on z/OS with IMS 10

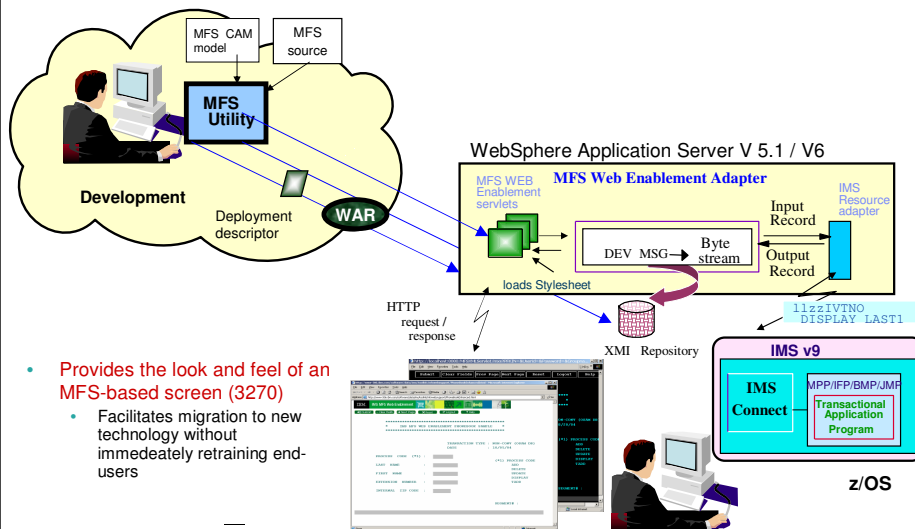


IMS Integration Suite - IMS MFS Web Support

- Support for the modernization of MFS-based IMS transactions
 - MFS Web Enablement
 - Extends the use of MFS by rendering displays on new devices, .e.g, web browsers, without modifying existing applications
 - MFS SOA Support
 - Provides the ability to transform IMS MFS-based transactions to Web Services through tooling



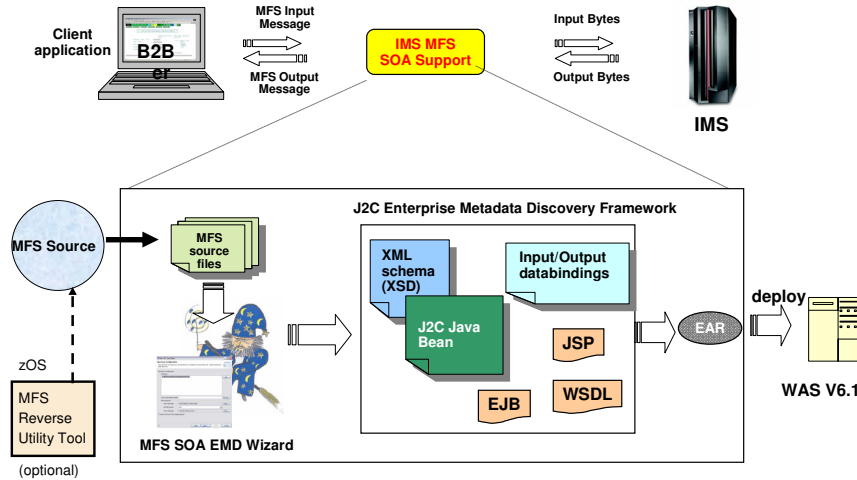
MFS Web Enablement



- Provides the look and feel of an MFS-based screen (3270)
 - Facilitates migration to new technology without immediately retraining end-users

MFS SOA Support

- A capability that takes advantage of MFS source to generate web services

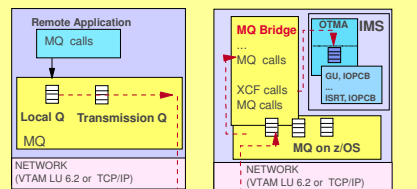


Architecture Foundation - Messaging and Queuing

- WebSphere MQ (MQSeries)
 - Supports the use of MQ API
 - 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 JMS (Java Message Service) API
 - Messaging standard that allows application components based on J2EE to create, send, receive, and read messages

MQ IMS Adapter
 - uses the IMS ESS interface
 - Supports the use of explicit MQ calls in the IMS application

MQ IMS Bridge
 - uses the OTMA interface
 - Takes advantage of the DL/I call interface in the IMS application



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

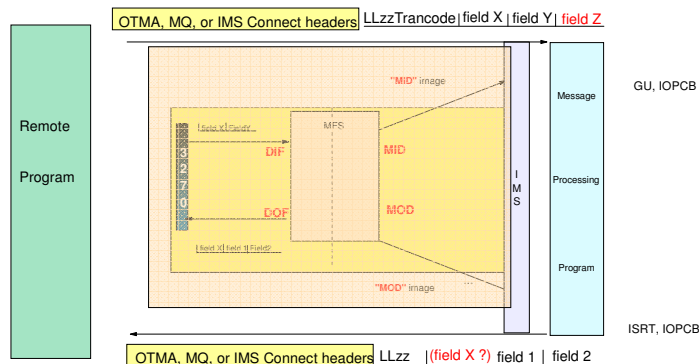
▲ Messaging and Queuing

- 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

<http://w3-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/WP100638>

For All OTMA-based Solutions

Consider whether or not the remote application or exit routines need to provide the additional information that MFS would have provided



Allows existing IMS programs to be invoked by the OTMA client
 - Possible additional logic on the remote program to deal with some applications
 Supports new IMS programs that can be coded to existing DLI interface

And then there is DataPower

- **XML is the foundation of SOA, but brings new challenges:**
 - Scalability: XML is bandwidth, CPU and memory intensive
 - Performance: some XML apps literally grind to a halt
 - Security: connecting systems never before connected
 - Security: clear text over HTTP with no inherent security
 - Standards are still in flux
- **An IBM solution: DataPower SOA Appliances**
 - Purpose-built hardware to address these challenges
 - Simplify, accelerate and help secure XML Web services for SOA

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DataPower ...

DataPower products offer customers significant performance, ease of use, and packaging advantages for managing rapidly growing XML-based data



• XI50 Integration Appliance

- Expands support to non-XML solution
- Advanced architecture
- Integrated message-level security



• XS40 XML Security Gateway

- Security, agility and performance
- Device can off-load application security software
- Performs XML Web services security functions (parse, filter, validate schema, encrypt/decrypt, signatures, access control, and more)



• XA35 XML Accelerator

- Offloads overtaxed servers by processing XML, XSD, XPath and XSLT at wire speed
- SW provides significant performance improvements over WebSphere solutions
- HW + SW provides enterprise-class performance



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DataPower ...

- For IMS, DataPower XI50 provides:



SOAP/HTTP



SOAP/HTTP

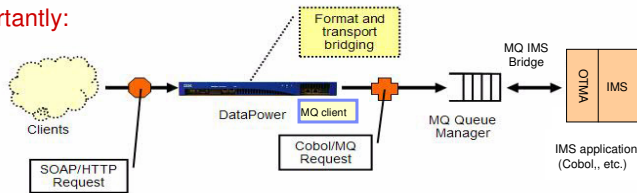


- Content-based Message Routing
- Protocol Bridging (HTTP, MQ, JMS, FTP, etc.)
- XML/SOAP Firewall
- Data Validation
- Field Level Security
- XML Web Services Access Control/AAA
- Web Services Management

DataPower ...

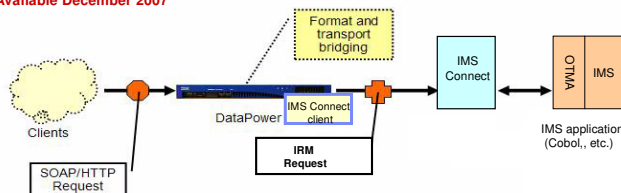
- AND more importantly:

- An MQ client



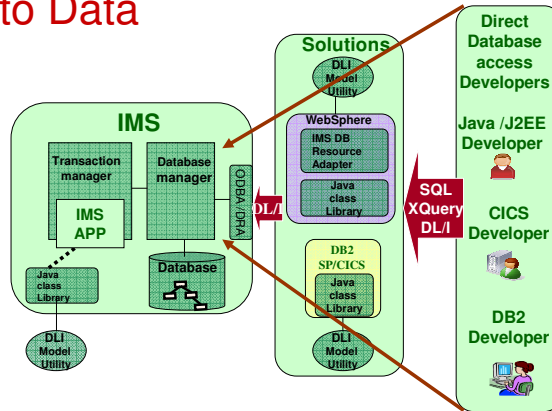
- An IMS Connect client

★ DataPower 3.6.1 – Available December 2007



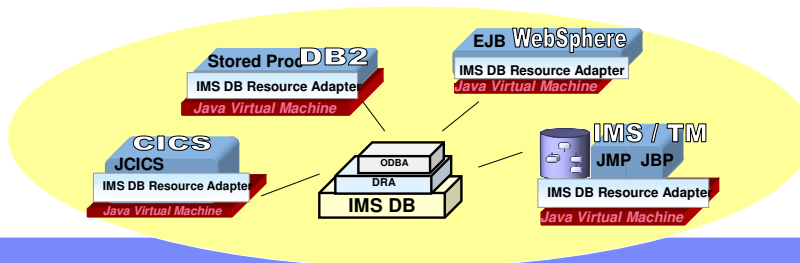
<http://ftp.software.ibm.com/software/websphere/integration/datapower/WSB11353-USEN-00.pdf>

Access to Data



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 DB calls must reside on the same MVS as IMS
 - **IMS Integration Suite - DB interfaces**
 - IMS DB Resource Adapter
 - *IMS Java with JDBC support and the IMS DLIModel utility*
 - IMS XML DB

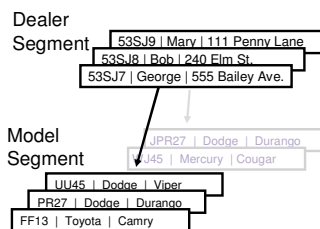


Java in IMS

- **Java Support APIs - Java Classes**
 - Java TM - message queue processing, program switching, etc.,
 - Java DB - ability to process all IMS DB access commands
 - JDBC Driver for IMS
 - SQL type statements to access IMS hierarchic structure
 - DLI Model Utility to create and SQLview of IMS DB
 - Supports IMS applications issuing JDBC calls
 - Support Java applications outside IMS issuing JDBC calls
 - *ODBA interface*
- **IMS Dependent Regions - JVM support**
 - JMP - Java Message Processing region
 - JBP - Java Batch Processing region
- **Language Interoperability**
 - Java and OO Cobol

JDBC Mapping

Hierarchical Design



Note: Segment Names ~ Table Names
 Segment Instances ~ Table Rows
 Field Names ~ Column Names

```

SQL: SELECT Dealer.Name, Dealer.Phone, Order.LastName
FROM SomePCB.Order
WHERE Model.MSRP>'50000'
AND Order.Date>='5/1/2007'
AND Order.Date<='5/31/2007'
    
```

```

SSA LIST: DEALER
          MODEL
          ORDER
    
```

Relational Design

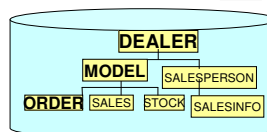
Dealer Table

	DealerID	DealerName	DealerAddress
0	53SJ7	George	555 Bailey Ave.
1	53SJ8	Bob	240 Elm St.
2	53SJ9	Mary	111 Penny Ln.
...

Model Table

ID	Make	Model	Dealer	
UU45	Dodge	Viper	53SJ7	0
PR27	Dodge	Durango	53SJ7	0
FF13	Toyota	Camry	53SJ7	0
JR27	Dodge	Durango	53SJ8	1
WJ45	Mercury	Cougar	53SJ8	1
...

Relational JOIN



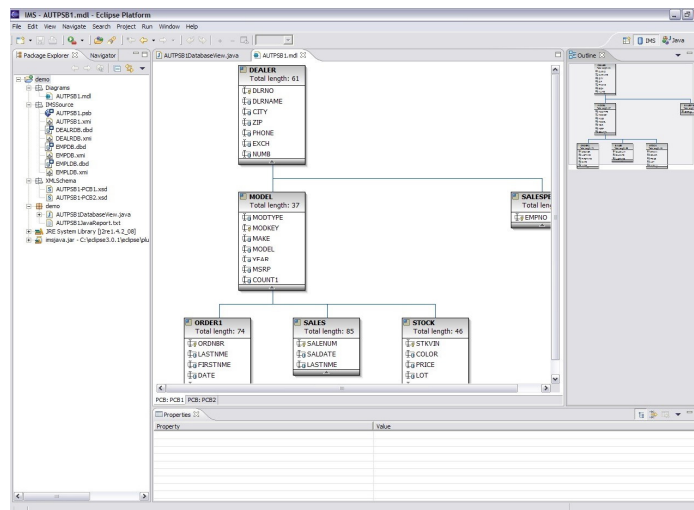
DLIModel Utility

- **IMS database visualization tool**
 - Visualize an entire IMS PSB
 - Can view each PCB individually
 - *Hierarchy, segments, fields, types, etc*
- **IMS database metadata generation tool**
 - Generates the necessary metadata that is consumed at runtime by IMS JDBC driver, XML-DB support
 - Database metadata
 - XML schema
- **Bottom up tooling approach**
 - Parses PSB and DBD source
 - Optionally COBOL copybook definitions of segments
- **An Eclipse 3.x plug-in**



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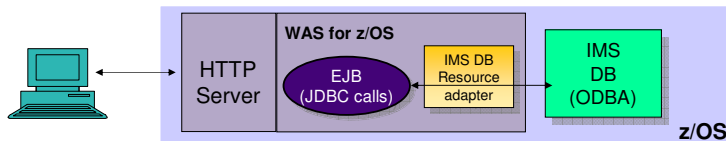
Database Visualization (UML View of the Database Metadata)



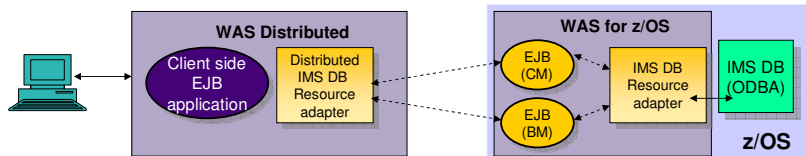
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IMS Solutions

- **JDBC access to IMS DB with the IMS DB Resource Adapter**
 - Subset of SQL syntax - limited to what IMS DBMS can do natively
 - 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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IMS DB Resource Adapter

- **A JCA resource adapter for deployment in a WebSphere Application Server runtime**
- **JCA interaction provides the application with a JDBC connection to IMS DB**
 - Supports a direction connection to an IMS database
 - Allows applications to directly query and manipulate IMS database information using JDBC with both SQL and XQuery
- **Projects IMS database assets in the SOA “Data Services / Messaging Layer”**

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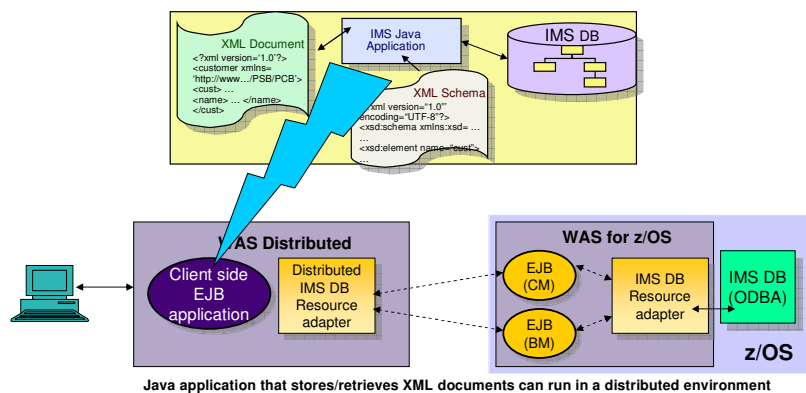
IMS DB Resource Adapter Capabilities

- Supports J2EE Connector Architecture (JCA) 1.0
- Connection Management
 - Connection pooling
- Supports various types of interactions and programming models
 - JDBC
 - SQL and XQuery support
 - Java for DLI
- Security Management
 - RACF for authentication
 - ODBA does additional check for PSB (database) authorization
- Transaction Management
 - Global z/OS RRS transaction support
- Multi-platform support
 - Runs in WebSphere family of 31 and 64 bit application servers

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XML Database - IMS V9

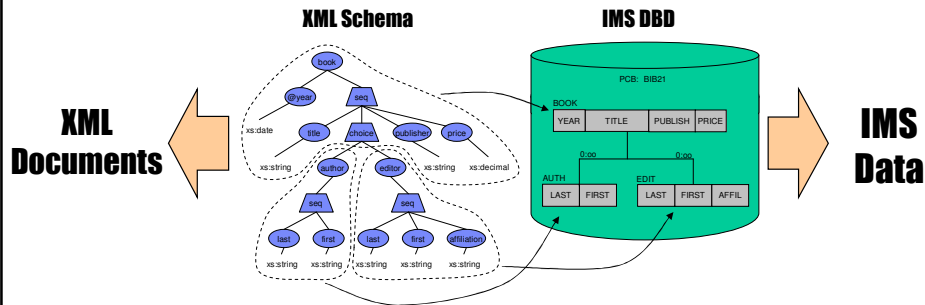
- Storage and retrieval of XML documents in IMS databases
 - Composition of XML documents from existing IMS databases
 - Creation of IMS segments from XML documents (decomposition)
 - Intact storage of XML documents (without decomposition)



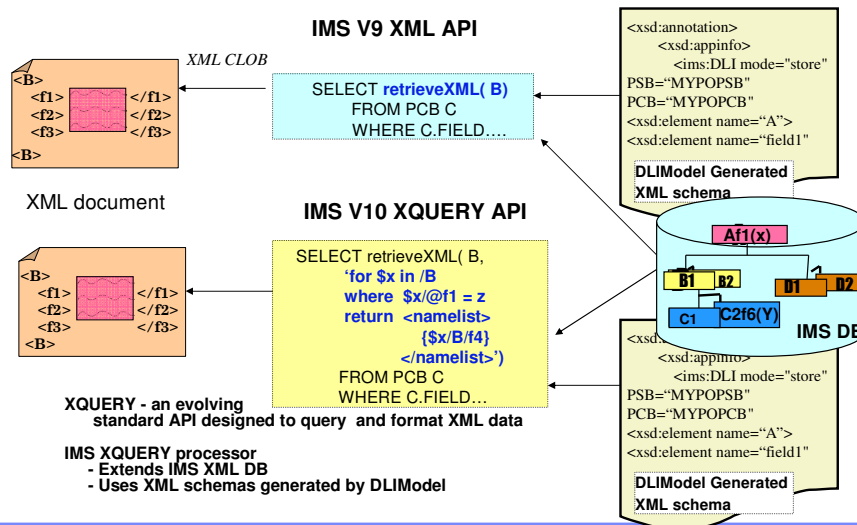
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XML Database - IMS V9 ...

- Introduces a way to view/map native IMS hierarchical data to XML documents
 - Aligns IMS Database (DBD) with XML Schema
- Allows the retrieval and storage of IMS Records as XML documents with no change to existing IMS databases
 - Enables query of IMS data using XQuery



IMS DB Resource Adapter XML APIs

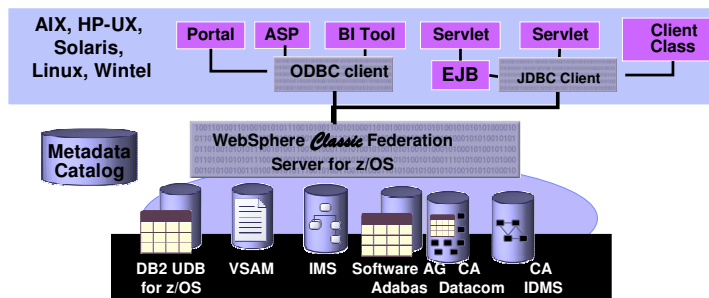


IMS XML DB

- Value
 - XML is Heirarchical
 - A standard that is well-suited to an IMS implementation
 - *More natural fit for heirarchical data querying*
 - IMS has a 38+ year head start
 - Immediately usable with no migration of IMS data

Information Integration

- **WebSphere Classic Federation Server for z/OS**
 - Integrates access to a variety of resources
 - ODBC, JDBC access to IMS data
 - *Read and update access to IMS DB using JDBC and ODBC*
 - Access to IMS transactions



• <http://www-306.ibm.com/software/data/integration/iicf/support.html>

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'*
 - WebSphere Classic Event Publisher for IMS (5655-M38)
 - 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 Classic Event Publisher

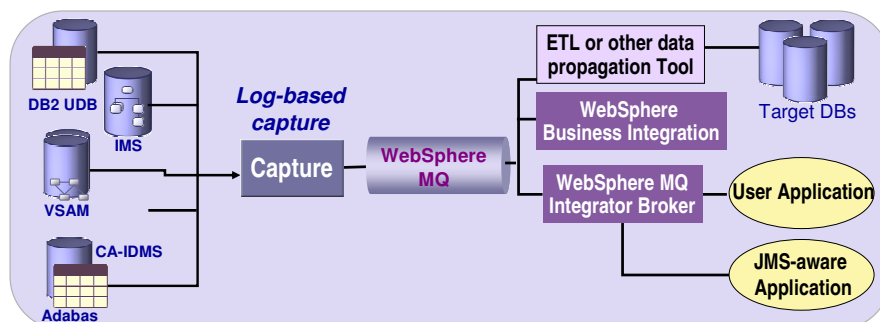
...

Function

- **Capture data events in real time**
- **Publish these data events:**
 - to a message queue for widespread delivery
 - in XML format for widespread use

Usage

- **Application to application messaging**
- **Event streaming**
- **Change-only data distribution**



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Outbound Access

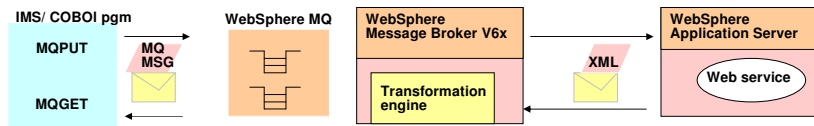
Positioning IMS applications as service consumers

Accessing Other Environments - Consuming web services

- **IMS applications can “explicitly” code communication API 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 Java application capabilities**
 - Java classes
 - HTTP, etc.?
 - Enterprise Cobol For z/OS V3.2 or later
 - Interoperability with IMS Java
- **IMS 10 Integration Suite asynchronous capabilities**

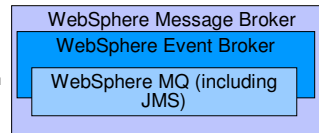
Consuming Web Services...

- **Websphere MQ/MB/ESB**
 - MQ API calls in IMS applications can participate in solutions provided by WebSphere Message Broker and the ESB (enterprise service bus)
 - Transforms messages formats between MQ applications and web services



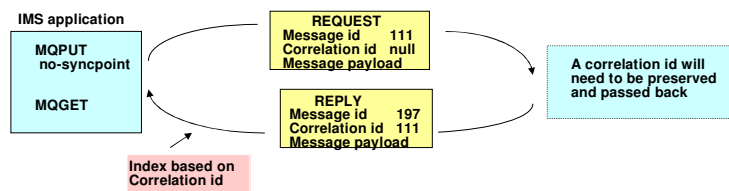
Transformation, Routing and Data Integration

- Provides an ESB solution
- Powerful engine for message/data transformation and integration
- XSLT engine for XML transformation
- Web services (HTTP/SOAP) protocol support



Consuming Web Services...

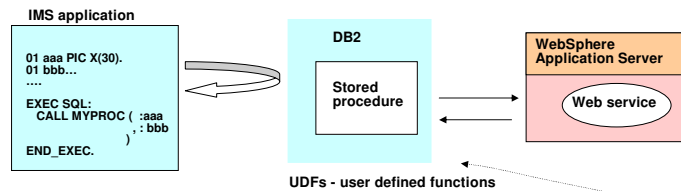
- **Websphere MQ/MB/ESB...**
 - Considerations
 - MQ - correlation ids, indexes, ...
 - MB - mapping, nodes, ...
 - IMS - dependent region occupancy, locks, ...



- References
 - SG24-7163 Enabling SOA Using WebSphere Messaging
 - SG24-7137 WebSphere Message Broker Basics
 - http://www-1.ibm.com/support/docview.wss?rs=171&uid=swg24009880&loc=en_US&cs=utf-8&lang=en

Consuming Web Services...

- “SQL CALL” to DB2 stored procedures
 - IMS application program must include logic to
 - Set the host variables prior to executing the CALL
 - Handle any error conditions returned by the stored procedure

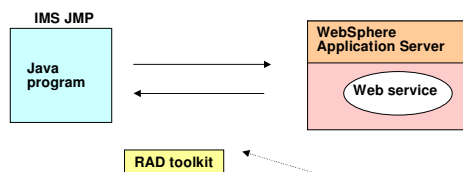


- References
 - SG24-7083 DB2 for z/OS Stored Procedures: Through the CALL and Beyond
 - Chapter 24.4 - Accessing DB2 stored procedures from IMS
 - SG24-7064 WebSphere for z/OS V6 Connectivity Handbook
 - Chapter 13.2 - Calling a web service from DB2

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Consuming Web Services...

- IMS Java application capabilities
 - Natively, IMS Java does not contain the runtime for calling a Web service, calling EJBs or sending e-mails
 - Necessary runtime jar files and libraries from WAS z/OS can be used (even if WAS z/OS is not enabled)

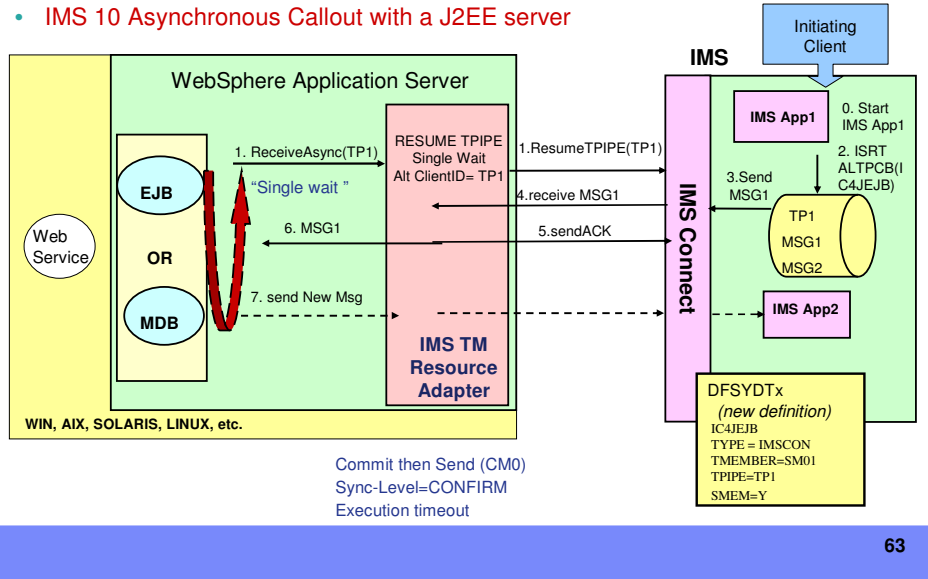


- References
 - SC18-7821 IMS Java Guide and Reference
 - SG24-7064 WebSphere for z/OS V6 Connectivity Handbook
 - Chapter 14 - Connecting to WebSphere from IMS using SOAP

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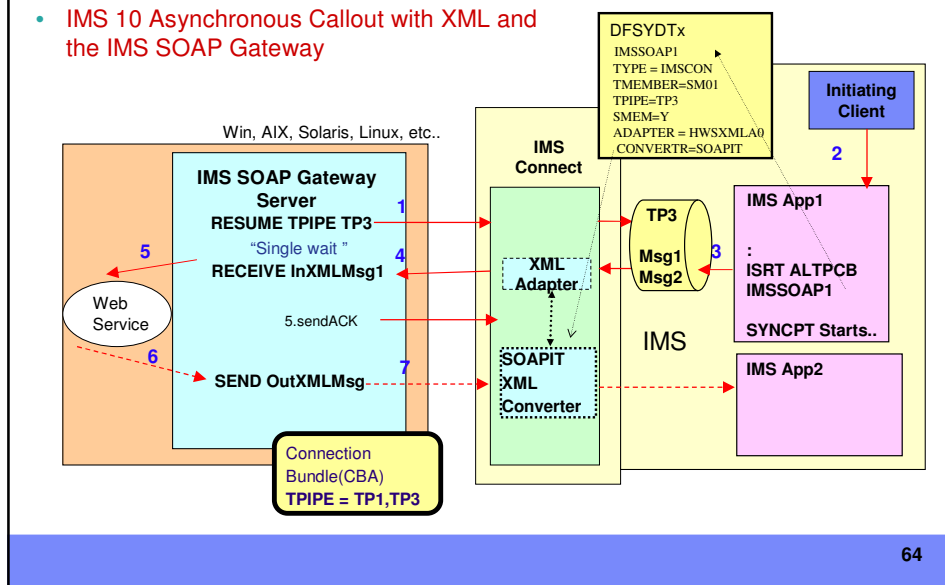
Consuming Web Services ...

- IMS 10 Asynchronous Callout with a J2EE server



Consuming Web Services...

- IMS 10 Asynchronous Callout with XML and the IMS SOAP Gateway



Consuming Web Services ...

- Synchronous support
 - Requirement is well understood

AND continuing on with emerging technologies...

WEB 2.0

- ???
- **A second-generation of web communities and hosted services**
 - transition from websites containing isolated information to interlinked environments
 - The idea is that the web itself is a computing platform
- Leverages two main approaches to web APIs:
 - REST (Representational State Transfer)
 - *Uses HTTP alone to interact, with XML or JSON (java script object notation) payloads*
 - SOAP
 - *Involves POSTing more elaborate XML messages and requests to a server that may contain quite complex, but pre-defined, instructions for the server to follow*

REST

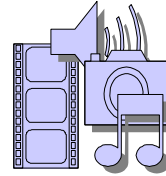
- **Representational State Transfer**
 - Emerging style for interacting with web services
 - **Value is its simplicity – builds on what we have today**
 - Verbs are a subset of the verbs in the HTTP protocol

GET http://myserver/myphotos/myfamily.img
 PUT http://myserver/myphotos/birthday.img
 DELETE http://myserver/myphotos/oldstuff.img
 POST http://myserver/myblog

Comparisons

REST	DB access	Cut and Paste
POST	CREATE (Insert)	PASTE AFTER
GET	READ (Get)	COPY
PUT	UPDATE (Replace)	PASTE OVER
DELETE	DELETE (Delete)	CUT

The Goal --- > Mashups



Comes from music terminology:

music that contains songs already released by other artists

- **For the web:**
 - An application that combines data or content from more than one source into a single integrated view
 - Can include private interfaces or content from outsourced third parties

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MASHUP

- **Three types**
 - Consumer
 - Integrates data elements from multiple sources with a simplified front-end
 - *E.g., Google Maps*
 - Data and Enterprise
 - Mixes data of similar types from different sources with a graphical front-end
 - Integrates data from internal and external sources
 - *E.g., Manufacturer's product description with additional map on closest retailers to a zip code*
 - Business
 - combination of all the above, focusing on both data aggregation and presentation, and additionally adding collaborative functionality
 - *E.g., telecommunications service where service elements come from more than one source such as the base service from company A, a ringback tone from company B, a voicemail service from company C, etc.*

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But...

- Didn't we already have PORTALS?

- Both are content aggregation technologies
 - Portals (portlets) extend the web server model (servlets)
 - Servlets generate the markup for an entire document
 - Portlets generate the markup for a fragment of a document
 - *A Single presentation page aggregates the markup fragments and displays the output of multiple portlets*
 - Mashups implement the newer Web 2.0 technology

AND ...

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Portals versus Mashups

Portals	Mashups
Approaches aggregation by splitting role of web server into two phases - generation markup "fragments" and aggregation of the fragments into web pages	More fundamental approach to aggregation without regard to markup
Content aggregation occurs on server	Content aggregation occurs on server or client
Aggregate content presented side by side with no overlap	Individual content may be combined in any manner, resulting in arbitrarily structured hybrid content
Specific portlet API	REST architecture but no formal API
Defined standards	Evolving

2007: Gartner – "The future of Portals is Mashup, SOA, and more aggregation"

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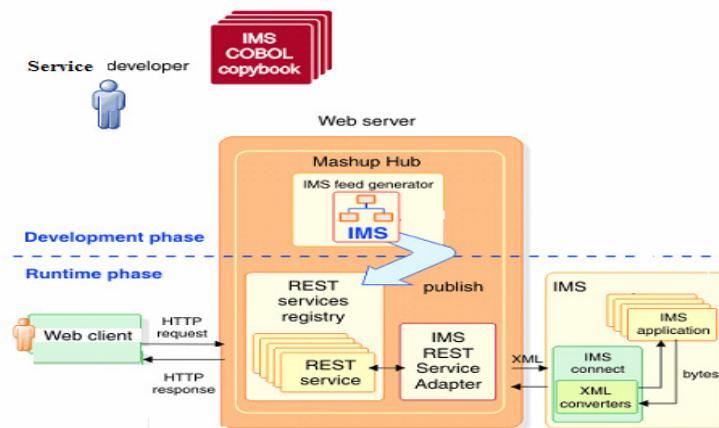
How do you do it with IMS?

- **Product preview on Alphaworks – IMS Info 2.0**
 - Once again, note that
 - Web 2.0 is not an update to Web technical specifications
 - *It is a change in the ways software developers and end-users use webs*
 - Web 2.0 services are “*mashable*”
 - Some *mashup* scenarios for IMS include the ability to
 - Compose IMS services (data or content) into a composite service
 - *Transforms IMS assets into RESTful services*
 - Compose “widgets” / HTML segments into a composite User Interface (UI) or an application template
 - Bind services (data or function) to the composite UI
- Plugin to the **IBM Mashup Starter Kit**

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Web 2.0 and IMS Info 2.0

IMS Info 2.0 Generation and Runtime



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Web 2.0 and IMS Info 2.0 ...

- **IBM Mashup Starter Kit -**
 - Supports assembly of Web 2.0 mashup applications with two components:
 - Mashup Hub – a mashup server
 - *Transforms access to resources, including IMS transactions and data, into feeds and REST services*
 - *Enables reuse and collaboration*
 - QEDWiki – provides the user interface
 - *Includes a mashup maker with many built in widgets*
 - *URL Viewer, XML Viewer, RSS Viewer, Google Map, etc.*
 - *Browser-based assembly*
 - *Integrates a variety of web services onto a web page*
- **IBM Mashup Starter Kit is available on both IMS and IBM Alphaworks website**
 - <http://www.alphaworks.ibm.com/tech/ibmmsk>
- **IMS Info 2.0 demo video on YouTube**
 - <http://www.youtube.com/watch?v=BWJGSC-RyXQ>

The Message

- **IMS continues to be a premier server with architected standard interfaces**
 - **New products and tools from a variety of vendors provide access to IMS transactions and data**



- **SOA is revolutionizing the way businesses are being designed and run. For it to make sense:**
 - *All assets must be easily accessible in a standard way*
 - *All data must be represented and manipulated in a standard way*
- **Our goal is to leverage IMS as an integral part of the enterprise in the evolving business world through**
 - *Addition of support for complimentary standards surrounding IMS connectivity, data representation, and application development*
- **To allow you to realize the promises of building an SOA**
 - *Simply the business environment*
 - *Respond to market changes more quickly and cheaply*

Additional information

- www.ibm.com/ims
 - IMS home page
- www.ibm.com/support/techdocs
 - Presentations and papers
- Many vendors offer a variety of comprehensive solutions for IMS in the SOA environment