

IBM Software Group



A1: IMS On Demand Integration Strategy

*Barbara Klein
IMS Strategic Plan and Brand Manager
IBM Silicon Valley Laboratory
San Jose, California
bk@us.ibm.com*



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Key Message: IBM's Information Management System (IMS), unsurpassed in database and transaction processing availability and speed, provides an ideal environment for on demand business.

IMS has been an evolving, critical focal point for powerful applications and information over the past decades and our clients have built up an extensive storehouse of applications and data. With the evolving on demand business environment, we at IBM have been providing distributed web solutions that leverage the power of this critical IMS Business Information. These solutions can deliver the integrity, capability, and performance that you have learned to expect from IBM. These solutions can help you transform the way you do business with integrated information. They can help you build on demand business applications and take advantage of doing business on the net. They can help you run a scalable, available, safe, and easily manageable environment. And they can also help you leverage your business decisions to make more informed decisions.

Today we will be talking about the IMS On Demand Integration strategy and the solutions provided to help you leverage the power of your critical IMS business information. I'll provide an overview with technical leaders from IMS and related tools filling you in on some of the key solutions we are providing.

Agenda

- **Overview of Strategy**
- **Standards and Terminology**
- **IMS Solutions**
 - Distributed Open Access to IMS Transactions
 - Distributed Open Access to IMS Operations
 - Producing Industry Standard IMS Applications
 - Storing/Retrieving XML Data
 - Distributed Open Access to IMS Data
 - Accessing Other Applications/Data from IMS
 - Distributed Open Access to IMS Transactions
- **Summary**



Key message: IMS is providing a number of solutions

IMS Solutions are being provided for access to applications/operations/data, writing industry standard applications, storing/retrieving XML data in IMS and accessing other applications from IMS

On Demand, Integrated Business Solutions Require:

- A *common programming model* for a Service Oriented Architecture (SOA) based on *standards*
- Offerings shaped from components that use a *shared technology infrastructure* for runtime, connectivity, end-user access, and tools
- Integrated offerings based on *client choice* of components
- *Protection with continued reuse* of client investments



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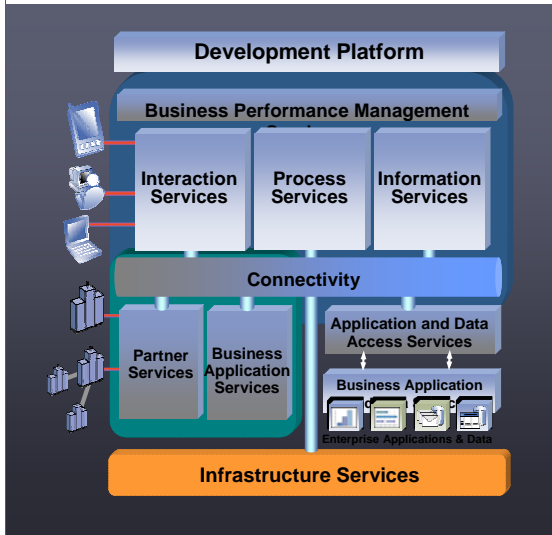
Key message: Today's On Demand Business environments call for Distributed, integrated solutions with certain requirements.

In providing these web solutions to leverage your critical IMS business information, we must address the following requirements:

- A common programming model for a service-oriented architecture (SOA), that is based on using standards,
- Product offerings made from components that share an infrastructure for runtime, connectivity, end-user access, and tools
- Integrated offerings that provide you a choice of components, and
- Provisions that ensure protection and continued reuse of your investments.

Automating Business Processes with a Service Oriented Architecture (SOA)

-- Integrate and extend existing and new Applications and Data

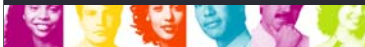


Business Benefits

- Improved customer service
- Handle more business without increasing the workforce
- Enforce consistent process execution across many participants
- Quickly respond to new business opportunities

IT Benefits

- Deliver complex solutions in a short period of time
- Support changing business needs
- Swap out applications without changing the process
- Change processes without upgrading applications



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Key Message: Automating business processes can use as a common business model the Service Oriented Architecture

A Service Oriented architecture can help you provide an extensive integration capability, allowing you to automate your business processes and provide benefits for both your business and your IT departments.

Perhaps the best thing is that this can offer solutions that enhance your ability to take advantage of the new technology, provide automation and significant benefits, while leveraging investments that you've made over the last few decades. Our IMS solutions lead the way in providing the means through which our clients can most quickly and safely extend their long-standing investment in existing applications and data and integrate new applications for on demand business. This can be done utilizing state-of-the art industry standard open application interfaces. This further enhances the enterprise computing qualities of service our clients and their users have come to expect. Existing and new applications and data can be integrated and extended as web services.

IMS is SOA Enabled with Distributed, Integrated On Demand Solutions:

- Protect customer investments by **enabling access** to IMS transactions and data
 - Designed to support open integration technologies
 - Modernize IMS transactions and data
- Fully integrate with WebSphere and **Tools** and utilize a common programming model for a service-oriented architecture (SOA) based on standards
- Encourage new application development by supporting **standards**
 - **Java for rapid application development**
 - **XML for clean/structured documents with powerful views/search**
 - **SOAP for structured info exchange in loosely-coupled distributed environment**



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Key Message: IMS is SOA Enabled.

IMS distributed, integrated on demand solutions protect customer investments by enabling access to IMS transactions and data. These solutions are designed to support open, integrated technologies and modernize use of IMS transactions and data.

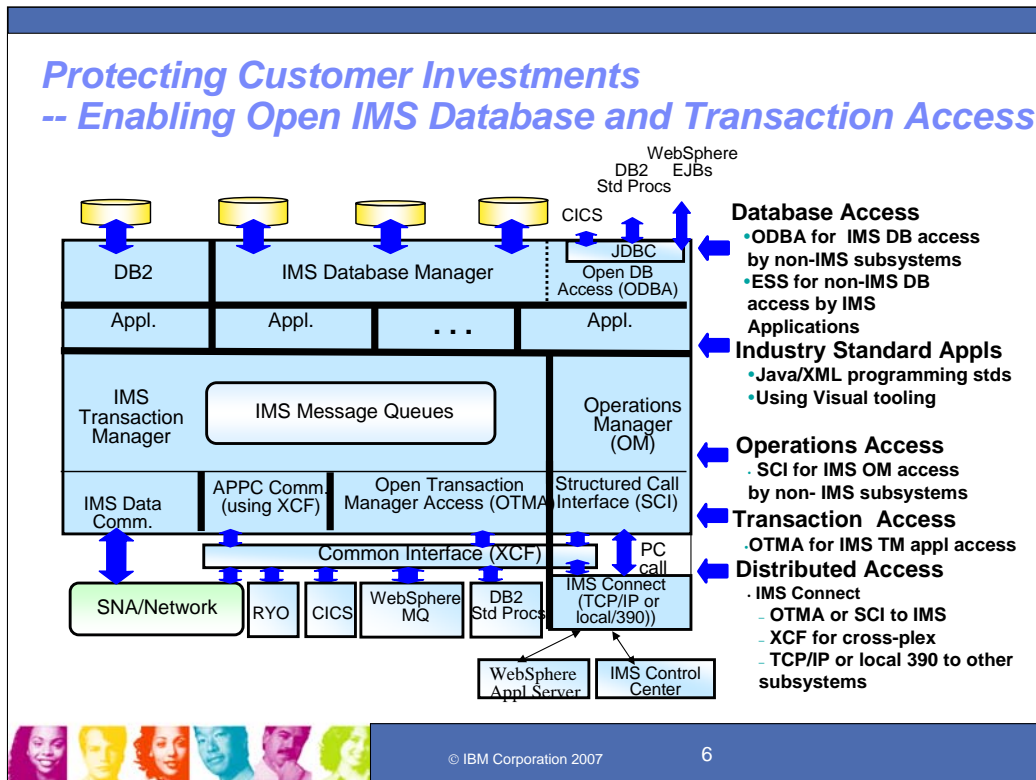
These solutions fully integrate with WebSphere and industry tooling. They utilize a common programming model for a service-oriented architecture (SOA), based on standards, such as XML, SOAP, Java, JDBC, etc., and new ones as they develop.

▪Java can be used for rapid application development of new applications that access IMS transactions and data, and for new applications that run under IMS control. It offers reuse of applications in a variety of environments. And it leverages standards, such as Java Connectivity Architecture (JCA) for enhanced IMS application access and JDBC for enhanced IMS data access.

▪XML allows us to create clean, structured documents with powerful views and search capabilities. It can be used for data exchange of documents containing structured and non-structured information from a variety of sources. And it is hierarchical, a natural fit for IMS, ensuring the ultimate performance our clients expect.

▪SOAP (simple object access protocol) is an XML based standard for exchanging structured information in a loosely coupled distributed environment. It is platform-neutral and can communicate with and take advantage of individual functions of distributed applications

Support of this advanced technology would then encourage new application development and new application developers.

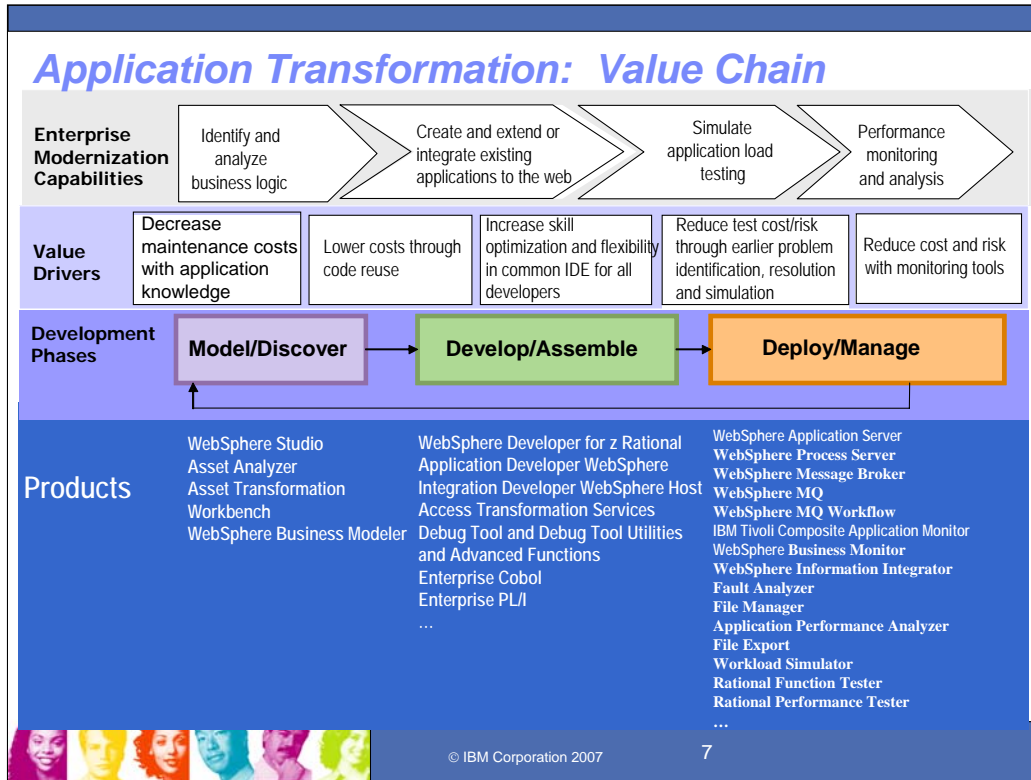


Key Message: The IMS Architecture has been evolving to provide open interfaces, and support the latest standards to protect customer investments

Traditionally or historically messages only came into IMS through its SNA data communication protocol from VTAM, shown at the lower left.

In more recent years, IMS has incorporated standard interfaces for Database access through its Open Database Access facility (ODBA) and utilizing JDBC (shown in the upper right). These have evolved from the IMS Database interface provided for CICS. Stepping down on the right, we have also provided Industry-standard IMS applications using Java and visual tooling, and more recently operations access through the Structured Call interface. This interface can offer distributed IMS operations with the IMS Control Center, shown on the lower right.

Shown in the middle, IMS also offers Transaction access through the open transaction manager access facility, offering access to IMS applications through the IMS message queues. And we've provided distributed access to applications and operations through the IMS V9 Integrated Connect function, or the earlier IMS Connect tool. Distributed access to IMS applications and data is also available through CICS, MQ, DB2, WebSphere and other application servers.



Key Message: IBM has also been providing, extending, and enhancing fully integrated tooling for IMS, utilizing common programming models.

The large number of Websphere, Rational, Tivoli and IMS Tools for the On Demand Service Oriented Architecture, help our customers with automation and optimization of this environment. In addition to systems and data management tools, IBM provides a broad array of Application Development tools, designed to support existing IMS enterprises in their transition to on demand applications. This is true particularly in the areas of discovery, development and deployment. These tools include compilers designed to support XML, tools to assist in the identification of impacts due to program modifications, debug and performance aids, and tools that aid error correction and file manipulation. IBM's Application Development thrust is towards helping customers provide innovative Service Oriented Architecture based IT solutions, while leveraging their existing IMS asset base. IMS application development tools are also being provided to help develop new Java applications running in IMS or in other environments for access to IMS applications and data.

Here are some of the Tools to help with IMS Application Development.

This chart maps the development cycle and its tasks, to the value drivers that our customers demand and the large number of IBM products available to satisfy that demand.

In addition to IMS, IBM provides a broad array of Application Development tools designed to support existing enterprises in their transition to "On-demand" applications. This is true particularly in the areas of discovery, development and deployment. These tools range from compilers designed to support XML, tools to assist in the identification of impacts due to program modifications, debug and performance aids as well as support to aid error correction and file manipulation. IBM's Application Development thrust is towards helping customers provide innovative "SOA" (Services Oriented Architecture) based IT solutions, while leveraging their existing asset base.

Standards Support for New Application Development with IMS Applications/Data using Java, XML, SOAP

- **Rapid Application Development and Data Interchange**
 - Products/documents can be developed faster and of higher quality
 - Embraced by the object-oriented methodology
 - Re-use of software components and data
 - Tooling widely available for entire development cycle
 - Reduce total cost of ownership and time-to-market
- **Leverage existing marketplace, industry-sanctioned standards**
 - Persistent
 - Well-documented and understood
 - Standard APIs minimize specific back-end knowledge of IMS
 - Our drivers will handle that on behalf of the application
- **Leverage new and abundant skills in the marketplace**
 - Help to mitigate the reducing numbers of mainframe skills
- **Integrate with other products and information**



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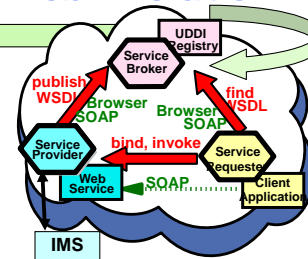
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Key Message: Support of standards offers significant value for IMS.

▪ These standards can be used to leverage new and abundant skills and tools more readily available in the marketplace. They can also be used for enhanced integration of IMS with other products

Web Services Provides Next Step in Web Evolution

- Allows programmable elements to be placed on sites for distributed web access across platforms
 - Leverages past investments
 - Reduce new programming efforts
 - Aid business process transformation
 - Aid application integration with partners, suppliers, customers
- Software components described via Web Services Description Language (WSDL) capable of being accessed via standard network protocols, such as SOAP over HTTP/HTTPS using XML Schema to describe data types
- Provides for an enabling architecture for application to application communication and interoperation
- Provides standard language and platform independent infrastructure for interoperating between applications across the internet
- Uses Universal Description, Discovery, Integration (UDDI) as directory of available services and service providers
 - SOAP can query UDDI for services
- Provides for WS-Security, WS-Transaction, WS-publishing,



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



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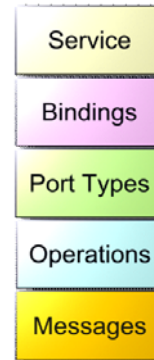
Key Message: Web services provides supporting standards for interoperation across the web.

Web Services are software components described via WSDL capable of access via standard network protocols and providing for unlike applications to talk to each other. This allows service providers to make available their services (for example IMS applications and data) through a service broker to make them available to a service requester, ie. a client application.

Web Services further enhance the evolving standards for distributed web solutions access to critical IMS applications and data. Web Services provide a standard language and platform independent infrastructure for interoperating between applications across the internet. SOAP protocols can be used for sending/receiving across HTTP/HTTPS. The Web Services Description Language (WSDL) can describe the interface, using XML schema to describe data types. And the Universal Description, Discovery, Integration (UDDI) can be used as a directory for the available services and service providers. And many more standards are evolving and being incorporated for enhanced security, etc.

Web Services Description Language (WSDL)

- Open Standard definition language
- XML format describing what a Web service can do, where it resides, and how to invoke it
- Machine readable, generated, used by IDEs
- Similar in purpose to IDL, but in XML form
- Consists of one or multiple XML documents defining
 - Service Interface – input and output parameters, operations and methods
 - Service binding – protocol binding
 - Service implementation – location of service

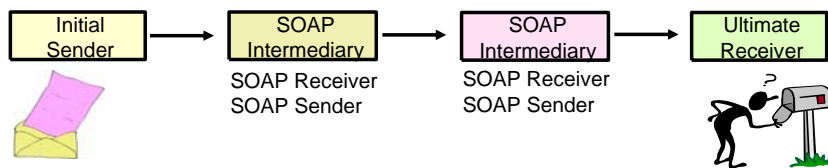


Key Message: This defines Web Services Definition Language (WSDL)

WSDL is the open standard definition language in XML format that describes a web service can do, where it resides, and how to invoke it. It is made up of one or more XML documents defining the interface, the protocol, and the location of the service.

SOAP

- What is SOAP?
 - An XML-based protocol for exchange of information
 - An open standard whose main goal is to facilitate interoperability
 - A protocol which is not tied to any operating system, transport protocol, programming language, or component technology
- What type of HTTP request does SOAP use?
 - HTTP POST method
- What do the letters stand for?
 - Simple Object Access Protocol (SOAP 1.1)
 - Nothing (SOAP 1.2)

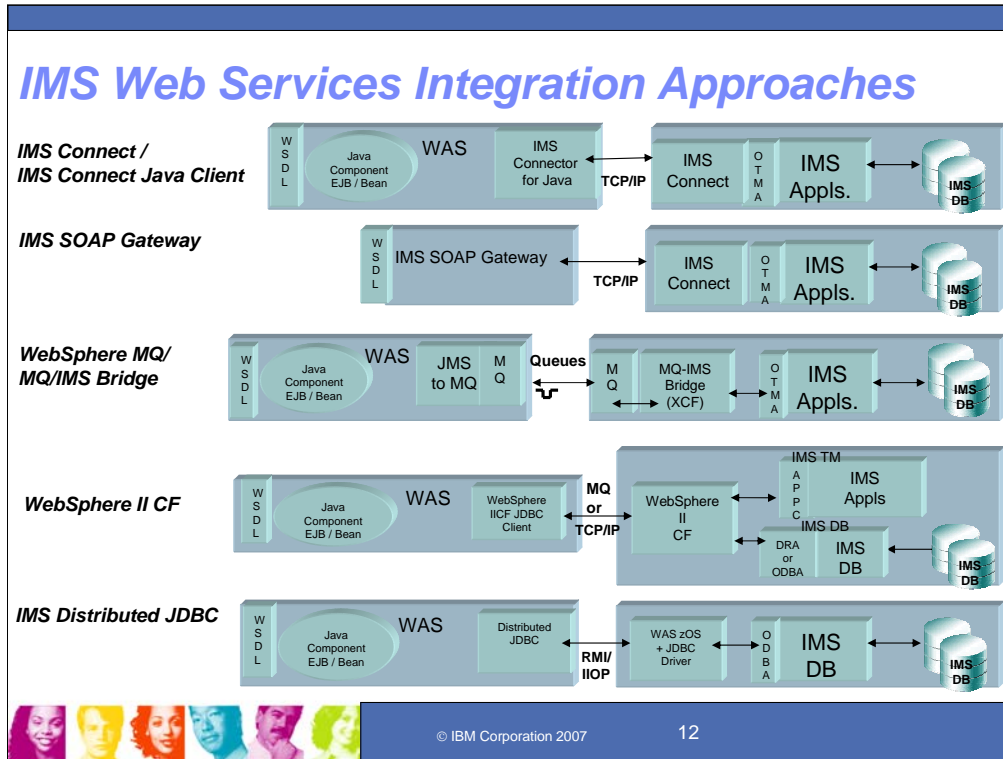


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Key Message: This defines what SOAP is.

SOAP is the open standard protocol for this interoperability, independent of operating system, transport, programming language or component technology. SOAP initially stood for Simple Object Access Protocol, but has evolved beyond its initial name.



Key Message: IMS Transactions and data can now be enabled as Web services, and be supported in a Service Oriented Architecture (SOA) with a variety of techniques.

Web services provides the next step in the evolution of the internet, allowing programmable elements to be placed on sites for distributed web access across platforms.

WebSphere tooling today enables IMS transactions using COBOL, C, PL/I and MFS-based applications as Web services.

Using IMS Transactions as Web services leverages your past investment in application development and information. It can also eliminate or greatly reduce new programming effort, reduce end-to-end business process transformation, and facilitate application integration with partners, suppliers, and customers.

- A key element of the On Demand environment in IMS V9 is the Integrated IMS Connect function. This function provides easy-to-install, easy to use, high performance/high volume and secure transparent access to IMS applications and their data. This can be done from any application environment, including LINUX. It utilizes the IMS Open Transaction Manager Access (OTMA) interface for access to IMS applications and the Structured Call Interface (SCI) for access to IMS operations.
- The IMS Connector for Java, provided as development and runtime code, works with IMS Connect to enable development and connectivity of Java applications running under WebSphere Servers.
- WebSphere MQ also provides access to IMS applications through the OTMA interface.
- As we move down the page, WebSphere Information Integration Classic Federation (IICF) offers SQL and JDBC access to IMS Data through the IMS Open Database Access (ODBA) interface. This provides distributed, common access to IMS Databases along with non-IMS databases, using the Information Integration product family. IICF can also be used to provide access to IMS applications.
- Also providing Distributed JDBC access to IMS database resources is the integrated IMS V9 Remote Database Services support. This support provides an IMS JDBC driver for a distributed J2EE application server and requires no additional z/OS application programming.
- And lastly on this chart, the IMS Soap Gateway broadens IMS application integration to other web serving environments

Distributed, Open Access To IMS Transactions



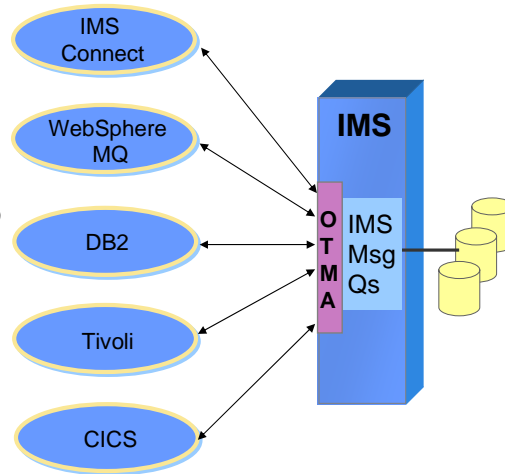
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Key Message: Standard interfaces and solutions are provided for Distributed Open, Access to IMS Transactions

IMS Open Transaction Manager Access (OTMA)

- OTMA is an open interface to **IMS TM** through which a **z/OS** or **TCP/IP** application program can send a transaction or command to **IMS** without using **SNA** or **VTAM**.
- OTMA uses MVS Cross-System Coupling Facility (XCF) interface to allow high performance cross-address space communications.
- Distributed access to IMS applications and data is available through IMS Connect, WebSphere MQ, DB2, Tivoli, CICS and other application servers using OTMA interface.



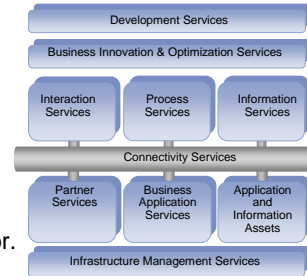
Key Message: IMS Open Transaction Manager Access (OTMA) is an open interface to IMS TM through which a z/OS or TCP/IP application program can send a transaction or command to IMS without using SNA or VTAM.

OTMA uses MVS Cross-System Coupling Facility (XCF) interface to allow high performance cross-address space communications.

z/OS applications, such as IMS Connect, WebSphere MQ, DB2, Tivoli, and CICS, interface with OTMA to access IMS applications and data.

IMS V9 Integrated Connect Function

- **Provides easy install/use, high volume/performance, secure transparent access to IMS applications and operations from other environments (incl. LINUX)**
 - Integrates function of IMS Connect
 - Simplify administration and reduce costs
 - Reduces design/coding effort for client applications
 - Ease access to IMS applications and operations
 - Improve programmer productivity
 - Provides commands to manage the network and balance workload for better resource utilization.
 - Enables high availability with z/OS Sysplex Distributor.
 - Used with IBM WebSphere/Rational Server/Tools to
 - Quickly transform static web sites into sources of dynamic Web Content to improve marketing effectiveness and enhance customer service
 - Transform IMS Transactions into Web services for Service-Oriented Architectures (SOAs), enabling quick response to new customer requirements, business opportunities and competitive threats.
 - Used with DB2 and the IMS Control Center for Distributed Operations
 - Improve system availability and operator productivity

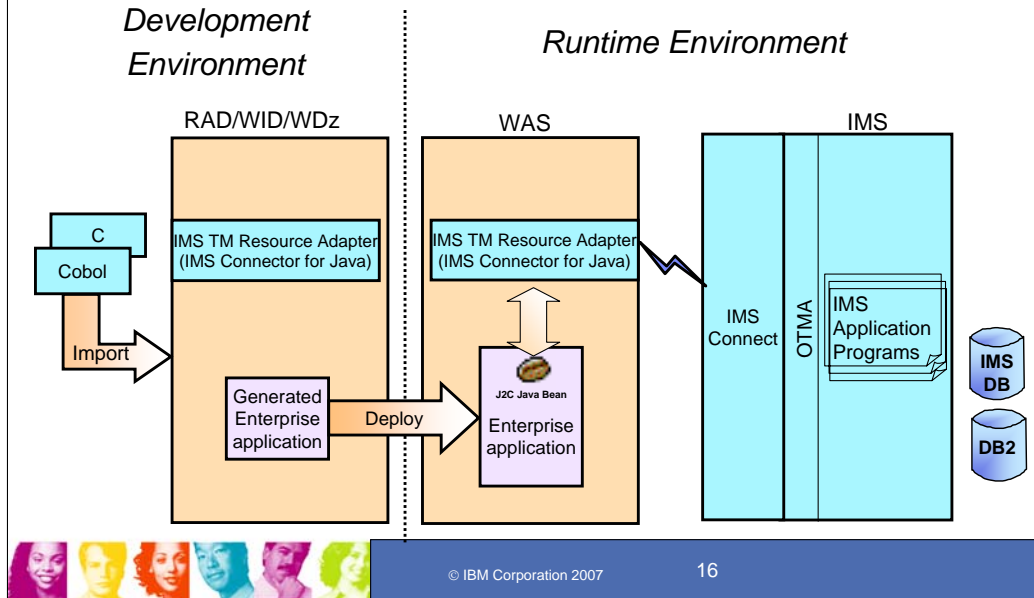


Key Message: A key element of the On Demand environment in IMS V9 is the Integrated IMS Connect function.

This IMS V9 Integrated IMS Connect provides easy-to-install, easy to use, high performance/high volume and secure transparent access to IMS applications and data from any application environment, including LINUX.

- It provides commands to manage the network environment and assist with workload balancing resulting in better resource utilization.
- It reduces design/coding effort for client applications and provides easier access to IMS applications and operations, thereby improving programmer productivity.
- It enables high availability using z/OS sysplex distributor for IMS applications. Recent IMS Connect enhancements for z/OS sysplex distributor customers are Send-Only-Output-Reroute, Purge for undeliverable output, Reroute for undeliverable output, application NAK for output purge or reroute, and super member support.
- IMS V9 integrated IMS Connect can be used with IBM WebSphere/Rational Servers/Tools to quickly transform static web sites into sources of dynamic Web Content improving marketing effectiveness and customer service, and also to transform IMS Transactions into Web services for Service-Oriented Architectures (SOA), enabling quick response to new customer requirements, business opportunities and competitive threats.
- IMS Connect can be used with DB2 and the IMS Control Center to control both IMS and DB2 operations, improving system availability and operator productivity.
- This IMS V9 integrated function can be used to replace the separately orderable/priced IMS Connect Tool offered for earlier IMS Versions, simplifying administration and reducing cost.

IMS On Demand Business Application Development and Connectivity Environment



Key Message: IMS TM Resource Adapter (also known as the IMS Connector for Java) is a J2EE Connector Architecture standard-based resource adapter that enables your developers to quickly and easily develop Java applications and Web services targeted to run in the WebSphere family of servers.

Over the years, the IMS TM Resource Adapter has been greatly enhanced and has evolved with the industry standards. Shipped first with VisualAge for Java in the late 90's, then with WebSphere Studio Application Developer Integration Edition and WebSphere Studio Enterprise Developer, IMS Connector for Java for development use is now shipped with Rational Application Developer, Rational Software Architect, WebSphere Integration Developer and WebSphere Developer for zSeries.

IMS TM Resource Adapter for runtime use, along with IMS Connect, started shipping as part of IMS with the release of IMS Version 9. Originally IMS Connector for Java shipped as part of the stand-alone IMS Connect product shipped by IBM's Data Management Tools organization. The IMS Connector for Java runtime can also be downloaded to a workstation from the IMS Connector for Java website. From there, it can be deployed to your WebSphere application server running on zSeries and most of the distributed platforms.

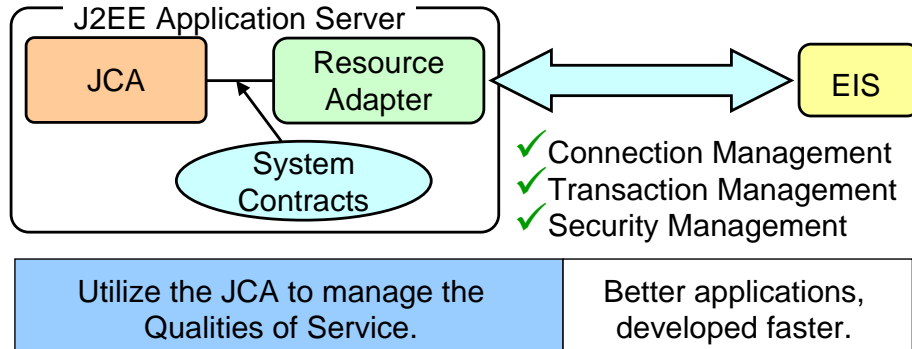
Using IMS Connector for Java, Java applications and Web services are able to execute existing or new IMS transactions, communicating with IMS through IMS Connect and OTMA. Being a J2C resource adapter, IMS Connector for Java interacts with the J2EE server to provide your application with transparent support for such qualities of service as transaction management to ensure the integrity of your data, connection management to make efficient use of your network resources, and security management to protect your critical data. These qualities of service help shield your application from many of the underlying complexities encapsulated by this J2EE architecture.

Being J2C standard-based, IMS Connector for Java also simplifies your development environment. Instead of having to learn a different programming model for each backend system, your developers are able to use the same standardized programming model for many different back-end systems.

Now lets move to the next slide and take a glimpse at the kinds of things your developers would be doing in a rapid application development process using IMS Connector for Java in one of IBM's best-of-breed development environments.

IMS and J2EE Connector Architecture (JCA)

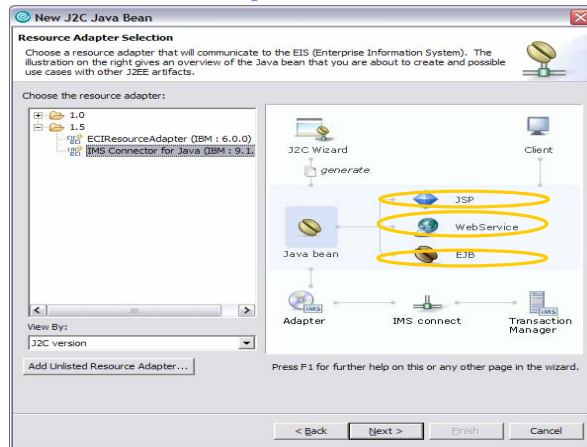
- **JCA provides key advantages:**
 - Standard programming interface to all Enterprise Information Systems (EIS)
 - Delegated management of Connections, Transactions and Security
- **IMS has two JCA connectors/resource adapters:**
 - IMS TM Resource Adapter (IMS Connector for Java)
 - IMS DB Resource Adapter (IMS JDBC Connector)



Key Message: The JCA architecture provides value for IMS Connectivity

IMS has been an early supporter of the standard programming architecture for distributed Java connectivity, the J2EE Connector Architecture (JCA). JCA provides standard programming interfaces to all enterprise systems. It also delegates the management of the connectors, transactions and security. IMS has two connectors, the IMS TM Resource Adapter (aka IMS Connector for Java) for IMS application access, and the IMS DB Resource Adapter (also known as the JDBC Connector for IMS) database access. The Java Connector Architecture manages the Qualities of service to ease enablement of new applications built on the vast extent of existing applications and data.

Rapid Application Development/Deployment: Rational/WebSphere and IMS TM Resource Adapter



- Rational & WebSphere development environments
 - Easy-to-use
 - Graphical and source editors
 - Generate application code:
 - Java Server Pages
 - Web Services
 - Enterprise Java Beans
 - Business processes
- IMS TM Resource Adapter (IMS Connector for Java)
 - Provides access to existing and new IMS applications
 - Standards-based provides quality of service for mission critical applications
 - Enables rapid application development and deployment
- WebSphere Servers
 - 24x7, lightning fast access to your On Demand Business from anywhere in the world



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Key Message: Development can be done, using Wizards in IBM's Eclipse-based development environments, RAD, WID and WDz, and Deployment can be done using WebSphere application servers

In this example, the developer is Web-enabling an IMS application. The developer started by importing the appropriate IMS TM Resource Adapter into the workspace in the development environment.

The next step in the application development process using IMS Connector for Java was to import the source that describes the input and output messages used by the target IMS application. These messages are described in data structures inside the C or COBOL IMS application program or MFS source. The C, COBOL or MFS source is used by the development environment to generate specialized Java classes called data bindings representing the input and output messages of the target IMS application program.

Following the flow of the easy-to-use wizards, RAD, WID or WDz, automatically generates code for the application, in this case creating a J2C Java bean that uses the IMS data bindings created earlier to communicate with IMS Connector for Java to run the target IMS transaction. The Rational and WebSphere development environments include graphical and source editors providing users with both simplicity and flexibility. Your developer can assemble these components into either a Java Server Pages-based application, a Web service, or an Enterprise Java Beans application. In addition, these components can be incorporated into a simple Business Process using the Process Editor in Rational Application Developer or into a more sophisticated Business Integration process using the Assembly Editor in WebSphere Integration Developer.

IMS TM Resource adapter (IMS Connector for Java) provides access to both existing and new IMS applications. It is standards-based, providing the quality of service you need for your mission critical applications. IMS Connector for Java supports rapid application development using IBM's premier WebSphere and Rational software products. IMS Connector for Java enables rapid application deployment to production using WebSphere's multi-platform family of application servers.

IMS TM Resource adapter and the WebSphere family of products will quickly give you 24x7, lightning fast access to your On Demand Business from anywhere in the world, whether you are running on AIX, HP-UX, Linux, Solaris, Windows, or the premier platform for On Demand Business, zSeries.

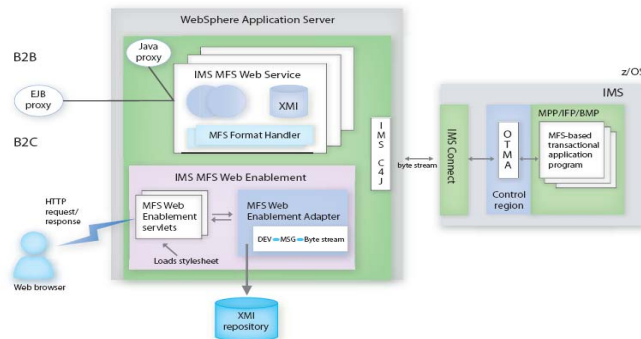
Enhanced IMS Application Integration with Modernized MFS-based IMS Transactions

MFS Web Services (B2B)

Enables business applications to interact with MFS-based IMS transactions

MFS Web Enablement (B2C) – **NEW** V9.3 available

Enables users to seamlessly navigate through dynamically generated MFS-like Web pages in a Web browser



Additional information at <http://www.ibm.com/ims>



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Key Message: IBM also provides support for IMS Message Format Services (MFS) Solutions

We offer two solutions to modernize and reuse your MFS-based IMS transactions

-The first solution converts your MFS-based IMS transactions to Web services in a B2B business scenario. Your client application calls the generated proxy to invoke the Web service. The solution gives your application the power and flexibility to consolidate the results of one or more Web service calls across your enterprise applications.

-The second solution Web-enables your MFS-based IMS transactions in a B2C business scenario. No coding is required to take advantage of this solution! It allows you to experience the same 3270 look, feel, and flow via Web browser! Furthermore, you have the flexibility to customize the generated HTML pages.

Both solutions just require valid MFS source files and run on WebSphere Application Server. And if you don't have the MFS Source files, we have an IMS MFS Reversal Utilities Tool that can help recreate them for you.

Modernize MFS based IMS transactions

- Revitalize existing assets with total cost reduction
 - ❖ 3270 emulator and VTAM are no longer required
- MFS Web Services
 - ❖ Transform MFS based IMS transactions as web services via
 - WSAD-IE & WebSphere Application Server
 - **Requirement:** Evolving RAD SOA Tooling & WebSphere Application Server support
 - **Requirement:** Conversational support
- MFS Web Enablement
 - ❖ Render displays on new modern devices, extending use of MFS without modifying existing applications
 - Web browser & WebSphere Application Server
 - **Requirement:** Displayable devices, e.g. PDAs



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Key Message: MFS applications are revitalized in the new environments without using 3270 emulators or going through VTAM.

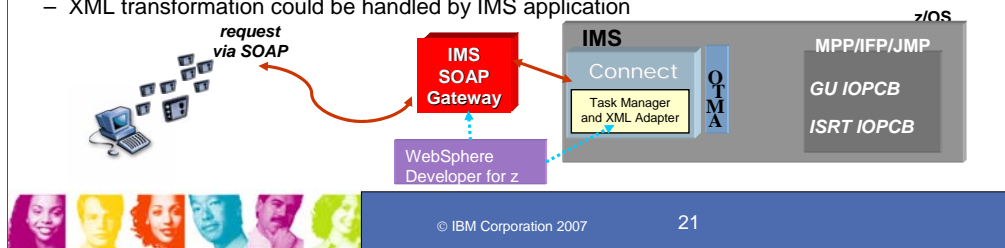
MFS Web Services are used with WSADIE for enabling WAS applications with access to IMS applications.

MFS Web enablement renders display of IMS output on modern devices without application change.

MFS web services and utility enhancements are being provided for use with WDZ.

IMS SOAP Gateway

- **Enables IMS Application Reuse as Web Service**
 - Independent of location, programming language, and platform
- **A Web Service solution for IMS with direct SOAP support**
 - Leverages existing IMS applications as Web Services without needing a J2EE server
- **Integrates IMS assets into the broader Service-Oriented Architecture (SOA)**
 - Interoperation with vendors/partners in a B2B environment
 - Support different application types: Microsoft .Net, Java, third-party (e.g. SAP XI), RYO
- **Supports Web Service specifications and leverage Open standards**
 - SOAP/HTTP 1.1, WSDL 1.1, WS-I Basic Profile 1.0
- **Web service-enables IMS applications with easy deployment**
 - IMS application as web service with easy deployment/configuration without programming
- **Flexible tooling support**
 - Supports user- or IBM-provided tooling (eg. WDz generates Web Service artifacts like WSDL and XML converters from IMS application COBOL copybook)
- **Transforms XML data without IMS application change**
 - IMS Connect XML Adapter transforms XML data using WDz XML converters
 - XML transformation could be handled by IMS application



Key Message: IMS SOAP Gateway eases use with heterogeneous component management in an SOA world

In the customer's increasingly complex systems, IMS SOAP Gateway can ease the management of heterogeneous components and support direct integration with the Service Oriented Architecture environment.

IMS SOAP Gateway provides you a direct SOAP capability to help you to leverage your existing IMS applications as Web Service without the need of a full-blown J2EE server. With IMS SOAP Gateway, you can protect your current IMS investments and allow your IMS assets to collaborate with vendors and partners in a Business-to-Business environment. Any type of clients, like Java, Microsoft .NET can access IMS application via the Web Service interfaces.

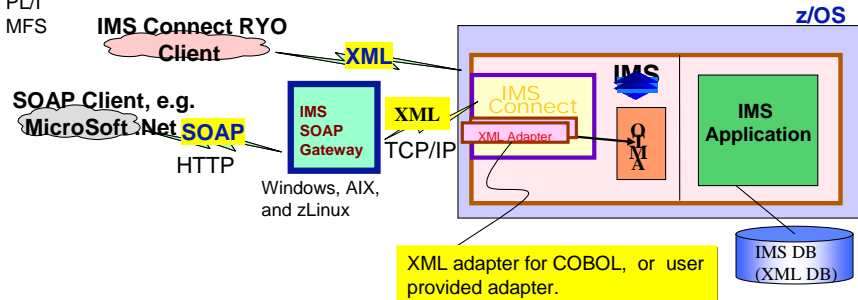
To achieve interoperability with other distributed applications regardless of platform, protocol and programming languages, IMS SOAP Gateway aims to support the Web Service specifications and leverages on open standards. We currently support SOAP over HTTP 1.1, WSDL 1.1 and WS-I Basic profile 1.0.

To use IMS SOAP Gateway, you do not need to do any programming. IMS SOAP Gateway helps you to make your IMS application become a web service via easy deployment and configuration steps. IMS SOAP Gateway can work with different types of tooling such that we can consume web services artifacts like WSDL file that is being created by the tooling of your choice. In addition, we provide integrated tooling with IBM WebSphere Developer for zSeries to help you easily generate WSDL files and XML converters directly from your IMS COBOL application source.

We also offer flexible data transformation options on how the XML data can be handled as illustrated in the previous chart. For example, you can choose to have your IMS application to handle the XML data, or you can use the IMS Connect XML Adapter function that utilizes the XML converters generated by WebSphere Developer for zSeries to convert the XML into bytes such that you do not need to modify your IMS application.

IMS SOAP Gateway and XML Processor

- *IMS SOAP Gateway R9.2 GA* downloadable at <http://www.ibm.com/ims> with SSL/HTTPS Security enhancements, zLinux
 - Requirements
 - Callout (V10)
 - Web Services Standards enhancements : WS-Security, WS-Atomic Transaction, etc.
 - z/OS environment support
 - Multi-segment support
- *IMS Connect Task Manager/XML Adapter* available via IMS V9 service stream provides data transformation, leveraging WDz generated XML Converters
 - Requirements
 - RYO Clients
 - PL/I
 - MFS



Key Message: The IMS Soap support takes advantage of existing IMS Interfaces and enhanced adapters to broaden and ease access.

IMS is now providing direct SOAP support for running in Windows and AIX environments, to enable customers to reuse IMS applications as Web Services. In the future, this could be enhanced to support the latest Web Services standards and security, run in z/OS and other environments, the support multi-segment messages.

The XML Adapter is also now available through the IMS V9 service stream. The XML Adapter for this release supports COBOL for SOAP clients. In the future, it could support RYO clients, as well as PL/I and MFS.

The WebSphere Developer for z/Series can also be used with this IMS SOAP support and XML Adapter.

Enterprise Tooling

- **RAD (Rational Application Developer)**
 - PL/I based tooling to support IMS and CICS PL/I applications
- **WDz (WebSphere Developer for z/OS) Requirements**
 - IMS MFS SCA/SDO (evolving SOA standards) support
 - IMS DB SCA/SDO support
 - SOAP client support for COBOL
 - Map WSDLs to COBOL copybooks
 - IMS SOAP clients for COBOL applications
 - PL/I tooling
 - XML Services for Enterprise (XSE) for PL/I applications
 - Generate PL/I XML inbound and outbound converters
 - IMS SOAP server for PL/I applications
 - Provide SOAP client support for PL/I
 - Map WSDLs to PL/I data constructs
 - IMS SOAP client for PL/I applications



Key message: WebSphere/Rational products are providing enhanced tooling for IMS

As WebSphere and Rational tooling develops, support is provided/enhanced for IMS. RAD has already provided PL/I based tooling. PL/I is still a requirement for WDZ support. Also requirements exist and are being put in plan for the latest MFS and SCA/SCO/SDO standards.

IMS Connect Solutions ...

- **Additional Product solutions that leverage IMS Connect:**
 - Attachmate - Synapta Services Builder for IMS
 - http://www.attachmate.com/NR/rdonlyres/2FFC7D0A-9744-4996-95CE-18AFCEC0B4F7/0/tp_ssb_transactionaccess.pdf
 - Comporsys Connector for IBM IMS
 - [http://www.comporsys.de/pdf/connector.ims.datasheet\(en\).pdf](http://www.comporsys.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_2004main/html/his_planning_for_transaction_integrator_node_gphi.asp
 - NetManage OnWeb Connectors
 - http://www.ftp.com/products/pdf/datasheets/OnWeb_Connectors2_3-05.pdf
 - SeeBeyond e*Way Intelligent Adapter for IMS
 - http://goldstar.seebeyond.com/support/support/docs/4.5.4/eWay_Intelligent_Adapters/IMS_eWay_Monk.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>
 - ...
- **Products that enhance IMS Connect:**
 - BMC Energizer for IMS Connect
 - <http://www.bmc.com/>
 - IMS Connect Extensions
 - http://www.fundi.com.au/pr_ims_ce.html


This is a sample list that does not attempt to include all possible vendors



Key Message: IMS V9 Integrated IMS Connect function and its predecessor tool are supported throughout the industry for connectivity to IMS.

There are also a lot of additional products that leverage IMS Connect function to access IMS applications.

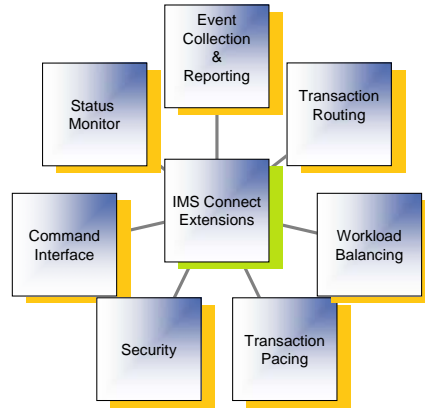
IMS Connect Extensions

IMS Connect Extensions for z/OS is a companion tool for IMS Connect.

It provides a new level of control, enabling users to more easily monitor, manage, tune and secure IMS Connect.

Key functions and services:

- Provides comprehensive event recording for IMS Connect internal events.
- Allows users to monitor and display IMS Connect activity and utilization in real time
- Enhances IMS Connect availability by dynamically managing workloads
- Improves system security by providing a greater degree of access control



Key Message: IMS Tooling extends IMS Connect function

IMS Connect is even more powerful with a companion offering, IBM IMS Connect Extensions for z/OS.

- This new tool Provides comprehensive event recording for IMS Connect internal events. These events can be used for basic reporting and problem analysis, and can, if used in conjunction with IBM IMS Performance analyzer, provide extensive performance and usage reporting for IMS Connect activity
- IMS Connect Extensions tool allows users to monitor and display IMS Connect activity and utilization in real time
- It enhances IMS Connect availability by dynamically managing workloads
- Also, it improves system security by providing a greater degree of access control

IMS Connectivity Enhancements 2006-2007 through Service Process

- Connect enhancements
 - Connect Client application NAK with output purge or reroute option (2006)
 - Connect Super member support provides for shared asynch messages (2006)
 - Connect Send-only
 - Reroute option (2006, V9 only)
 - With acknowledgement (2007)
 - With Serial delivery (2007)
 - Resume TPIPE with alternate client ID (2007, V9 only)
- Additional Connector for Java enhancements
 - WID/WBI V6 support (2006 for IMS V9)
 - RAD V7 (2006 for IMS V9)
 - SSL Null cypher encryption (2007, V9 only)
 - 64-bit local option support for WAS z/OS (2007, V9 only)
- MFS Web enhancements
 - WSADIE Attributes/extended attributes support (2006 for IMS V9)
 - Web Enablement V9.3 display enh, WAS V6 support (2006 Web Download for IMS V9)
- XML Adapter and Task Manager (2006 for IMS V9) for IMS SOAP Gateway V9.2



Key Message: Enhancements are continuing to roll out for IMS Connectivity.

IMS Connectivity enhancements include Connect Purge not deliverable extensions, which provides the user the ability to decide which messages to purge for Commit Mode 0 transactions that start as Commit Mode 1 and transfer to Commit Mode 0. (Previously only Commit Mode 1 transactions were supported).

This includes Connect and Connector for Java function for Sysplex distributor, the first of these is Connect support to reroute persistent socket messages (if Connect has a problem delivering a message it goes back to OTMA to reroute, but if OTMA cannot IOPCB to connect, there will be no reroute) and Connector for Java support to reroute sharable persistent socket messages. Also included are new Connector for Java JCA 1.5 and WAS V6 environment support as well as RACF Key Ring support. There are some additional RAS enhancements.

MFS Web Enablement from a windows environment (provided through web download) - Tooling utility and runtime to web enable existing or new IMSMFS applications for WAS V5/6 and interactively render the display web pages in standard browsers such as Microsoft Internet Explorer and Mozilla firefox. This solution no longer requires 3270 emulator and VTAM as HATS does.

IMS V10 Transaction Connectivity Enhancements

- SOA Composite Business Applications Conversational enhancements
- Multiple Systems Coupling (MSC) VTAM Generic Resources support
- OTMA CM1 Timeout support for improved automation
- OTMA Descriptor enhancement to ease usability
- APPC Local-LU and timeout granularity
- Callout enhancements
- Security enhancements
- Broadened Java/XML/SOA Tooling to ease development



Key Message: IMS Application Development and Connectivity enhancements are being delivered

A number of additional application development and connectivity enhancements have been provided and are being enhanced.

MFS Web Support provides access to existing IMS applications from WAS environments, protecting customer assets. MFS Web Services enhancements expose attributes and extended attributed fields for web services applications. MFS Web Enablement now includes access from WAS for zOS, in addition to Windows and AIX, and adds customizable display enhancements, allowing drop down list boxes and infopops on familiar look-and-feel 3270 web pages. These items are also being provided through the IMS V9 service process.

IMS Connector for Java PL/I application support is provided using the latest Rational Application Developer tooling and WebSphere Application Servers to allow IMS PL/I applications to be enabled as Web Services without IMS application changes. This support is also being provided for IMS V9 applications.

Sysplex Distributor Support has been provided over the past year with enhancements for this environment.

Multiple Systems Coupling (MSC) VTAM Generic Resources (VGR) support provides a remote IMS the ability to use a generic resource node name to communicate to any IMS within an IMS Sysplex through the MSC facility. A remote IMS could use a single MSC link definition to connect to the partner link in any of the IMSs in the IMS Sysplex and cloned MSC links can be used across IMSs for connection to remote IMSs.

These also include enhancements for standards enhanced support, Security, Automation, and more, which I'll be covering here.

IMS V10 SOA Composite Business Application Support



➤ Provides Visual Composition tooling and runtime

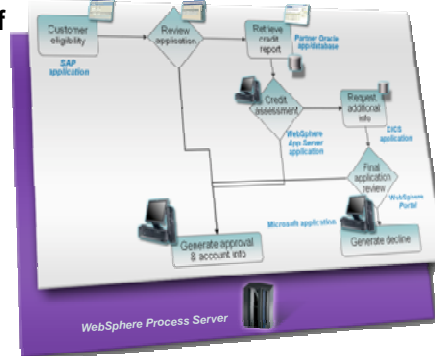
- Leverages WebSphere Integration Developer (WID) for visual composition tooling to create composite business applications with reuse of IMS transactions
- Deploys composite applications to WebSphere Process Server (WPS)
- Enhances IMS Connect/Connector for Java for long running Business Process Execution Language (BPEL) with user interventions without socket affinity

➤ Streamlines process design hands-off between business and IT

- Enable existing IMS transactions, including conversational transactions, as SOA-based composite business applications
- Enable IMS transactions for broad reuse and service development and assembly technologies

➤ Maximizes re-use and service development and assembly

- Ability to leverage existing services & save components for future service reuse
- Build and run IMS sub-process flows that can be reused within multiple external processes



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Key Message: IBM is providing visual composition tooling and runtime support for IMS

IMS SOA Composite Business application support provides for the next generation business process tooling and servers that integrate J2EE resources, services and activities (like user interventions), based on Web Services with the Business Process Execution Language (BPEL). This extends existing transactions to include conversational transactions as SOA-based composite business applications using the IMS Connector for Java and WebSphere tooling and runtime, maximizing re-use of IMS assets in new applications for rapid business innovation and reduced costs.

Enhanced IMS SOA Composite Business Application Requirements

Objective:

- Enhance integration of IMS transactions as SOA based composite applications while reducing existing complexity, proprietary nature and resource requirements

Solution:

- Invoke and Integrate IMS Message Format Services (MFS) conversational transactions as SOA-based composite applications
- Ease integration using the latest tooling support through IMS Connector for Java, WebSphere Integration Developer (WID) tool set and the WebSphere Process Server (WPS)

Value:

- Enhanced application integration and ease of use

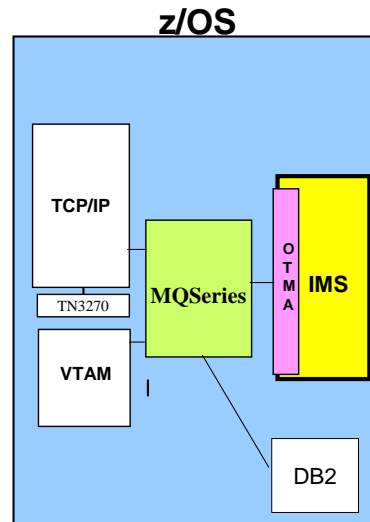


Key Message: IMS plans to enhance its SOA composite business application support

IMS would continue to enhance integration of IMS transactions with other transactions/applications, including in composite business application environments. This would be needed to help reduce the existing complexity, the proprietary nature of existing environments, and the resources and skills required.

Using WebSphere MQ to access IMS applications

- IBM WebSphere MQ delivers reliable integration for applications and Web services, allowing you to fully leverage your existing software and hardware investments
- WebSphere MQ supports more than 80 platform configurations and integrates virtually anything, including IMS and DB2 environments.
- Access to IMS using WebSphere MQ for z/OS can use both the IMS adapter and the IMS bridge.
 - **IMS Adapter** supports the use of explicit MQ calls in the IMS application
 - **IMS Bridge** takes advantage of the existing DL/I call interface in the IMS application



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Key Message: Using WebSphere MQ to access IMS applications

IBM WebSphere MQ delivers reliable integration for applications and Web services, allowing you to fully leverage your existing software and hardware investments

WebSphere MQ supports more than 80 platform configurations and integrates virtually anything, including IMS and DB2 environments.

Access to IMS using WebSphere MQ can use two methods: IMS adapter and/or IMS bridge.

Using the IMS Adapter, you can have the explicit MQ calls, such as MQ Get and MQ Put, in the IMS application.

Using the IMS Bridge, MQ puts the messages on the IMS message queue via OTMA and takes advantage of the existing DL/I call interface in the IMS applications.

Comparing Solution Types for IMS Connect and MQ

▲ Direct 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




Key Message: This briefly compares the direct and messaging solutions. IMS Connect provides a native-to-IMS solution to optimize that environment; MQ enables access not only to IMS applications but also to a variety of other environments for broader corporate solution. Other differences need to be understood when making the decision of which to use for individual applications.

Web Service access to IMS transactions

Standard architecture	Capabilities	Development Platform	Interface	Coupling
1. Using IMS SOAP Gateway	Inbound only Synchronous (HTTP) 32 KB limit (single segment)	WebSphere Developer for z (for XML Parser)	IMS I/O Message (Izztrandata)	Loose
2. JCA	Inbound only Synchronous with Asynchronous output options NO max message size: IMS Connect supports multi segment message (32K limit for one single segment)	RAD (for WSDL and SOAP Proxy)	IMS I/O Message	Medium
3. JMS/ WebSphere MQ	Inbound and outbound Asynchronous Assured delivery	RAD (for WSDL and SOAP Proxy)	IMS I/O Message or WebSphere MQ API	Medium

Standard architecture	Description	Positioning	Recommendation
1. Using IMS SOAP Gateway	Lightweight J2EE standard for messaging over the Web supporting SOA to IMS	Basic SOAP Support to access IMS transactions Future: Improving QoS, features and performance	<i>If customer does not wish to write a web services wrapper program (e.g. WAS EJB), then the best integration option is usually "IMS SOAP Gateway"</i>
2. JCA	Comprehensive W3C standards for messaging over the Web supporting SOA to IMS	Widely adopted IMS connectivity with highest qualities of service today	<i>If customer uses WebSphere Application Server to create mid-tier components then the best integration option is usually J2C, using IMS Connector for Java</i>
3. JMS/ WebSphere MQ	Comprehensive industry standard for assured messaging	Widely adopted B2B integration technology that includes IMS connectivity	<i>Continue to exploit WebSphere MQ for basic messaging and flowing Web services</i>


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Key Message: This briefly compares the SOAP, JCA, and JMI solutions

Distributed, Open Access To IMS Operations

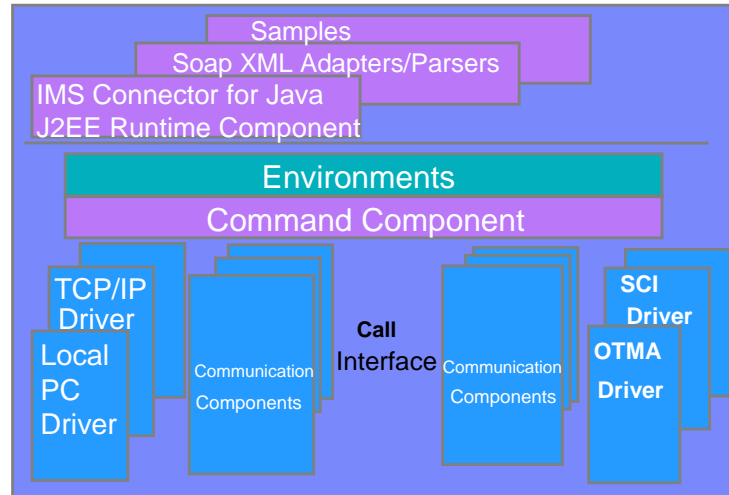


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Key Message: Standard interfaces and solutions are provided for Distributed Open, Access to IMS Operations

IMS Connect Internal Structure Provides Connectivity Base for Future



Key Message: IMS Connect is part of the overall restructure of IMS for the 21st Century and is architected as the base for all future IMS Connectivity.

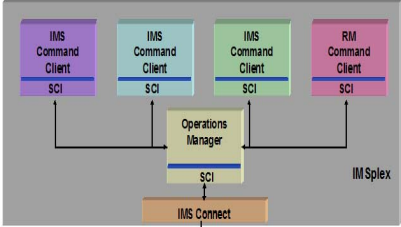
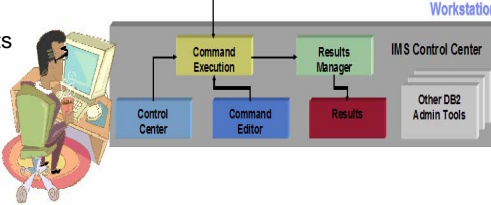
The structure of IMS Connect is designed such that drivers can be interchangeable. That is, alternatives for the TCP/IP front end or OTMA back end interfaces are already being provided. These are allowing IMS to exploit newer, additional, and enhanced protocols and/or interfaces. Along with IMS Connect is provided the IMS Connector for Java for access from Java applications, SOAP Gateway and parsers, and samples for other language access as well.


With IMS Version 8, IMS extended its use of XCF for use by other IBM subsystems, such as IMS Connect, for distributed operations access through the Structured Call Interface to the Operations Manager from the DB2 Version 8 Control Center as a single point of control.

With this structure IMS Connect could evolve to address other connectivity requirements, such as distributed database access to IMS DB.

IMS Control Center & Command Editor

- Simplifies Operations management and problem determination
 - Single point of control
 - No need to remember command syntax
- Provides **easy to use** GUI for IMS System management
- Seamlessly integrated single user interface for managing **IMS** and **DB2**
- Platform for modernization of IMS systems management user interface
- Additional information and instructions for download at <http://www.ibm.com/ims>
- IMS V10 Distributed Operations enhancements
 - **Dynamic Resource Definition User Interface with command wizards**
 - **Initiate IMS transactions**
- Distributed Operations Requirements
 - **Integrate operations further across environments**



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Key Message: IMS Control Center (CC) simplifies the management of IMSplex operations and problem determination by providing an easy to use GUI.

You can manage your IMS™ systems in a graphical interface from a workstation using the Control Center. Control Center for IMS provides a single point of control that simplifies system management tasks in an IMS environment. The IMS Control Center provides a consolidate user interface for both IMS and DB2 administration. Administrators can work with a consolidated system view and manage all their IMS systems from a single station. IMS CC is seamlessly integrated with DB2 CC.

On the bottom of the chart, you can see the three main components of CC: CC itself, Command Editor and Results Window. The command flows from CC or CE to the host site through IMS Connect, through the IMS Operations Manager (OM), which can route that command to one or more IMSs. The results, are then sent from each IMS to OM, which consolidates responses for Control Center and passes them back to the workstation side through IMS Connect. The results are then processed by Results Manager and displayed in the results window.

The CC allows you to issue newer type-2 commands, using either Wizards, Command Dialogs or Command Editor (CE). Wizards provide a step-by-step guide in creating a command. Command dialogs are a one page quick guide to creating an IMS command. And Command Editor is a free input text area that allows you to type your command. Also, since CE is a free input text field, it allows you to issue IMS type-1 commands, which are older IMS commands, as well. And as I mentioned earlier, all the results are displayed in the results Window.

If you want to learn more about the CC please visit our website shown on the summary slide. The website contains information about CC as well as instructions for downloading the CC.

Producing Industry Standard IMS Applications



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Key Message: Standard interfaces and solutions are provided for new IMS applications

IMS Java for Integrated On Demand Business Application Development and Database Access

- **Provides development and enablement for Java applications running in IMS dependent regions**
 - Two new Java Regions - Java Message Processing (JMP) and Java Batch Processing (JPB) regions, analogous to MPP/BMP regions
 - A complete Java Virtual Machine (JVM) supported/maintained by the new regions
 - IMS scheduler recognizes Java transactions and schedules them in new regions
- **Provides Direct database access to IMS data using standard interfaces**
 - Accessing Full function (including HALDB) and Fast Path database resources
 - This includes access to IMS XML DB
- **Provides a Java class library that...**
 - Offers Java language support to access IMS database resources from various environments
 - IMS (in the new Java Dependent Regions)
 - WebSphere Application Server (z/OS and distributed)
 - DB2 Stored Procedures
 - CICS, using the JCICS API
 - Offers Java support to access IMS message queue and transaction services
 - Used when operating within a Java dependent region
 - Enables SQL (structured query language) access through the JDBC interface
 - Enables XML-DB query access as a SQL UDF

Goal: Offer in Java all IMS TM and DB application services available from traditional programming languages



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Key Message: Java is the base for new application development and connectivity in IMS and for access to IMS databases.

IMS JAVA provides development and enablement for Java applications running in IMS dependent regions and supports database access to IMS data from other environments. JDBC access is provided to full function, including HALDB, and Fast Path data. This includes XML DB data as well.

A Java class library is also provided to offer language support for access to IMS databases. Support for IMS DB access is provided from CICS/zOs Java applications, DB2/z/OS Java Stored procedures and WebSphere z/OS applications, opening IMS DB up to better integration and use across platforms and across application environments. This enables SQL access through the JDBC interface and enables XML DB query access as a SQL UDF.

We have been providing new Java Tooling, as well as installation and usability enhancements and supporting Java/Cobol and XML Interoperation.

IMS support for Java is augmented by IBM's Eclipse-based Application Development tools for J2EE programmers, as well as a broad array of AIM tools designed to facilitate building Innovative Services Oriented Architecture based applications that provide the best of the z/Series world with the best of the Java world.

Why Java for IMS?

- **Rapid Application Development**
 - Concept that products can be developed faster and of higher quality
 - Embraced by the object-oriented methodology
 - Re-use of software components
 - Tooling widely available for entire development cycle
 - Reduce total cost of ownership and time-to-market
- **Leverage existing marketplace, industry-sanctioned standards**
 - Persistent
 - Well-documented and understood
 - Standard APIs minimize specific back-end knowledge of IMS
 - Our drivers will handle that on behalf of the application
- **Leverage new and abundant skills in the marketplace**
 - Help to mitigate the reducing numbers of /390/z skills
- **Integrate with other products**



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Key Message: Since initial delivery, IMS Java application support has enhanced the ability of our customers and business partners to provide integrated on demand business application development with IMS.

The objective of IMS Java function is to provide support for you to write Java applications and run them as IMS applications or accessing IMS data, using WebSphere workstation and host tools for development and testing. This would leverage your existing applications/data while taking advantage of industry standards and the newer abundant skills in the marketplace and integrate with other products.

Java Transactions Under IMS TM Control

- **DB2**
 - DB2 database access provided from the new Java Dependent Regions
 - IMS DB-DB2 interoperability from within a Java Dependent Region
- **COBOL/PL/I**
 - COBOL/PL/I-Java interoperability within single transaction in Java Dependent Reg.
 - COBOL-XML support for parsing/transforming XML documents
 - COBOL XML plug-in to parse COBOL Copy libs (DLIModel Utility)
- **Installation/usability enhancements**
 - Expanded samples/examples/documentation
 - IVP and install program improvements
 - Symbolic Checkpoint/Restart for the JBP
 - Java Deferred Program Switch
- **Java applications can run in zAAP processors**
 - Lowers the cost of running these Java applications
- **64 bit JVM support (2007 thru IMS V9 service process)**
 - Java/C++ Libraries operate in 64-bit mode, invoke 31-bit assembler modules
 - Provide improved performance
- **JDK 5.0 support (2007 thru IMS V9 service process)**

- **IMS V10 Java application enhancements**
 - Java Library support enhancements for DB2 Java Stored Procedures
 - GSAM Database support expanded to JBP Regions



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Key Message: IMS provides access to IMS TM message queues and to IMS DB and DB2 data through JDBC and continues to be enhanced.

New Java Region Types were also being provided to replace initial support utilizing the High Performance Java Compiler with the high performance Java Virtual Machine (JVM).

More recent enhancements provide for better interoperability between IMS and DB2 data and between Java and Cobol applications.

IBM Java support for the new IBM zSeries Application Assist Processor (zAAP) for the IBM zSeries 990 and IBM zSeries 890 servers allows Java workloads to transparently execute on the zAAP processors without requiring application change. This allows you to integrate and run Java workloads on the same server as your database at a significantly lower total cost of ownership than previously possible. This helps reduce overall cost of computing for Java applications, increase system productivity by reducing the demands on general purpose processors, and makes capacity available for other workloads.

Storing/Retrieving XML Data



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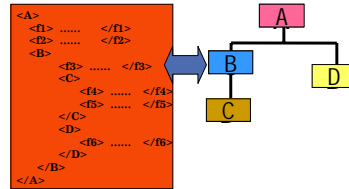
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Key Message: Standard interfaces and solutions are provided for storing/retrieving XML data in IMS

IMS V9 XML Database Storage and Retrieval

- **Enables global standard for on demand solutions, providing universal, transparent information interchange among internal business processes, suppliers, partners, customers**

- Implementation is native IMS
 - Provides efficient utilization of resources
 - Top overall performance
- Converts existing IMS data to XML
 - Facilitates integration with business processes
 - Improves programmer productivity
 - Reduces development lead times
- Decomposes XML data for use by non-XML enabled applications
 - Preserve and extend past investment
 - Enhance programmer productivity
- Identical data descriptions for distributed and host environments
 - To reduce overhead
 - Improve data consistency and integrity
- DL/I Model Utility generates XML schema used at runtime
 - Improves application development time and reduces errors
 - Code in an industry standard interface
- Introduces way to view/map IMS hierarchical data to *native* XML documents, aligning IMS Database Definitions (DBD) with XML Schema
- Retrieval/storage of IMS Records as XML documents without change to existing IMS DBs



Key Message: A key element is XML Database support for storage and retrieval of XML data in IMS databases

- The implementation is native IMS, not merely a mapping as must be done with other technologies, providing efficient utilization of resources and top overall performance. Existing IMS data can be easily converted to XML to facilitate integration with business processes, improve programmer productivity and reduce development lead times.
- XML data can be decomposed for use by non-XML enabled applications, thereby preserving and extending past investment and enhancing programmer productivity.
- Data descriptions can be the same for distributed and host environments to reduce overhead and improve data consistency and integrity.
- DL/I Model Utility Enhancements generate XML schema from existing IMS Database Definitions (DBDs) and Program Status Blocks (PSBs) for XML storage and retrieval at runtime. This improves application development time, reduces errors and makes it possible to consolidate skills by allowing programmers to code in an industry standard interface.
- IMS V9 introduced a way to view your IMS data (from existing or new IMS databases) as collections of XML documents -- aligning the stored hierarchical IMS records with the hierarchically structured XML documents for retrieval and automated conversion between
- IMS V9 XML-DB allows you to retrieve and automatically convert an IMS record into an XML document. Similarly, it allows you to store an XML document into IMS by automatically converting the XML document into an IMS record.

IMS V10 XML Data Enhancements

- IMS XML DB Mapping enhanced for emerging standards and usability
- IMS XQuery support
 - Jointly developed by industry leading companies as standard XML query language
 - W3C Recommendation Nov 2005
 - SQL-like (but specifically designed for hierarchical data)
 - More natural fit for hierarchical data querying
 - Further aligning IMS with industry direction
 - Enhanced integration with tooling support
 - Full support for IMS databases using XML-DB with IMS/XML mapping
 - Technology Preview downloadable from <http://www.ibm.com/ims> on alphaWorks -- an early adopter website for emerging IBM technologies in early stages of R&D.
 - Includes DBD, PSB, load job, sample applications and step by step instructions

```
<bib>
  for $b in /bib/book
  where $b/publisher = "Addison-Wesley" and $b/@year > 1991
  return
    <book year="{ $b/@year }">
      { $b/title }
    </book>
</bib>
```



Key Message: IBM is working on XQuery support for open standards and integrated data access

The emerging XQuery standard is a powerful query language to search, aggregate, evaluate, pick and choose parts of the XML collection and then convert the resulting data into XML. IBM V10 is providing a fully functional, performance-oriented XQuery implementation atop IMS, offering this hierarchical query language the fully functional performance implementation that only IMS can offer. An IMS XQuery Technology Preview is now available on alphaworks through the IMS website for early testing.

Distributed, Open Access To IMS Data

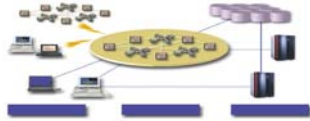


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Key Message: Standard interfaces and solutions are provided for Distributed Open, Access to IMS Data

What is Open Database Access?



- Open Database Access (ODBA) is a callable interface for accessing data managed by IMS DB
 - Based on the DRA interface provided for CICS applications
 - Also provided through the IMS V6 service process
- ODBA allows IMS DB and z/OS application programs to be developed, installed, and maintained independently of each other
- ODBA provides for failure isolation and independent resource recoverability
 - Requires OS/390 Resource Recovery Services (RRS)



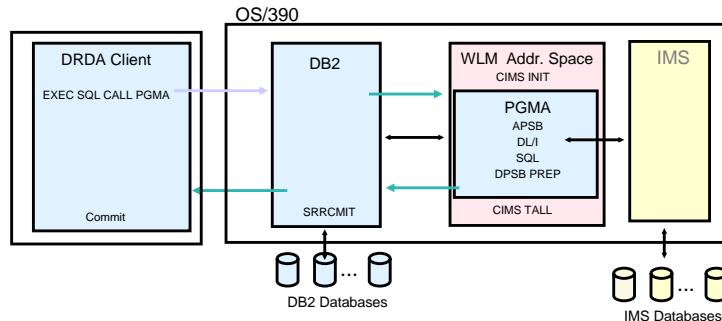
Key Message: Open Database Access (ODBA) for IMS is making it easier for customers to access the valuable information stored in their IMS Databases.

ODBA makes it possible to access IMS DB subsystems from any z/OS application address space.

In fact because synchpoint processing is coordinated through the use of z/OS Resource Recovery Services (RRS) from one address space, you can connect to more than one IMS DB subsystem on the same MVS image, as well as commit or back out changes with just one call.

ODBA is also easy to use. Your application issues DL/I calls to an IMS database application interface block (AIB). The application supplies the AIB, an IMS connection table suffix, and a program specification block (PSB) name. ODBA connects you to "IMS and schedules your PSB in a single bound. To make DL/I calls, you have to supply only a program communication block (PCB) name. In addition the DB2 Stored Procedures function had added support for ODBA in DB2, allowing DB2 to coordinate synchpoint processing through RRS.

DB2 Stored Procedure Example



- DL/I calls to IMS DB from DB2 Stored Procedures
- Client program does commit when stored procedure returns or DB2 can issue SRRRCMIT
- JDBC calls to IMS DB from DB2 Java Stored Procedures
- APPC/OTMA calls to IMS TM from DB2 Stored Procedures



Key Message: This is an example of ODBA usage from DB2 Stored procedures

This example shows a DRDA client issuing an SQL call which invokes a DB2 stored procedure. The call could be issued by any DB2 program, including one running in the MVS system where DB2 and IMS are executing.

The DB2 Stored Procedure must run in a Workload Manager (WLM) established stored procedures address space. This is required for support of recoverable resources (RRS/MVS). DB2 Version 5 or a later release is required for the use of these WLM established address spaces.

The stored procedure application program does not issue the CIMS calls. These are done by DB2 when it establishes and shuts down the address space. There may be multiple WLM stored procedures address spaces and each address space may have multiple tasks (TCBs). These characteristics are determined by WLM and DB2 parameters.

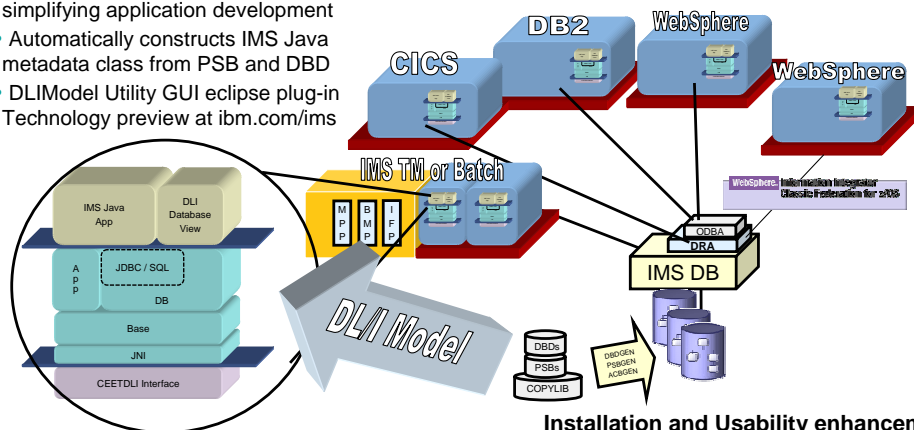
Those interested in implementing DB2 Stored Procedures may want to refer to redbook, Getting Started with DB2 Stored Procedures: Give Them a Call through the Network, SG24-4693.

Built on the ODBA support is the JDBC access to IMS DB provided through the IMS service stream. This is available in z/OS environments from IMS TM, DB2, CICS, and WebSphere application servers.

IMS Database Access Solutions using JDBC

DLIModel Utility tooling support

- Visually represents IMS data simplifying application development
 - Automatically constructs IMS Java metadata class from PSB and DBD
 - DLIModel Utility GUI eclipse plug-in
- Technology preview at ibm.com/ims



Installation and Usability enhancements

- Expanded samples/examples
- IVP and install program improvements
- Expanded documentation



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Key Message: IMS Java support provides Java libraries and JDBC drivers that allow direct IMS database access using the Java programming language.

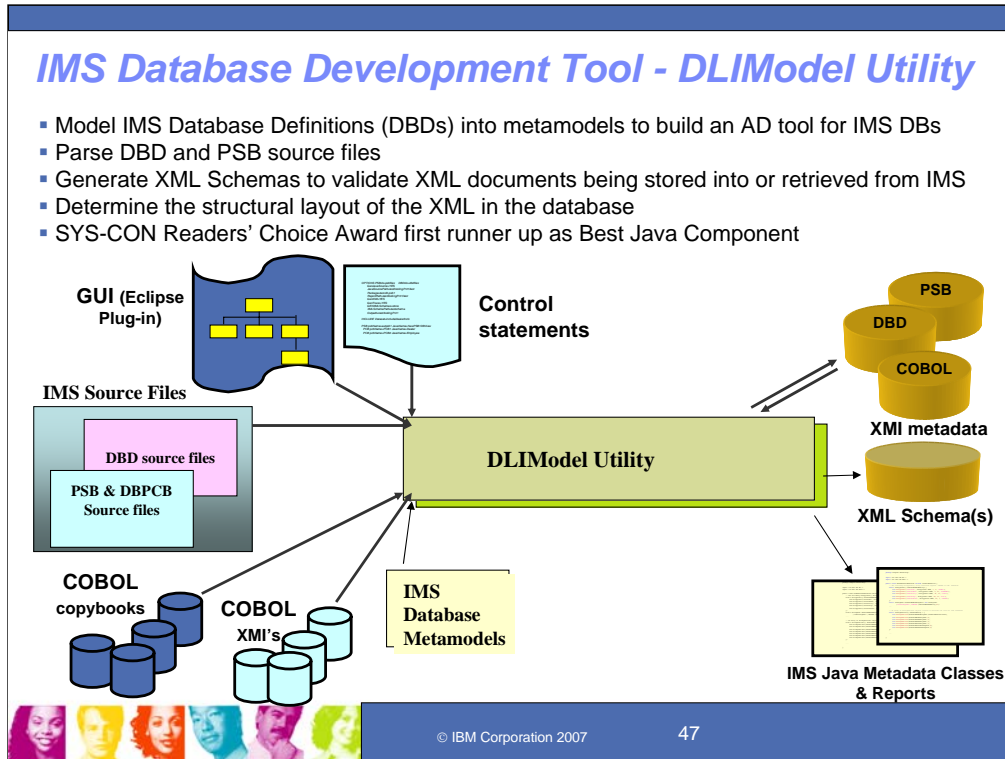
IMS has been taking advantage of the Java environment for Web connectivity to IMS applications, for writing IMS applications running in IMS, and for writing applications running in other environments that access IMS DB data. And IMS continues to enhance its Java application support and access to IMS DB through JDBC.

JDBC support enhances the IMS Java support for enabling JDBC access to IMS DB data not only from IMS TM environments but also now from a CICS/z/OS Java application, DB2/z/OS Java Stored procedure, and/or a WebSphere/z/OS Enterprise Java Bean. This chart shows those environments and how they access IMS data. IMS Java class libraries also provide IMS transaction and message queue services when deployed in the IMS Java Dependent Region environment.

Java Tooling introduced an IMS utility called DLIModel, which automatically constructs the required IMS Java metadata class from PSB and DBD source (earlier users were responsible for creating this class manually). This utility allows information on additional fields, long Java-style names and data types to be supplied from user-coded control statements and/or from XMI descriptions of COBOL copybook members. If desired, it will produce XML descriptions of databases that conform to the OMG's Common warehouse Metamodel 1.1. This greatly eases development of Java applications and JDBC access to IMS DB. The DLI Model utility generates IMS database metadata information that the IMS Java class libraries will use at runtime. The utility will parse PSB and DBD source and optionally COBOL copybooks to generate the database metadata. With this metadata, the Java libraries will understand the complete hierarchic layout of an IMS database – including relationships, keys, secondary indexes, segment names, field names, and field types. This will allow the libraries to perform automatic type conversion as well as translation from a SQL query or XML-DB expression to the native IMS DB query language.

Java Installation and Usability enhancements are also being provided - with expanded sample applications for IMS, WebSphere, CICS and DB2 Stored Procedures, expanded examples for logically related databases and secondary indexes, improvements for installation and Installation Verification program (IVP) applications and expanded documentation.

The DLIModel Utility has subsequently been enhanced further with V9 and the DLIModel Utility GUI, providing a graphical version of the DLIModel Utility, built as an Eclipse plug-in. This GUI simplifies IMS metadata generation, eases IMS Java and XML Database application development, and offers a visual representation of IMS databases. Initial support was provided as a Technology Preview on the ibm.com/IMS website. We are currently enhancing this DLIModel Utility and its GUI with even more capability in V10.

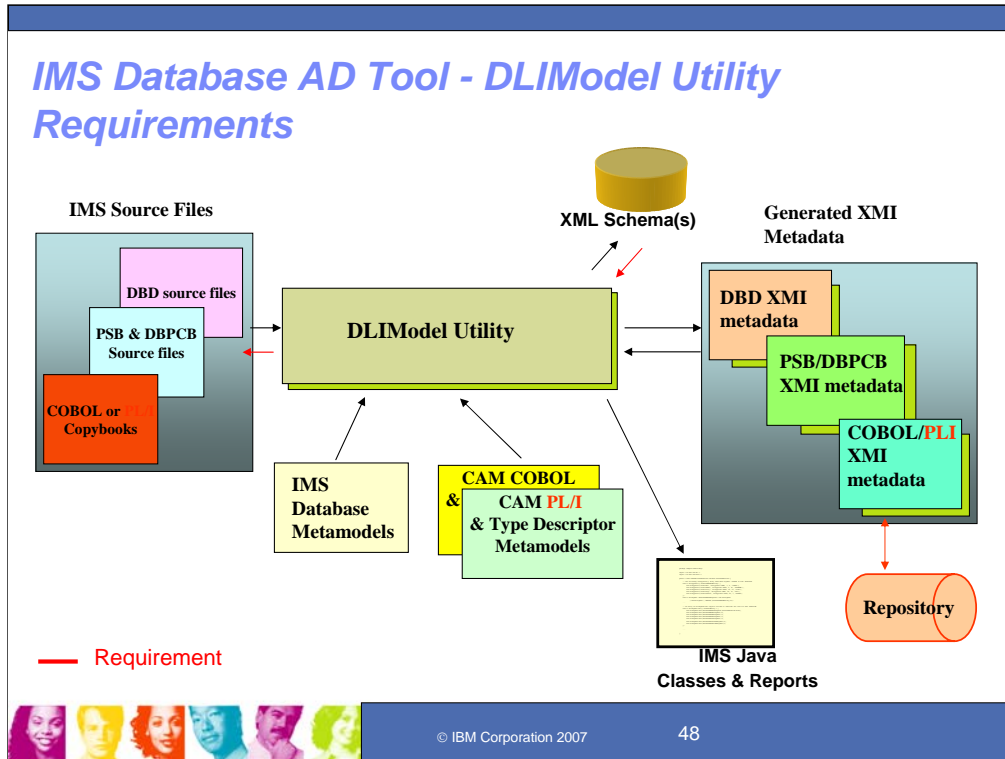


Key Message: The DLIModel Utility is valued as an application development tool

DLIModel utility tooling creates metadata for the IMS data. This tooling has won the Sys-Con readers choice award first runner up for best Java component in the industry.

. Latest enhancements include

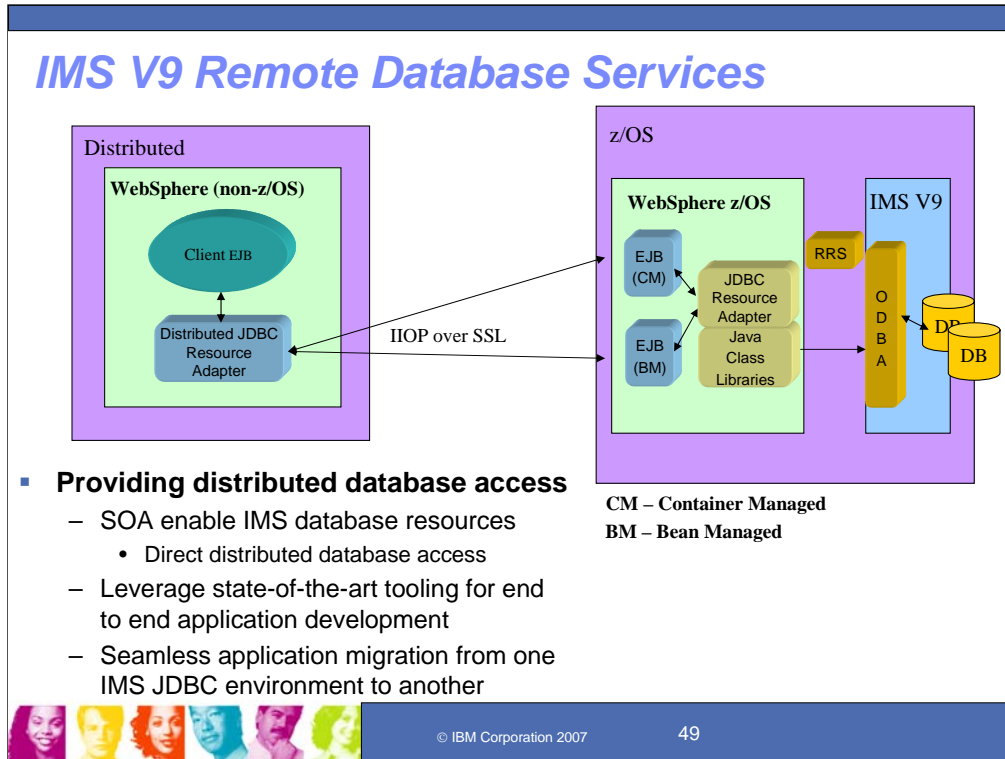
- generate PSB and DBD XMI separately,
- enhance XML schema generation to support XQuery,
- allow import of newly generated XMIs,
- allow direct Cobol copybooks import, and
- an improved GUI which provides a UML view of the PSB metadata



Key Message: IBM is also providing improved data access tooling for the DLIModel Utility

IMS V8 introduced a way to view your IMS data with the DLIModel Utility for IMS Java tooling support. This has subsequently been enhanced further with V9 and the DLIModel Utility GUI. It provides a graphical version of the DLIModel Utility, built as an Eclipse plug-in. This GUI simplifies IMS metadata generation, eases IMS Java and XML Database application development, and offers a visual representation of IMS databases. Initial support was provided as a Technology Preview on the IMS website. We are currently enhancing this Technology Preview with even more capability. This is being made available very soon from the IMS website at ibm.com/ims.

We also have a demo of this that Alan will show you.



Key Message: In IMS V9, IMS put a lot of focus on offering distributed access to IMS database resources for non-z/OS applications.

The result of this effort was the introduction of the Remote Database Services support in IMS V9. This support offers direct IMS database access from a distributed J2EE application server. The complete client application can be developed and deployed on a non-z/OS platform – meaning that no mainframe programming is needed. The distributed functionality provided is completely transparent to the application itself. Furthermore, by offering distributed database access, IMS database resources are SOA-enabled using this technology.

This slide depicts the high level architecture of the solution. On the right side is the mainframe and on the left the distributed application space. To provide a bit of history, in IMS V7 the Java class libraries were first introduced. These libraries form the core of Java application development for IMS. On top of these libraries was built the initial IMS JDBC driver, also in IMS V7. Since then we built a J2EE resource adapter that sits on top of our JDBC driver and therefore completely leverages both the driver and existing class libraries. Using that adapter applications are able to directly access IMS databases from the WebSphere z/OS environment. You can see that in the WebSphere z/OS box on the right side. Within that box you'll see the resource adapter that I just mentioned. Now, for the distributed functionality that Remote Database Services provides, we built another WebSphere J2EE resource adapter for non-WebSphere z/OS deployment and coupled that with a new distributed JDBC driver. You can see the new J2EE resource adapter in the WebSphere box on the left side of the slide. Also provided with this solution are two components that reside in WebSphere z/OS. These components service the distributed client requests. You'll notice the arrows from the Distributed JDBC Resource Adapter box going into the new components. Our distributed driver, not the client application, will determine which component to use at runtime based on the transaction semantics of the application itself. As you can see in the chart, this new solution once again completely leverages the existing Java class libraries.

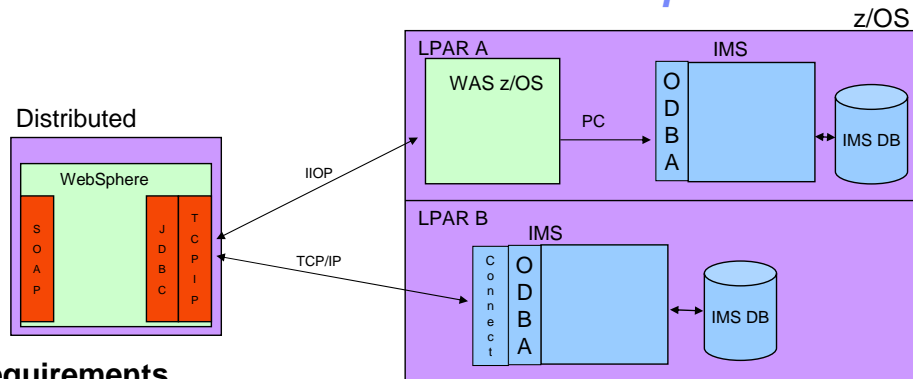
To use IMS Java Remote Database Services to access IMS databases from applications that run on WebSphere Application Server in a non-z/OS environment, you must download IMS Java files from the IMS Java Web site. These downloaded files are required in addition to the files that are installed as part of the SMP/E installation of the IMS Java FMID. To download the required IMS Java files, go to the IMS Web site at www.ibm.com/ims and link to the IMS Java Web page for more information.

It is important to note that this solution requires a TCP/IP endpoint on the mainframe to facilitate the distributed communication. We currently leverage WebSphere z/OS as this endpoint.

Another great feature of this solution is that developers can take full advantage of the facilities that tools such as IBM's Rational Application Developer offer to completely develop, test, and debug their applications. Using the Remote Database Services technology, these applications deployed in the Rational test server will be able to connect to and access IMS databases. Once the application is fully functional, the developer can choose where to deploy the application for production use. Due to the design of our offering, the applications can be deployed in either WebSphere z/OS or WebSphere distributed. There are no migration changes necessary – applications work seamlessly in either environment.

To summarize, the Remote Database Services solution provides three new components: a new JDBC resource adapter and two "listener" components that service distributed requests. Everything else used in the solution was pre-existing Java technology also offered by IMS.

Distributed IMS Database Access Requirements



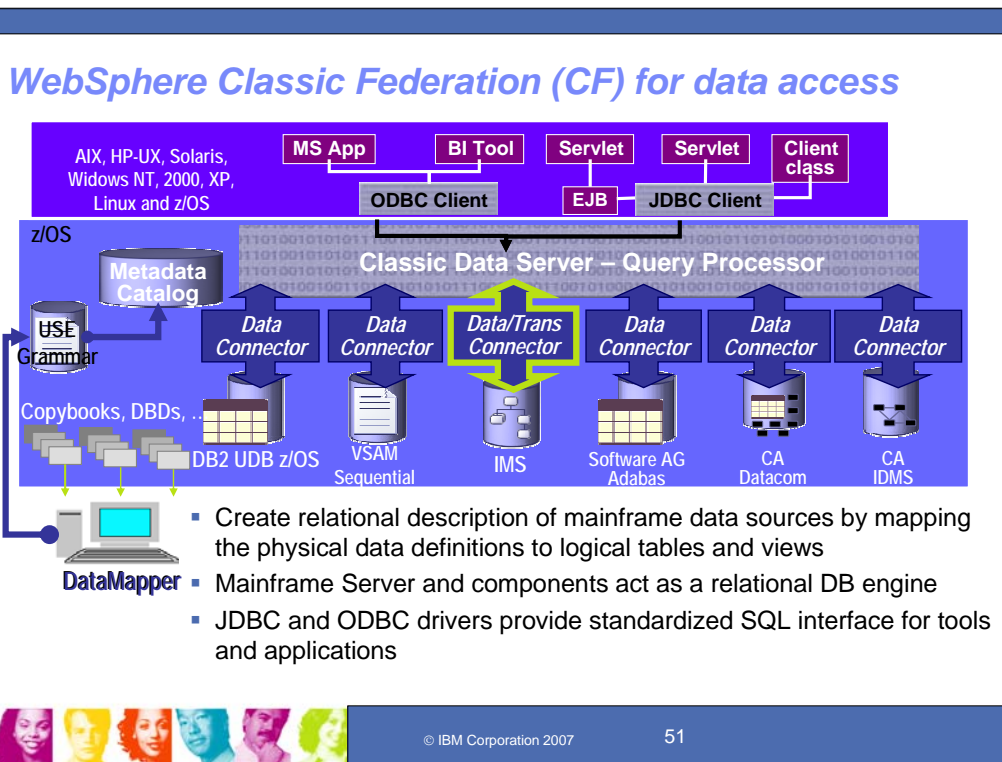
Requirements

- **Businesses that rely on data storage in IMS want:**
 - Extended, distributed access to IMS DB with language independent interfaces
 - Improved availability through better isolation of open IMS DB access components
 - Enhanced integration, eased development using standard, state of the art tooling
 - Supporting Service Component Architecture/Service Data Object (SCA/SDO) programming models along with XQuery



Key Message: IMS is also addressing requirements for extended distributed database access.

In the top box on the right labeled LPAR A you'll see our current solution. Once again, we leverage WebSphere z/OS as the TCP/IP endpoint on the mainframe and our libraries use the ODBA API to access IMS databases. The requirement we have is to leverage IMS Connect as the TCP/IP endpoint on the mainframe. This nicely positions IMS Connect as the complete gateway to IMS resources...both TM and DB related. This is shown in LPAR B.



Key Message: You can also use Websphere Classic Federation to extend the value of your IMS Data and Transactions to other environments

The easiest way to think of Classic Federation is that it is a Relational Database Management System with one fundamental distinguishing characteristic from other such systems: Classic Federation does not store its own data, instead, it references the data in other database systems such as IMS. Classic Federation is also a Federated RDBMS because it can access many different mainframe data sources as if they were a single database system. For example, it can join data from two different databases systems on z/OS, such as IMS and DB2, within a single query.

Classic Federation accomplishes this by supporting a relational abstraction on top of typically non-relational database systems like IMS. To implement this abstraction, you use a metadata tool, known as the Data Mapper, to produce relational table definitions from native database artifacts like IMS DBDs and COBOL copybooks. Once you build these relational tables in the Classic Federation catalog, you are then able to use the standard's based JDBC and ODBC client drivers to query data from the large number of products where these drivers execute. For example, the JDBC driver runs in all platforms supported by WebSphere Application Server, including the z/OS and Linux for zSeries products, as well as WebSphere Development tooling environments such as WebSphere Studio and Rational Data Architect.

ODBC and CLI clients are supported on 32bit Windows, AIX, Solaris, HP, and Intel Linux platforms. ODBC and CLI clients allow data in IMS to be accessed from products such as WebSphere DataStage, QualityStage, and ProfileStage, acquired in the recent acquisition of Ascential, as well as WebSphere Information Integrator, and WebSphere Business Integrator Message Broker. We are also working to address requirements to extend our support of CLI to support both native and USS environments in z/OS as well as 64bit versions on the Unix platforms.

The relational catalog and query processor for Classic Federation are implemented on z/OS and therefore can utilize many of the powerful features z/OS has to offer, such as Workload Manager, RRS, and RACF.

Data and Transaction Connectors are the glue between the relational mapping and the native database systems. They use information in the catalog to map SQL requests from client applications into the native calls necessary to access a specific data source. Classic Federation provides four different connectors for use with IMS.

Three of these provide access to IMS data:

A DRA Connector which we recommend for maximum query performance,

an ODBA Connector if you require two-phase commit involving other RRS-enabled data sources,

and a BMP/DBB Connector for easy development. There is also an IMS Transaction connector which supports execution if IMS Transactions as stored procedures using the SQL Call syntax.

WebSphere Classic Federation – Business Value

- Extend the value of existing mainframe investments
 - Instant integration of mainframe assets into current business initiatives
 - Non-disruptive to existing applications and data environment
 - Reduces or eliminates redundant data and its costs
- Fits seamlessly into existing IT infrastructure out-of-the-box
 - Leverages SQL capabilities of modern tools
 - Works with mainframe infrastructure: security, accounting, monitoring, workload mgmt.
 - Reduces dependence on scarce mainframe skills
- Accelerate time-to-value of enterprise integration projects
 - No mainframe programming required
 - Transactional speed and enterprise scale
 - Easy to configure & maintain using its metadata-driven approach
- **For further information on WebSphere Classic Federation for z/OS:**
<http://www-306.ibm.com/software/data/integration/iicf/>



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Key Message: Classic Federation allows you to capitalize and extend your existing investment in IMS applications and data.

Classic Federation allows you to extend the reach of platforms and environments.

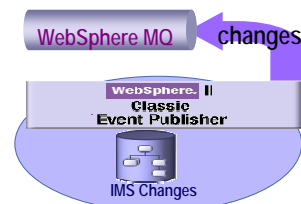
While many Classic Federation customers initially look at Classic Federation as a mechanism to help them migrate or copy data to other environments, many ultimately find that they can leave the existing data and applications where it is and build new applications in other environments.

Because Classic Federation supports the SQL standard, and is supported in Development environments, like Rational Data Architect, you can build these new applications without requiring your increasingly limited COBOL skills. And because more people have these skills, you can have more people doing more work, allowing you to take those applications into production more rapidly.

Also, because of its support for standard client interfaces, like JDBC and ODBC, you can use many off-the-shelf products like WebSphere DataStage to construct services that manipulate, cleanse or move the data, without requiring application development.

Pushing Data Out

- **IMS Architecture capability using the Data Capture Exit**
 - Extension to IMS application as exit routine (with no application change)
 - Synchronous – ISRTs ALTPCB, db calls, etc.
 - Data Capture Log records – x'99'
- **WebSphere Information Integrator Classic Event Publisher for IMS**
http://www-306.ibm.com/software/data/integration/iicpe/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



Key Message: IMS can also provide changed data as it changes and the Classic Event Publisher can transfer this data out

In addition to getting data on demand with these solutions, another way of providing the data is to push it out to the user for later use. For this, IMS initially provided a data capture exit for capturing changes as they happen. New log records were created for this data.

The Classic Event Publisher for IMS leverages the data capture architecture, capturing the changes using a log exit and reformatting them into a relational format packaged as a self describing XML message published to MQ for distribution.

Pushing Data Out – WebSphere Classic Event Publisher (CEP) for IMS

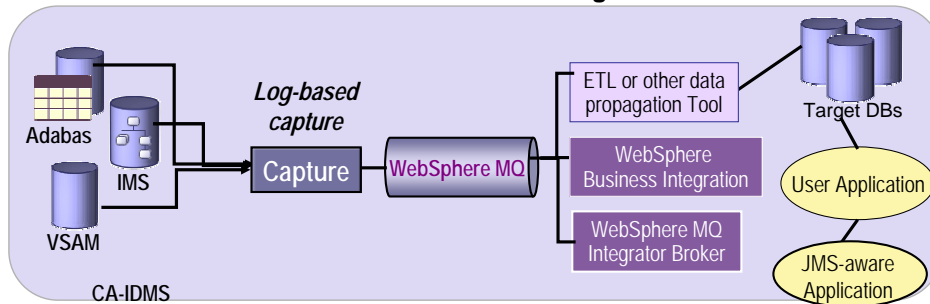
*Capture IMS Database changes as XML messages
and publish them to WebSphere MQ*

Function

- Publish events to a message queue
- XML self-describing format
- Active (real time) or recovery logs

Usage

- Application to application messaging
- Initiate business processes
- Source for ETL – WebSphere DataStage



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Key Message: Classic Event Publisher works with other tooling to transfer the data to other environments

In a sense, Classic Event Publisher is the inverse product to Classic Federation. Where Classic Federation is a pull product, Classic Event Publisher pushes out the IMS captured changes in XML messages that might be used to provide a trickle feed to a Data Warehouse, such as WebSphere DataStage, or you might use them to drive workflows in JMS-aware environments (ie. CEP supports output in XML to WBI Message Broker. This can serve as events that drive Message Driven Beans in WAS).

Working Together for a Consistent Infrastructure

- **Log-based & recoverable:**
 - Log exits for active processing
 - Log files and spills for BOTH recovery processing and non-real time implementations
- **XML message output:**
 - Self-describing XML message format for easy integration
 - Consistent format across all publishing solutions regardless of source
- **WebSphere MQ publishing:**
 - Common delivery mechanism
 - Guaranteed delivery that spans broadest choice of platforms
 - Dominant mainframe messaging infrastructure
 - Broad set of IBM & 3rd party solutions can “read” WebSphere MQ queues
 - Publish once – read any number of times
 - High performance
- **Real-time &/or background capture and publishing of data changes made to:**
 - DB2 UDB
 - VSAM through CICS
 - IMS database
 - CA-IDMS database
 - Software AG Adabas database
- **Two Event Publisher infrastructures:**
 - DB2 Universal Database for z/OS
 - based on WebSphere II Replication
 - IMS, VSAM, CA-IDMS and Adabas
 - based on WebSphere II Classic Federation



Key Message: Classic Event Publisher works with Classic Federation for consistent infrastructure tooling

Classic Event Publisher uses the same server infrastructure, Metadata tools, and relational catalog used by Classic Federation. You use IMS DBDs and COBOL copybooks to create relational tables, just as you do for Classic Federation. You then create definitions, known as publications, to identify which tables should be enabled for change capture and where those changes should be sent.

Accessing other Environments/Data from IMS applications



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Key Message: Standard interfaces and solutions are provided for Accessing other Environments/Data from IMS applications

Accessing Other Environments and Other Data

- **IMS applications can “explicitly” code communication interface calls**
 - TCP/IP sockets support
 - Standard sockets api - C, Java
 - Extended sockets api - Assembler, Cobol, PL/I
 - APPC calls
 - CPIC interface
 - MVS interface
- **IMS Java application capabilities**
 - Standard Java classes
 - HTTP, etc.?
- **Enterprise Cobol For z/OS V3.2 or later**
 - Interoperability with IMS Java
- **Accessing Data outside IMS**
 - DB2
 - SQL, JDBC, SQLJ
 - Other data
 - ISV products (e.g., ORACLE Access Manager for IMS – allows IMS applications to access Oracle data)
 - ???

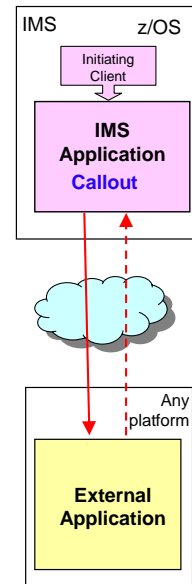


Key Message: Today IMS applications can access other environments

IMS applications can also access other environments and data as well. IMS applications can explicitly code communication interface calls such as TCP/IP or APPC calls. IMS Java applications can make calls out using standard Java classes. And Enterprise Cobol can provide interoperability with IMS Java applications. IMS applications can also access DB2 and other relational data.

IMS V10 Callout Enhancements

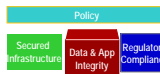
- **Enable IMS applications as clients**
 - Asynchronous outbound support from IMS applications.
- **IMS pull of information/data from distributed system**
 - IMS application initiates request to outbound WAS or other applications, and receives response back
- **Asynchronous Callout to EJB**
 - Customer provides code in JCA EJB application
- **Asynchronous Callout to Message Driven Bean (MDB)**
 - Use JCA 1.5 inbound architecture support of Enterprise Information System (EIS, e.g., IMS) to initiate communications to J2EE application server, eg. WebSphere Application Server (WAS)
 - End-to-end tooling available
- **Outbound Web services support**
 - To external SOAP server for IMS SOAP clients
- **Correlation mapping/tracking, enhanced security, usability, and destination routing assistance**
 - For better integration



Key Message: IMS V10 applications can callout to other applications

Additional enhancements for IMS interaction with other environments includes Callout support, where an IMS application could call out to another application across the IMS Connector for Java to WebSphere server applications or to SOAP application environments. IMS Callout support enables IMS applications as clients, interoperating with business logic outside of the IMS environment. It provides for asynchronous callout to an external application (eg. a Web Service or a WebSphere Application) through the IMS SOAP Gateway or IMS Connector for Java. This support includes correlation mapping between the callout request and the external application, enhanced security, and assistance on destination routing. This support allows for better integration in an SOA environment.

Integrated IMS Security and Integrity




- Organizations are seeking more and more very comprehensive security approaches
- Built in Security of the z platform and IMS continue to address the full spectrum of security requirements -- World Class security server
- IMS Transactions and Resources protected with RACF, Secure Socket Layer (SSL), etc.
 - IMS follow-on requires RACF or equivalent; Security Maintenance utility (SMU) no longer supported
- Data is protected at IMS segment level and DB2 row level
- IBM Data Encryption for IMS and DB2 Databases
 - Enables Storage Area Networks (SANs) safely while complying with privacy and security regulations worldwide.
 - Exploits z/Series and S/390 Crypto Hardware features, resulting in low overhead encryption/decryption.

RACF provides:

- IMS user verification
- IMS trans. authorization
- Authorization to IMS control region resources

Over 50B transactions per day run through IMS
IMS customers have run over 3000 days without an outage

IMS benefits from transaction security through RACF



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Key Message: IMS continues to ensure the ultimate integrated security and integrity.

More and more, organizations are seeking very comprehensive security approaches.

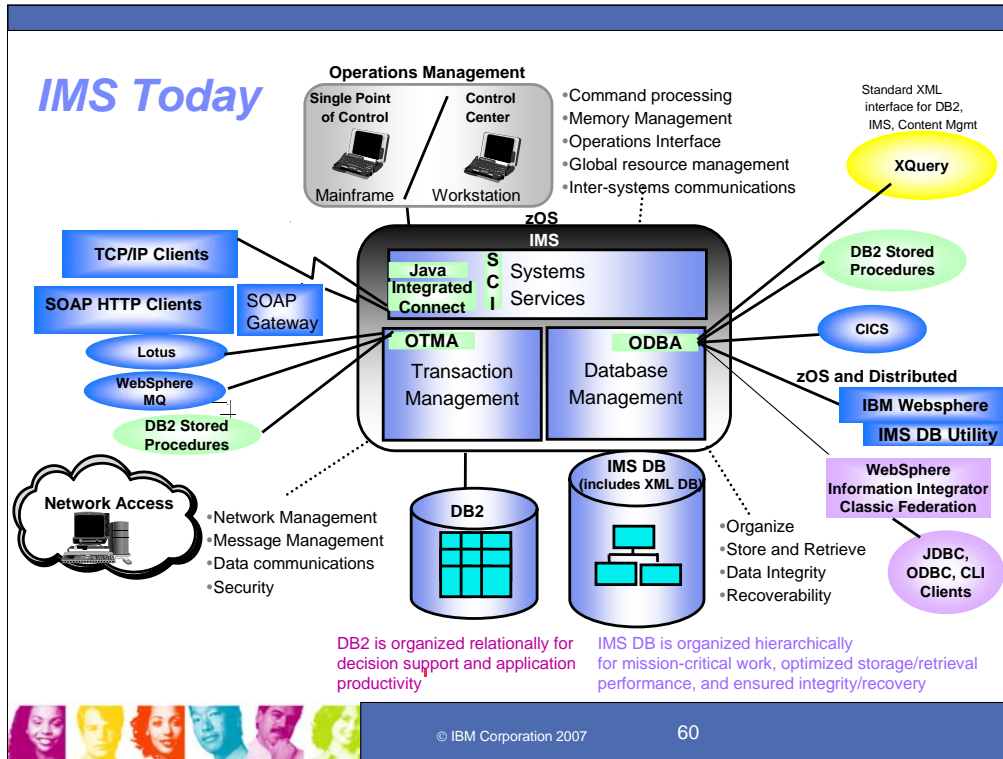
The z platform and IMS have always focused on built-in security for the integrated environment to address the full spectrum of security requirements, making it the world class security server. They are designed to meet the evolving applications needs and address multiple resource types-applications, data, and networks. This positions the z platform and IMS as the “secured vault” with a proven heritage and experience base. They simplify the security infrastructure. And most importantly --- IT WORKS!

IMS transactions and resources are protected with RACF, Secure Sockets Layer (SSL) and other security mechanisms. IMS V9 has enhanced its RACF support, enabling take over from the Security Management Utility (SMU). Clients using SMU should migrate to RACF, or its equivalent, since IMS V9 is the last release to support SMU.

And data is being protected at the IMS segment level and DB2 row level.

The IBM Data Encryption Tool for IMS and DB2 databases helps customers to meet compliance with privacy and security regulations worldwide.

Security of the z platform and IMS offer end-to-end resource and function coverage. Together they are unmatched in offering security and integrity in the distributed, integrated environment.



Key Message: IMS Today provides integration with other IBM products for common network, application, data and operations access.

IMS is a powerful database and transaction management system, which also includes significant systems services that are built on and exploit the z series processors and its operating system. Connectivity and Integration have always been a priority with IMS. IMS has provided solutions that can use workstations or servers to access IMS data. Information can be retrieved from the server system in a two-tier environment or in a three-tier environment. Our strategy here is to support standard connectivity solutions, as well as those tailored to the IMS environment. The IMS Database Manager can be used with applications running under the IMS Transaction Manager, CICS Transaction Server, or running as DB2 stored procedures, WebSphere ejbs, etc. The IMS Transaction Manager can be used with IMS DB or DB2 data. IMS tooling shipped with WebSphere can provide connectivity with IMS applications and data as well as to other environments regardless of the tools used or what they want to connect with. Consistent integrated data access is provided for relational DB2 databases and hierarchical IMS Databases (both its IMS Fast Path and IMS Full Function databases). IMS V9 added XML Database Support for these databases. And IMS V9 enhances its full function database capability with its integrated High Availability Large Database (HALDB) Online Reorganization (OLR) support, offering ultra-high availability to its virtually unlimited size databases. Our internal testing has demonstrated over 21,000 transaction per second with Database update on a single system, demonstrating that nothing can match the performance of IMS.

Along with the IMS Transaction and Database Managers are IMS Systems Services, consisting of facilities to optimize/ease systems operations and management. These services help with command processing, memory management, operations interfaces, global resource management, and inter-systems communications. These services also include support for industry standard, Java application support for IMS transactions, Java data base connectivity to IMS and DB2 databases, and interoperability with existing IMS applications and data. These services also included integrated connect function, which provides open connectivity support to IMS applications and operations.

For application and information integration, and for operational integration, IMS is exploiting the latest programming technologies for the Internet and Java. With the industry standard, open interfaces of Java, users can transparently download and seamlessly run applications. It is becoming widely used and is platform independent. IMS applications and data can use and be accessible using the latest in standard architectures and interfaces, include the J2EE Connector Architecture (JCA) and standard application programming interfaces, for example, Java Database Connectivity (JDBC) interface, across platforms.

In conjunction with WebSphere studio tools and WebSphere servers, the IMS V9 Integrated Connect/Connector for Java function can be used for new J2EE application development/enabment to access IMS applications. IMS provides Web services for IMS applications using the WebSphere Application Server, IMS Connector for Java, and IMS Connect.

You can transform existing IMS transactions into Web services by using WebSphere Studio tools to create service definitions for IMS transactions. You then deploy these service definitions to WebSphere Application Server (WAS) to make the IMS services available as Enterprise Java Bean (EJB) services or Simple Object Access Protocol (SOAP) services. In this way, customers can enable IMS applications as Web Services to support IMS COBOL, C and MFS-based applications. This Web services support integrates IMS into the Services Oriented Architecture (SOA). SOA is key to interoperability and flexibility for on demand business. SOA supports end-to-end integration across the enterprise and among business partners. This provides a flexible business process model that allows customers to respond quickly to new customer requirements, new business opportunities, and competitive threats.

IMS Java support provides for the development/enabment of Java applications running under the IMS Transaction Manager and also for accessing IMS Databases with JDBC from applications running under other environments, such as WebSphere, CICS, and DB2 Stored procedures, as well. The IMS V9 Java DB utility can help distributed as well as z/OS WebSphere environments access IMS data. Interoperability is also being provided between Java, Cobol and PL/I applications, and between DB2 and IMS databases.

IMS V9 also provides for the storage/retrieval of decomposed or intact XML data in IMS DB databases.

And new support for DB2 Stored procedures can access IMS TM applications as well as IMS DB data.

IBM is also providing JDBC access to IMS Databases with the DB2 Information Integrator Classic Federation product.

IBM is also planning to provide support for IMS Databases with XQuery, the new standard XML interface.

IMS is also using the WebSphere XML Adapter for COBOL and SOAP support with its IMS SOAP gateway code, a sample/demo of which is currently available at www.ibm.com/ims.

The IMS SOAP Gateway is an XML based connectivity solution that enables existing or new IMS applications to communicate outside of the IMS environment using SOAP to provide and request services independently of platform, environment, application language, or programming model.

The IMS SOAP Gateway enables the seamless exposure of IMS application assets as Web Services. The IMS SOAP Gateway, providing a relatively simple but extensible option, will provide the ability for non-WebSphere customers to re-use existing and to create new IMS-based business logic. One typical usage scenario of providing Web services with the IMS SOAP Gateway is to enable Microsoft .NET client applications or intermediary servers that submit SOAP requests into IMS to drive business logic transactions.

The SOAP for IMS function can assist organizations with Enterprise modernization, Application development, Business integration, and Web Services implementation.

Generated IMS service definitions (that is, Web Services Description Language (WSDL) files) can be published or exposed to a Universal Description, Discovery, Integration (UDDI) directory for businesses to publish their offerings, and for users to discover their needs. You can retrieve IMS WSDL files out of the UDDI directory and fit them into a tool (such as Microsoft, Net tools, or Apache Axis server tools) to generate SOAP messages to be sent to the host to run existing IMS applications. You can also use the standard APIs, such as Java API for XML-based RPC (JAX-RPC), to create both client and server code out of the generated WSDL files.

This gateway could also provide the ability to preserve and enhance IMS value to SAP and other customer applications, as well as to applications running in WebSphere and other Web Server environments.

XML and IMS for Transparent Application/Data Integration

Processing XML Documents in New IMS Applications Today

- Customers can write IMS C, C++ applications using the XML Toolkit for z/OS
- Customers can write IMS Java applications using the SDK for z/OS, Java 2 Technology Edition
- Customers can write IMS Cobol/PL/I applications using parsers in Enterprise COBOL/PL/I z/OS compilers
- Customers can use WebSphere Developer for z (WDz) XML Converters for COBOL to generate/parse XML inputs/outputs from COBOL applications

Bridging XML and Existing IMS Applications Today

- Using WebSphere Message Broker to support IMS COBOL and C applications
- Supports publishing as Web Services existing IMS C, COBOL, PL/I, MFS applications with connections thru SOAP and EJB bindings
- Transform XML for existing IMS applications within IMS Connect (V9)

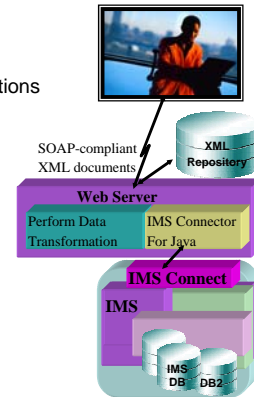
IMS XML DB Support

- Support storing, retrieving, and querying XML in IMS databases (V9)
- Generate XML schema for existing IMS databases (V9)
- XPATH/XQUERY support (Technology preview, V10)
- XML DB mapping enhancements (V10)

XML and IMS Requirements

- Enhanced PL/I support using WDz
 - Enable IMS PL/I applications as Web Services
 - Generate XML output from PL/I applications
- Create new IMS databases from users' XML Schema

IMS is Strategic in any Services Oriented Architecture (SOA)



Key Message: IMS provides and continues to enhance and integrate XML support

IMS has also been taking advantage of XML which is critical for future transparent application integration. Today, IMS documents can be processed in new IMS Java applications using the XML toolkit for z/OS. We are also making available IMS COBOL and PL/I XML Application Capability, using the IBM Enterprise COBOL and PL/I compilers, which allows you to develop new or modify existing IMS applications using XML support for COBOL and PL/I. This can be used to enhance your existing high performance IMS transactions written in COBOL and PL/I in a Business-to-Business environment by receiving and sending XML documents. IMS supports the transmission of XML documents in the data portion of the IMS message. The messages can be placed and retrieved for the IMS messages queue for all messages regions for IMS Message Processing Programs, Fast Path Programs and Batch Message Processing Programs.

You can also enable existing IMS COBOL, C, PL/I, and MFS applications as Web Services by connecting SOAP and EJBs to IMS.

IMS V9 provided XML Database support, supporting the storing, retrieving and querying of XML in IMS databases and the generating of XML Schema for existing IMS databases.

Additional enhancements support transformation and industry tooling and XML Database Mapping.

XML transformation processing can be contained within the integrated IMS Connect, using WebSphere Developer for z.

XML DB mapping enhancements allow for expanded mappings between new or existing IMS databases and visualized XML documents or collections. These enhancements widen the scope of supported XML documents for new IMS databases, and ease disparate data integration across the enterprise.

With new WebSphere Developer for z tooling you would be able to generate XML documents for outputs from PL/I applications.

Today IMS Databases can generate XML Schema. With new tooling you would be able to create new IMS Databases from a users' XML Schema

Additional IMS Information at <http://www.ibm.com/ims>



- Presentations/Papers, Newsletters, Fact Sheets, Announce Letters, Technical Support Information, Information Center, Information Roadmap, Training and Certification, Events, and additional documentation, plus
 - **Examples Exchange**
 - **Integration Solutions Suite educational presentations/demos**
- Redbooks/Redpieces - Release Guides, Sysplex Guides, Java Guides, etc
 - **IMS Connectivity In an On Demand Environment Redbook**
- Redbooks Search**
- “An Introduction to IMS” book
- WW IMS Technical Conferences and Seminars
 - **IMS Seminars coming to a city near you**
 - **GSE IMS User Groups**
 - **Webcasts and Teleconferences, with replay available**
 - **IBM Information on Demand 2007, Las Vegas, October 15-19**



Key Message: IMS continues to provide information and services for our clients

A wide range of IMS Information is available

The IMS solutions are generally available along with other IBM products in support of IMS. Additional documentation and information is available from the IMS home page at <http://www.ibm.com/ims>. The Technical Support, Information Center and Information roadmap now ease search and easy link to information. Links also exist here for training, certification and events.

The IBM International Technical Support Organization has been producing redbooks and redpieces with additional information. The latest just shipped is the new IMS Connectivity in an On Demand Environment Redbook.

One piece of IMS literature we mentioned earlier is the new comprehensive textbook called “An Introduction to IMS”.

A number of IMS Technical Conferences are also being provided on an ongoing basis. Upcoming conferences featuring both IMS and DB2 include the Information Management conference in The Haag in May and the Information On Demand Conference in Anaheim in October. Both of these conferences provide an extensive amount of education on IMS and the transformation/Integration of IMS for On Demand environments.

We also are beginning this spring worldwide seminars/roadshows.

And we are continuing to provide IMS webcasts and teleconferences, with replays of these available afterwards