IMS On Demand Service Oriented Architecture Tools and Solutions

Extending existing assets into On Demand Architectures

An Introduction

The IBM Information Management System (IMS) is IBM's premier transaction and hierarchical database management system, the product of choice for critical on-line operational applications and data where support for high availability, performance, capacity, integrity, and low cost are key factors. Today, IMS manages the world's mission critical data and continues as a major player in the on demand world. IMS customers' mips have been growing rapidly to over 2.6 million mips worldwide. And customer migration to the latest IMS versions has also been growing rapidly, with greater numbers getting into production faster than previous versions. As we move further into the new era of on demand computing, IMS is still leading the way. More than 35 years since the first IMS-ready message for the Apollo space program, IMS along with the zSeries is breaking technology barriers and continues to lead the industry, though sometimes taken for granted. IMS is continuing to provide solutions to exploit the latest technologies to address customers' requirements. In exploiting new technologies and balancing priorities to address increasing demands and sophistication of their customers, IMS customers are at the bleeding edge. Their customers have been making the highest demands for performance and availability, along with interoperability, flexibility, and support for new, emerging technologies. And IMS has been continuing to provide solutions to address these needs. To extend customers' existing assets in modern on demand architectures, IMS is focusing on enterprise modernization through Integration and Open Access with an On Demand Service Oriented Architecture.

1. The Challenge

With the tightening of economies, there becomes more and more pressure for increased revenues and reduced costs. Companies are requiring increased returns on their existing investments, improved reuse of their existing assets, and simplified access to and better integration with other subsystems and environments. Customers are looking for a lower total cost of ownership, improved application development productivity, and easier systems management with an Information Technology infrastructure that is scalable, available, reliable and secure. This requires an On Demand Operating Environment that is flexible, self-managing, scalable, economical, resilient, and based on open standards. Yet customer environments are becoming more and more complex. The increasing challenge of managing large systems is due to the inherent complexity of the solution and the sheer number of heterogeneous components. Integration and manageability become critical issues of the new environments. IMS is continuing to help efficiently provide heterogeneous access across global networks and address companies' changing needs. IBM is providing integrated solutions with IMS to help customers with their on demand processing. The increasing challenges of managing the complexity of the solution and sheer number of heterogeneous components involved are also being addressed by IMS and the environment/products with which it runs.

2. Setting the Stage

Enhanced Integration is required to address the increasing complexity. A Service Oriented Architecture (SOA) and services as building blocks are key to providing an integrated environment for on demand solutions. Customers need the flexibility to treat elements of business processes and the underlying IT infrastructure as secure, standardized components (i.e. services) that can be reused and combined to address changing business priorities. An extensive integration capability allows for the automation of business processes and provides benefits for business and IT departments. Perhaps the best thing is that it offers the ability to take advantage of the new technology, provide automation and significant benefits, while leveraging existing investments made over the last few decades.

IMS leads the way in providing the means whereby customers can most quickly and safely extend their long-standing investment in existing applications and data. They can integrate new applications for on demand business, utilizing state-of-the art industry standard open application interfaces to further enhance the enterprise computing qualities of service IMS customers and their users have come to expect.

IBM's overall SOA solution will be in the form of an Enterprise Service Bus (ESB), a combination of WebSphere Application Server (WAS) runtime support for message transport, and transformation with ESB 'endpoint' support provided in existing server environments. IMS ESB endpoint support will be a very important part of the overall ESB deliverables.

3. Providing Solutions

IMS Version 9 provides significant support for On Demand Service Oriented Architecture. To better integrate business processes end-to-end in their enterprise and transact and interact with customers, suppliers, partners and employees, IMS transactions can be published on the Internet as Web Services connecting via SOAP and EJB bindings. Using IMS Transactions as Web services leverages customers' past investment in application development. 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.

For rapid response for business transactions and inquiries, IMS V9 provides Integrated Connect function, offering 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. This integrated Connect function also assists in managing the network environment and assisting with workload balancing for 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 can also be used with IBM WebSphere Servers and Tools to quickly transform IMS transactions into Web services.

To ease customers' increasingly complex environments, for rapid deployment of new web-based applications at the lowest possible cost, and to maintain competitive advantage, IMS V9 also provides a DLI Model utility (for generating metadata) and state-of-the-art JAVA and XML development tooling.

For training and maintaining highly skilled professionals to operate and manage increasingly complex environments, IMS provides additional enhanced autonomic computing functions and tools. These are provided with IMS V9 and as separate IMS Tools.

And to ensure continuous access to critical business information and unlimited data management capacity to handle unpredictable volumes, IMS V9 provides Integrated High Availability Large Database (HALDB) On Line Reorganization (OLR) and XML Database support. XML Database support is a key element of the On Demand Operating Environment, providing 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.

IMS V9 is also helping to maximize reuse and support collaboration by widening the interfaces to IMS with a SOAP Gateway, using standard interfaces to non-IBM, as well as IBM components, within and beyond the enterprise boundaries, and utilizing WD4Z to create converters for transforming XML messages and COBOL data. The IMS SOAP Gateway is available, at no additional charge, downloadable at http://www.ibm.com/ims.

4. Opening up Access

IMS has restructured to support the latest technologies and provide open data, applications, and operations access. Traditionally messages came into IMS through its SNA data communication protocol from VTAM. APPC/IMS support took advantage of the new Cross Coupling facility (XCF) to communicate with APPC/MVS. XCF is a software facility that allowed MVS subsystems to communicate more efficiently. The IMS Open Transaction Management Access (OTMA) facility extended IMS use of XCF for use by other IBM subsystems, such as TCP/IP and MQSeries, providing them more efficient and richer capabilities in accessing IMS. OTMA allows access to existing, unchanged IMS applications on any IMS TM system on any z/OS system, including that of a zSeries Sysplex. The IMS Connect function extends this application access out to the TCP/IP network.

IMS also extended its use of XCF for use by other IBM subsystems for distributed operations access through the Structured Call Interface (SCI) to the IMS Operations Manager (OM). Distributed IMS single point of operations management is provided through IMS Connect from a Distributed Control Center, along with DB2.

The IMS Open Database Access (ODBA) facility has also been provided for opening up and easing database access. Synchpoint processing is coordinated through the use of zOS Resource Recovery Services (RRS) from one address space and provides connectivity to more than one IMS DB subsystem on the same zOS image, as well as commit or back out changes with a single call. This provides for failure isolation and independent resource recoverability. JDBC access is provided with this for accessing IMS Databases from WebSphere ejbs, CICS and IMS TM Java applications, and DB2 Java Stored procedures.

WebSphere Information Integrator Classic Federation can also provide SQL and JDBC access to IMS Databases. This allows distributed common access to IMS Databases as well as other non-IMS databases using the DB2 Information Integration product set. It provides IMS access using SQL SELECT, INSERT, UPDATE, DELETE & stored procedure calls for ODBC, JDBC or Call-Level-Interface (CLI) clients. No mainframe programming is required. It is multi-threaded with native DRA IMS driver to IMS Databases for scalable, multi-user performance. It is designed to work with existing mainframe tools & application infrastructure. And offers enterprise ready 2-phase commit, transactional throughputs, and seamless integration.

Java and XML Industry Standards are also supported for Java application access as well as for XML Database support. JAVA/XML application development tooling is also provided.

5. Tooling up

IBM has been providing/extending/enhancing its wide range of IMS tooling for the On Demand Service Oriented Architecture. These have focused on easing application development/enablement and automation/optimization.

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 Service Oriented Architecture based IT solutions, while leveraging their existing asset base.

WebSphere tooling today enables IMS transactions using COBOL, C, and MFS-based applications as Web services. Using IMS Transactions as Web services leverages customers' past investment in application development. 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.

The IMS Connector for Java provides mapping of COBOL, C, and MFS IMS applications, as part of the WebSphere tooling, enabling the development and enablement of Java applications running under WebSphere Servers and connecting to IMS transactions through the IMS V9 Integrated Connect function. IMS Connector for Java interacts with the J2EE server to provide you transparent support of quality of service (like Transaction management, Connection management, Security management). Your application is unaware of all the complicated issues.

IMS Java tooling offers an IMS utility, called DLIModel Utility, which automatically constructs the required IMS Java metadata class from Program Status Blocks (PSBs) and Database Definitions (DBDs). 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 IMS Java applications and JDBC access to IMS DB. In addition, IMS V9 DL/I Model Utility enhancements generate XML schema from existing IMS DBDs and 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

IBM also provides a suite of problem determination tools. Note that since OS/VS COBOL is no longer supported, customers can use the IBM Debug Tool to help convert old COBOL programs to supported levels of COBOL.

In addition several new and recently enhanced IMS Tools are provided to help with automation and optimization are:

- *IMS Problem Investigator for z/OS, V1.2* provides an enhanced level of problem determination services for IMS Transaction Manager (IMS TM) and IMS Database Manager (IMS DB) systems. These services include navigation aids and investigative

procedures as well as powerful automated features which help to reduce the amount of time required to identify and analyze defects or other events of interest in the IMS log. IMS Problem Investigator supports IMS Connect Extensions for z/OS event data collection, formatting, and the other features available with IMS log records. IMS Performance Analyzer for z/OS system definitions can now be shared with IMS Problem Investigator. IMS Problem Investigator makes IMS log analysis quicker and easier than ever before.

- IMS Connect Extensions for z/OS, V1.1 enhances the basic IMS Connect function with extended features and functions in the areas of availability and security by utilizing comprehensive event recording and performance monitoring features, dynamic workload management capabilities, and additional security features. By enhancing the IMS Connect function with the high-performance IMS Connect Extensions, you gain the ability to measure and analyze the activities that take place within your IMS connectivity environment.
- IMS Performance Analyzer for z/OS, V3.3 provides comprehensive performance analysis and tuning assistance for IMS Transaction and Database Managers. IMS Performance Analyzer for z/OS processes IMS Log, Monitor, and IMS Connect event data to provide comprehensive reports for use by IMS specialists to tune their IMS systems and managers to verify service levels and predict trends.

6. Summary

IMS On Demand Service Oriented Architecture solutions help you quickly and easily configure your environment to address your needs. These solutions can help organizations better manage complex transactions, adapt more easily to growing workloads without impacting system responsiveness, improve end-user service and promote secure access to heterogeneous enterprise computing resources. Integrating existing IMS applications and data into an On Demand Service Oriented Architecture can offer a number of benefits for organizations. A Service Oriented Architecture integration strategy with IMS can help organizations respond to rapid changes in markets, capture new markets, improve products, better address regulatory issues, strengthen business partnerships, lower IT overhead, increase profits and better align IT with long–term business goals.

7. Learn More

A wide range of IMS Information is available, including presentations/papers, newsletters, Redbooks, Fact Sheets, Announce Letters and additional documentation. Technical support information can also be found, searching on IMS. IMS Information, along with related IBM products in support of IMS, is available at http://www.**ibm.com**/ims

The IBM International Technical Support Organization has been producing redbooks and redpieces with additional information on new IMS releases and support for IMS Sysplex, Java, Connectivity, etc. These are available at http://www.redbooks.ibm.com.

IMS Education is also being provided at http://www.ibm.com/services/learning/us or at http://www.ims-society.org/conf/

- Web and classroom education
- IMS Technical Conferences and Symposiums
- And there is an "Introduction to IMS" book available

IMS Consulting Services are offered for Migration and Skills Transfer and customized offerings, available through dmservices@us.ibm.com