The Business Value of IMS

Version 9

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EXECUTIVE SUMMARY

To fully understand the business value of IMS Version 9, it must be viewed from the perspective that IMS Version 9 has been designed and developed as a key building block for the now-and-future *on demand operating environment*, just as previous IMS versions have been the foundation of information management technology for IBM customers for the past 37 years.

In the on demand operating environment, business processes are integrated end-to-end across the company and with key partners, suppliers and customers, so that IMS customers can respond with flexibility and speed to any customer demand, market opportunity or external threat.

On demand is not something invented by IBM nor is it about technology for the sake of technology. The concept evolved from principals in IBM Business Consulting Services interviewing almost 500 CEOs worldwide in late 2003 – it's about enabling new ways of doing business. It's about helping an organization to reach new levels of innovation while continuing to deliver the increases in productivity that are necessary to improve the bottom line, which was among the highest priorities of these, and no doubt all other, CEOs. When an enterprise has business processes that have been integrated end to end – across the company and with key partners, suppliers and customers – it really does have the ability to respond to any customer demand, market opportunity or external threat. IMS has been on the forefront of integration technology, long before the concept of on demand evolved.

THE ON DEMAND OPERATING ENVIRONMENT

One way to think about the on demand operating environment (ODOE) is as a "global fabric", supporting and connecting the enterprise. It is an open standards approach that effectively weaves heterogeneous, disparate IT resources together in a common way, to enable optimized resource sharing and end-to-end infrastructure management. It provides the foundation for business resiliency and security, business integration, and end-to-end workload management based on business policies and priorities. Bringing them all together is like weaving a fabric, into a unified whole, or 'architecture' which is what the on demand operating environment is, and what IMS does so well. At the end of the day, the intent and result of all this is a move away from a vertical information technology landscape, to one where everything becomes: reusable, connected and integrated; resilient and highly secure; scalable and responsive; simplified and optimized; and unified and flexible to support the integrated business model.

THE ODOE must provide:

… **rapid response** for business transactions and inquiries from many customer, partner, supplier and employee locations utilizing **numerous different types of devices.**

… **continuous access** to critical business information and **unlimited** data management **capacity** to handle unpredictable volumes.

… high speed, transparent **universal interchange of information** throughout the enterprise and with partners and customers.

… **rapid deployment** of new web-based applications, at the **lowest possible cost**, to maintain competitive advantage.

… a **Service Oriented Architecture** to better integrate business processes end-to-end in their enterprise and transact and interact with customers, suppliers, partners and employees.

…the means to train and maintain highly skilled professionals to **operate and manage** an environment that is growing more and more complex.

IMS IN THE ON DEMAND OPERATING ENVIRONMENT

When customers need rapid response for business transactions and inquiries from many locations utilizing numerous different types of devices, IMS Connect function provides easy-to-install, easy to use, high performance transparent access to IMS applications and data from practically any application environment, including Linux. Customers can utilize their storehouse of IMS applications from IMS Connector for Java-based applications to access their IMS and DB2 data from the internet.

When customers need high speed, transparent universal interchange of information throughout the enterprise and with partners and customers IMS provides the ability to store and retrieve XML data natively. IMS also converts non-XML data to XML for interchange and converts it back or stores it natively.

When customers need continuous access to critical business information and unlimited data management capacity to handle unpredictable volumes IMS, utilizing High Availability Large Database (HALDB) and on-line reorganization capability provides virtually unlimited capacity and continuous availability for business-critical data in today's on demand operating environment.

When customers need to deploy new web-based applications, at the lowest possible cost, to maintain competitive advantage, IMS has state-of-the-art development tools available today to web-enable and thereby protect customers' long-standing investment in IMS applications, data and skills. Additionally, IMS customers can now build new applications using Java programming, with XML for universal data interchange, write and test them on workstations and integrate them with existing applications on the host.

When customers need to develop a Service Oriented Architecture to better integrate business processes end-to-end, their IMS applications and IMS transactions can be published on the Internet as Web Services, connecting to IMS via SOAP and EJB bindings, within customers' service-oriented architecture (SOA), thereby assisting Business to Business application integration**.**

When customers need to train and maintain highly skilled professionals to operate and manage an environment that is growing more and more complex, the latest IMS offerings contain literally dozens of new autonomic computing functions and tools intended to improve the productivity of systems programmers and database administrators, while reducing the skills required to manage ever-increasing complexity.

IMS Version 9 is the IMS offering for the on demand operating environment.

IMS VERSION 9

IMS V9 became generally available on Oct 28, 2004 after an extensive Quality Partnership Program (QPP), which involves customer participation from design through code validation. When general availability was achieved, six of the QPP customers were in major production and their entire portfolio of IMS tools was enabled and tested. At the end of 2004, we had over 100 IMS V9 licenses in North America and Europe, not counting the QPP customers. IMS V9 has all the early indications of being a big winner. The major new features among 40-50 new and enhanced functions are Integration of the IMS Connect function into the base product, native XML database support, HALDB online reorganization, and support for web services and Service Oriented Architecture.

Before we talk about the main functions in IMS V9 it's worth a few words about **the IMS development process** that assures new and enhanced line items have customer value built in. Each developer or software engineer who owns a line item must justify it's presence in the release in terms of customer value. All line items originate with a documented customer request or written requirement. Extensive function testing is done, extensive system integration testing is done, performance validation and tuning is done, all in the lab. And the product doesn't get out the door until the QPP participants say it's ready for prime time.

There are four major functions in IMS Version 9 of interest throughout all levels of most organizations, including executive level. They are: Integrated IMS Connect function; Native XML data storage and retrieval; Integrated Online Reorganization and enhanced Service Oriented Architecture/ Web services support. There are also dozens of new and enhanced functions of special interest for database administrators; systems programmers; operations managers and applications developers.

INTEGRATED IMS CONNECT FUNCTION

Integrated IMS Connect function provides easy-to-install, easy to use, high performance/high volume and secure transparent access to IMS applications and operations from any TCP/IP-supported environment, including Linux. It provides commands to manage the network environment and assist with workload balancing, resulting in better resource utilization. It reduces the design/coding effort for client applications and provides easier access to IMS applications and operations, thereby improving programmer productivity. It can be used with IBM WebSphere and Rational Development Tools to quickly transform static web sites into sources of dynamic Web Content, improving marketing effectiveness and customer service, and to transform IMS Transactions into Web services for Service-Oriented Architectures (SOA), enabling quick response to new customer requirements, business opportunities and competitive threats. It can be used with DB2 and the IMS Control Center to control both IMS and DB2 operations, improving system availability and operator productivity. This 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 Connect provides one to any and any to one connectivity. Performance measurements have demonstrated over 6000 transactions per second with a single IMS Connect instance to a single IMS. This can be greatly increased using parallel IMS Connect instances. Performance measurements have demonstrated over 22000 transactions per second (2 billion per day) with IMS on a zSeries Model 990 processor.

NATIVE XML STORAGE AND RETRIEVAL

IMS V9 provides for the native data storage and retrieval of XML documents into and from IMS databases. IMS can store XML documents in IMS databases either wholly intact or by decomposing them into standard IMS segments and fields that can be used by existing or new non-XML enabled applications. IMS V9 can also allow the composition of XML documents from pre-existing non-XML IMS data. Customers can thus preserve and extend past investments and enhance their programmer productivity. The IMS V9 XML capability provides high speed, transparent, universal information interchange throughout the enterprise and with partners and customers. Key to this is the lack of overhead required for conversion, since both XML and IMS are hierarchical in form.

INTEGRATED HALDB ONLINE REORGANIZATION

IMS High Availability Large Database (HALDB) support greatly increased, by orders of magnitude, the maximum database size permitted in earlier releases. HALDB delivers the first requirement for information management in the unpredictable on demand operating environment: virtually unlimited database capacity. IMS V9 HALDB Online Reorganization (OLR) delivers on the second: continuous availability of business-critical databases. IMS V9 OLR provides a fully integrated online reorganization by partition of HALDBs, with concurrent online update and availability. This is totally non-disruptive. There is no outage.

This online reorganization function provides for greatly enhanced database availability for those applications that cannot go off-line.

SERVICE ORIENTED ARCHITECTURE/WEB SERVICES SUPPORT

Service Oriented Architecture is currently very topical with enterprise customers and a major IBM initiative. Customers are either doing it, planning for it or talking about it. The Web services support in IMS Version 9, when used with WebSphere Application Server makes it possible to wrapper IMS applications and publish them as web services. The Services Oriented Architecture 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. This is the means whereby the customer can integrate all the IMS applications they've been investing in for the past 37 years with not only other zSeries applications and applications on other IBM platforms but with applications on non-IBM platforms, as well.

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 and Rational development 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.

For enhancing integration to non-IBM products, IMS would use the WebSphere XML adapter for COBOL 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 would enable 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 would enable the seamless exposure of IMS application assets as Web Services. The IMS SOAP Gateway, providing a relatively simple but extensible option, would provide the ability for non-WebSphere customers to reuse existing and to create new IMS-based business logic. One typical usage scenario of providing Web services with the IMS SOAP Gateway would be 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 could 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 could also use the standard APIs, such as the 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.

Additional IMS Version 9 functions of special interest for Applications Programming Managers include:

- Java Remote Database Services, which provide transparent access to IMS databases from any distributed WAS EJB through WAS z/OS, thereby potentially reducing application development lead times and improving programmer productivity.
- IMS Java programs running in z990 and z890 zAAP servers without change, thereby facilitating lower total cost of ownership, a simpler infrastructure for Web applications and increased system productivity.
- IMS Java interoperability for access to IMS DB and DB2 databases and between Java and COBOL applications, helping to improve programmer productivity, reduce lead times and simplify operations.
- SQL enhancements, supporting the latest standard keywords that allow you to apply standard relational database queries, from any platform, to the IMS database, reducing rewrite and enhancing productivity.
- COBOL XML support to receive and send XML documents directly and to parse and transform XML documents, thereby helping to improve programmer productivity and preserve prior investment.
- Increased number of scheduling classes, from 255 to 999 which expands your ability to tailor system scheduling, enhancing usability and improving utilization of resources.
- IMS V9 now provides a Java interface to access GSAM from Java Batch Processing (JBP) applications and JBP applications can now use symbolic checkpoint and restart calls to restart the application after an abend. These items improve programmer productivity and reduce operational complexity.

Additional IMS Version 9 functions of special interest for Operations Managers include:

- IMS Enhanced Command Environment is a simplified IMS operational configuration that takes advantage of type-2 commands, which are easy to understand with minimal training.
- Sysplex Wide Database Commands expand the operations management single point of control (SPOC), introduced in Version 8, to handle Database Commands. This provides the ability to better manage the IMS Sysplex and provide a single system image.
- Command Recognition Character Registration, uniquely registers a subsystem so that an operator can enter a command from any system in a Sysplex and have it routed to the right subsystem. The operating system can detect and prevent collisions between subsystems, as well as informing operators and systems programmers which prefixes are currently in use, thus easing operations management.
- Command Authorization support, for both batch and online DBRC commands, improves ability to secure DBRC commands.
- A new Write-To-Operator message and a new Diagnose command improve usability, serviceability and reduce outage.
- The IMS Application Menu provides a common menu interface to display and start applications running in TSO or ISPF (e.g. Single point of control, Syntax Checker, IVP), thus facilitating their use.
- Knowledge Based Log Analysis (KBLA) provides an ISPF panel driven user interface to a set of tools and utilities which assist with finding and interpreting information on the IMS log or IMS trace datasets. It's designed to simplify JCL creation and to prevent JCL errors. KBLA reduces manual reference and eliminates the work involved in creating jobs for extracting log records. It includes a new set of log formatting routines that allow the user to extract an interpreted version of the IMS log records, producing easy to read output.
- SVC dumps are now taken for some pseudo abends that used to cause the logging of snap dumps with associated buffer pools. This reduces logging

volume considerably in certain cases.

- In conjunction with DB2 V8.2, IMS Control Center enhancements help ease your IMS systems management from a graphical Control Center on a Windows workstation.

Additional IMS Version 9 functions of special interest for Systems Programmers include:

- System Generation enhancements remove the ETO feature install checking and stage the removal of the conditional link edits, currently done by Sysgen. The restriction of requiring separate execution libraries is removed, along with the conditional link of composite modules, eliminating a step and reducing the time and MIPS needed for the IMS Sysgen process.
- Online Change (OLC) Module Enhancements remove modules from the Nucleus Link edit step, another step towards limiting the impact of IMS Sysgen. This saves some below-the-line private storage, where the nucleus is loaded.
- Installation Verification Program (IVP) Enhancements, usability improvements and the ability to import variables from previous releases shorten the time required for IVP implementation and improve system programmer productivity.
- IMS Dynamic Allocation Virtual Storage Constraint Relief (VSCR) Enhancement assures Data Set Association Blocks (DSABs) are allocated above the 32 MB line. Additionally, selected DBRC modules are moved above the 16 MB line. This VSCR allows better management of below-the-line storage, better system utilization and system programmer productivity.
- Enhancements to the security interface enable migration from the Security Maintenance Utility (SMU) to RACF (or an equivalent product), which aids programmer productivity and enables you to take full advantage of RACF level security.
- There are a number of enhancements for the OTMA (for TCP/IP and RYO users) and APPC programming interfaces. These improve programmer productivity, as well as aiding availability, usability and security.
- The Type 4 SVC can be dynamically changed, the Resource Cleanup module is added dynamically and there are enhancements to Syntax Checker. These eliminate a z/OS IPL, enhance availability and serviceability, support definition and maintenance of additional IMS Proclib members and add usability. These items also aid programmer productivity and reduce operator error.

Additional IMS Version 9 functions of special interest for Database Administrators include:

- A new DBRC Application Program Interface provides a standard for application developers to work to, when accessing the RECON. This is expected to improve time-to-market for new function tools, improve usability and reduce the impact of migration to new versions/releases.
- Reuse of Database Management Block (DMB) slots for registration to DBRC when the last DMB number has been reached will aid productivity and eliminate a potential outage, thereby improving availability.
- There are Logger enhancements for availability and recovery of Online Data Sets (OLDS) and Work Area Data Sets (WADS). With these enhancements, Restart can now read both primary and secondary WADS and OLDS data can be used as input for restart.
- Greater than 32K Tape block size support, for image copy and recovery utilities, provides an additional performance advantage in the recovery process, which could improve the elapsed times for the Image Copy and IMS DB Recovery Utility by approximately 10 per cent.
- A new User Exit can provide enhanced recoverability with DB2 and other subsystems. This exit enables subsystems to resolve their in-doubt work (synch point phase 1 is complete, phase 2 is not), without waiting for IMS restart, to complete the resolution. This will improve subsystem availability and response

time.

- HALDB enhancements in partition initialization, DBRC option, control statement processing, and exit customization improve usability and flexibility in different environments, thereby offering improved programmer and operator productivity and ease-of-use.

Additional IMS Version 9 functions of special interest for Fast Path SYS Progs, DBAs, Operators include:

- Data Entry Database (DEDB) Area Open/Close Enhancements adds ten new TCBs to the IMS control region and re-engineers existing code. These enhancements could improve start-up time by approximately 30 percent for cold start and warm start, and 20 percent for emergency restart.
- Shared Virtual Storage Option (SVSO) Multi-area Structure Support provides for housing multiple DEDB areas in a single Coupling Facility (CF) structure. This reduces the total number of CF structures that need to be defined in a system, aiding productivity and making more efficient use of CF capacity.
- Optional Extended Message Handler Queue (EMHQ) Structure enables you to bypass allocating an EMHQ structure and its associated data sets. This eases manageability and facilitates more efficient use of Coupling Facility capacity.
- Additional log record data with sequential dependent segments (SDEPs) information may be used by the IMS Performance Analyzer enabling better tuning of the IMS system.

SUMMARY AND CONCLUSIONS

The arrival of the new century allowed the I/T community to put the Y2K focus behind it and concentrate on the emerging challenges associated with expanded global implementation of Internet technologies. IMS customers demanded and IMS delivered and is still delivering, a continuous stream of new/enhanced, open standards-based functions and tools.

With expanded implementation comes greater complexity, which in turn requires more skills and effort to manage. IBM responded to this need with its corporate wide autonomic computing initiative, building management capability into hardware and software. IMS is a major participant in this initiative, with literally scores of enhanced autonomic functions and tools. Systems Programmers, DBAs and operators are more productive, as they can concentrate their skills on the needs of the business, whilst the system does more of the routine "busy" work.

The other phenomenon of the new century, of much greater impact to the enterprise, is the ongoing transformation to the on demand operating environment. In this heterogeneous environment, where continuous, secure and transparent access by millions and billions of transactions to unlimited amounts of information from anywhere on the globe, are the minimum requirement and planned or unplanned outages are not permitted and their cost immeasurable or too painful to contemplate, IMS is invaluable.