IBM `Information Management` software

Business value of IMS and SOA: Better together

Executive summary

To encourage business growth while still keeping costs in check, many companies are searching for ways to increase the flexibility and reuse of their existing IT assets. Service oriented architecture (SOA) offers a means to define services that represent a repeatable task, such as "check customer account," using well-defined, standards-based interfaces. Organizations across the globe rely on IBM Information Management System (IMS™) to help maintain high availability, performance, capacity and integrity of critical online operational applications and data. IMS provides a connectivity infrastructure that you can use to integrate and reuse services within an SOA. The latest version, IBM IMS 10, builds on the foundation of previous IMS versions, which have been the bedrock of information management technology for nearly four decades. Virtually unsurpassed in database and transaction processing availability and speed, the business value of IMS 10 coupled with SOA flows directly from the continuing focus of on demand business enablement, growth, availability, reuse and systems management.

SOA and IMS

SOA offers a flexible, extensible and composable approach to reusing and extending existing applications and services, as well as constructing new ones. By implementing services you can interoperate among wide range of technologies, including IBM IMS, IBM CICS®, Java™ 2 Platform, Enterprise Edition (J2EE™), Enterprise JavaBeans™ (EJB), Java classes, IBM DB2® queries or Microsoft® .Net applications. In SOA interactions, service providers advertise the capabilities they offer by declaring the interfaces that they implement and their policies governing potential partner interactions. Service requesters can also declare the interfaces they require and the partner interactions they support. Web Services Description Language (WSDL) and other Web services standards provide the vocabulary for these declarations. Service requesters send requests to service providers that offer the capabilities they require, unaware of their implementations. SOA therefore provides an ability to virtualize business functions by isolating service definition and usage from the underlying service implementation. The latest enhancements to IMS Database Manager (IMS DB) and IMS Transaction Manager (IMS TM) enable you to shape how you:

- *Maximize the flexibility and reuse of an SOA.*
- *Transform the way you do business with integrated information.*
- *Build on demand business applications that can tolerate the rigors of doing business on the net.*
- *Run a scalable, available, safe and easily manageable environment.*
- *Leverage your business decisions to make more informed decisions.*

With the demands of the evolving on demand business environment, and a marketplace working in Web time, IMS delivers the integrity, capability and performance customers have learned to expect from IBM. IMS TM continues to deliver on its role as the premier IBM transaction server for environments that employ relational and hierarchical data stores, and require the utmost in integrity, capacity, availability and performance for e-business and enterprise computing environments. At the same time, the premier IBM hierarchical database server, IMS DB, provides and enhances high performance/capacity, superior integrity and continuously available database management solutions for IMS TM, IBM CICS and IBM WebSphere® Application Server users. IBM TM and IMS DB are well positioned to fully participate in an SOA environment.

Now, IBM is introducing IMS 10. This white paper provides an overview of the on demand operating environment, and how the latest enhancements of IBM IMS 10 can help organizations achieve the Information On Demand enablement, growth, availability and systems management required to meet the needs of current and future environments.

Driving on demand business with IMS 10

With IMS 9, IMS further strengthened its leadership role, helping customers in their on demand business enablement and the growth, availability and systems management that evolving environments and cost measures require. IMS 10 continues to provide information integration with open access and supporting tools for the on demand business environment, continually improving systems management/usability and system scalability with increased availability, performance and capacity. The goal is to deliver the next stages of this function.

Java and XML remain key areas for new application development. IMS Java and XML support, and the IMS TM/DB Resource Adapters, are enhanced to meet the latest in standards and ease of use to allow customers to take advantage of the latest in tooling. IMS also offers enhanced performance for this environment, and provides better integration with the WebSphere development tool set as it evolves. New technology that evolves with XML and Web Services can also be exploited to enable new application development tooling. IMS is forging a strong alliance with the application development community to provide an integrated tool solution for supporting IMS Java and connectivity to the Internet.

IMS 10 also provides enhanced Sysplex support to ensure the highest in availability/performance for systems growth and new capabilities within the environment.

As systems management through autonomic computing continues to be a key area with IMS customers in managing their systems, the latest version provides single system image with expanded standard user-friendly commands and interfaces accessible across environments; continued ease of installation to help reduce or eliminate the gen requirement, as well as enhanced security and serviceability for application access and database usage.

IMS 10 also offers additional tools to better integrate and ease use of IMS as an on demand business server, and continued efforts to leverage the latest technologies to enhance usability.

In addition, IMS offers enhancements to help eliminate bottlenecks and impediments to growth in the IMS systems and in connectivity to the IMS systems. IMS 10 helps improve availability, performance and capacity in the Multiple Systems Coupling (MSC), Fast Path and Database Recovery Control (DBRC) areas of IMS. In addition, IBM will continue to provide for education and usability of our products, and to enhance the ways users can access and use our information.

IMS 10 enhancements: Tackling integration, manageability and scalability
IMS 10 enhancements can help you drive the Information On Demand business enablement, growth, availability and systems management that today's and future environments and cost measures require. IMS 10 helps in addressing your on demand business needs through:

Integration with other products and platforms across the Internet, supporting open standards that benefit you, taking best advantage of the latest industry tooling for application development and connectivity. Enhancements include additional Java/XML Tooling and connectivity enhancements in support of the latest technology with SOAP, XQuery, etc.

Manageability in staging users to autonomic computing, easing installation and use, eliminating/reducing outages, and minimizing the education curve for IMS users. Enhancements include simplified installation and definition using new Dynamic Resource Definition facilities, and additional online change capabilities to help simplify the method to define IMS systems and resources. These allow dynamic additions, changes and deletions, help reduce the number of required user decision points, and use intelligence to determine system default values while allowing users to define and override definition choices.

Additional enhancements are also provided to ease systems/operations management, installation, serviceability and usability.

Scalability with virtualization in assuring flexibility for growth and expansion in a heterogeneous environment, utilizing the latest hardware and software facilities to optimize performance, capacity, availability and recovery. Scalability enhancements for performance/capacity/availability/recovery include:

- *Fast Path enhancements to continually improve performance and usability.*

- *The Multiple Systems Coupling (MSC) facility, connecting IMS systems across the network, is enhanced to improve bandwidth performance across the network and to introduce new links for connectivity.*

- *Parallel Recon Access to relieve contention for the Database Recovery Control (RECON) data sets in the IMS Sysplex. As the Sysplex grows, this could relieve bottlenecks to growth.*

Boost application development and connectivity with integration enhancements
XML is critical for future transparent application integration, and IMS takes full advantage of the latest capabilities. Today, IMS documents can be processed in new IMS Java applications using the XML toolkit for IBM z/OS®. Using the IBM Enterprise COBOL and PL/I compilers, IMS also makes available IMS COBOL and PL/I XML application capabilities, which allows you to develop new or modify existing IMS applications using XML support for COBOL and PL/I. This capability 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, Java Message Processing Programs, Fast Path Programs, Batch Message Processing Programs Java Batch Processing Programs. You can also enable existing IMS COBOL, C, Java and MFS-based applications as Web Services by connecting SOAP and EJBs to IMS.

IMS 9 offered XML Database support, supporting the storing, retrieving and querying of XML in IMS databases and the generating of XML Schema for existing IMS databases. New IMS 10 enhancements support transformation and industry tooling and XML Database Mapping enhancements. XML transformation processing can be contained within the integrated IMS Connect, using WebSphere Developer for System z™ (WDz). In addition, 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 help ease disparate data integration across the enterprise.

Other XML enhancements include a new WebSphere/RAD tooling to generate XML documents for outputs from PL/I applications, allowing you to Web-enable MFS applications using XML.

Ease manageability with autonomic computing

Improved availability and productivity with Dynamic Resource Definition (DRD) is a key new IMS 10 enhancement. IMS resource definition currently is a two-stage, batch, assembler system generation process. Originally requiring a cold start, IMS offers support for online change for some resources, including: databases, transactions, routing codes and applications. But this online change requires a quiesce of the entire system.

Dynamic Resource Definition is a simplified method of defining IMS resources. It provides for increased productivity by introducing a new, easier-to-use user interface. DRD for MODBLKS reduces the need for system definition and online change, as well as the number of required user decision points and the need for Assembler skills to define an IMS system. The rollout of DRD is scheduled to occur over multiple releases. The TSO SPOC has been enhanced to provide a DRD user interface.

IMS 10 focuses on MODBLKS resources (databases, programs, routing codes and transactions). It allows an IMS user to dynamically create, update or delete MODBLKS resources via a command, and can modify one, some or all resources at once. Transactions and programs can also be created dynamically, on demand, via a user exit, and definitional attributes and resource status can be displayed using the QUERY command. In addition, an EXPORT command can export resource definitions to a resource definition data set and an IMPORT command can import those definitions back into IMS. DRD can create, update or delete one or more resources in a single request, while the IMPORT command can create multiple resources of different resource types in a single request.

Only those resources affected by the change are quiesced. Adding a new resource does not require all resources to be quiesced, while changing or deleting an existing resource results in the specified resource being quiesced, but does not affect other resources unless necessary. This technology provides greater availability for business applications during change windows and helps increase productivity by reducing required decision points for resource definition and customization, supporting user-defined system defaults for creating resources, supporting descriptors for creating resources and automatically stopping resources affected by update to prevent new work during update.

Help improve performance, capacity, availability and recovery through scalability enhancements with virtualization

IMS 10 provides and continues to improve availability of the RECON data set. Today, the RECON is serialized at the data set so one request waits behind another — even if they want different records. IMS V10 provides Parallel RECON Access for jobs sharing the RECON dataset.* Parallel Recovery Control (RECON) Access provides an option to use Record Level Sharing for the RECON via use of the Transactional VSAM (DFSMStvs). Serialization of access to the RECON at the data set level is replaced by concurrent processing of DBRC requests from multiple IMS systems, thereby reducing contention to the RECON data set. This provides the ability to improve transaction throughput and response time from reducing or eliminating RECON contention, and can help reduce or eliminate transaction response time issues, unplanned system quiesces for OLDS switches and growth constraints.

IMS provides parallel access to the RECON, addressing RECON contention issues. DBRC requests from multiple IMS systems are processed concurrently. Record level sharing is implemented for the RECON, and data set level (or volume level) serialization is eliminated.

The objective is to eliminate performance bottlenecks caused by contention for the RECON. It exploits DFSMS Transactional VSAM (TVS) to provide record-level locking and logging for the RECON data set. This helps eliminate or reduce transaction response time issues and unplanned IMS system quiesces for OLDS switches.

Transactional VSAM requires a coupling facility for locking and buffer caching and requires the z/OS System Logger which uses a coupling facility for logging. 'Undo' logging provides a backout capability for transactional processing. RRS (Resource Recovery Services) is used for commit processing. Parallel RECON access requires new MVS operational procedures.

*IMS Parallel Recon Access requires z/OS DFSMStvs, a separately orderable feature of z/OS V1.7 or later. Special bids will be considered for IMS customers using the Parallel Recon function, who do not already have DFSMStvs, to acquire DFSMStvs for use restricted to IMS.

Additional IBM 10 functions of special interest for applications programming managers:
Ease development through integrated, open access with enhanced XML and Web services connectivity, and broadened Java and XML tooling. Key features include:

- *IMS SOA Composite Business application support provides a next-generation business process to integrate J2EE resources, services, and activities—like user interventions—based on Web services with the Business Process Execution Language. This extends existing IMS transactions to include conversational transactions, as SOA-based composite business applications using the IMS TM Resource Adapter and WebSphere tooling and run time, maximizing re-use of IMS assets in new applications for rapid business innovation and reduced costs.*

- *IMS XQuery support provides access using standard XQuery expressions to IMS full-function data, including new IMS XML data. This opens IMS to the emerging market of off-the-shelf, third-party tools (for example, query generation tools for application development, business reporting, data sharing, etc.) and offers a standard shareable integration point between IMS and other industry databases. IMS XQuery is supported through the existing IMS JDBC interface. IMS XQuery support enhances IMS data integration, eases application development, and increases programmer productivity.*

- *Integrated Connect XML Adapter support for COBOL, together with the IMS SOAP Gateway and WebSphere Developer for System z, enables reuse of IMS applications as Web services, leveraging open standards, utilizing flexible tooling support, and providing IMS transaction interoperation with client applications independent of location, programming language, and platform. These items are also being provided through the IMS SOAP Gateway V9.2 service process.*

- *IMS Callout support enables IMS applications as clients, interoperating with business logic outside the IMS environment. It provides for asynchronous callout to an external application—for example, a Web service or a WebSphere application— through the IMS SOAP Gateway or IMS TM Resource Adapter. This support allows for better integration in an SOA environment and includes correlation mapping between the callout request and the external application, enhanced security and assistance on destination routing by avoiding the coding of IMS DFSYPRX0 and DFSYDRU0 user exits.*

- *IMS Java library support enhances IBM DB2 result sets and GSAM usage. This offers the ability to return IMS data to the stored procedure client encapsulated within a DB2 result set, with the conversion to the DB2 result set handled by the Java libraries. The Java libraries are also enhanced to support GSAM databases consistent with other IMS database types, which allows the supported data types to be stored into and read from a GSAM database record, and fully leverages the existing Java library built-in data conversion routines.*

- *DLIModel utility enhancements provide GSAM support and a new user interface. The DLIModel utility was enhanced to provide metadata generation support for GSAM databases. The DLIModel GUI is an Eclipse plugin that provides a user-friendly interface for viewing and generating IMS database metadata. The DLIModel utility GUI fully supports the parsing of Program Specification Blocks (PSBs) and Database Definitions (DBDs), now including GSAM, and the importing of COBOL copybooks while eliminating any need to program control statements. It generates IMS Java metadata classes, IMS XML Schemas (with new annotations for XQuery support), or DBD and PSB XMIs. These enhancements simplify IMS metadata generation, ease IMS Java and XML Database application development and offer a visual representation of IMS databases with printing support. This can help achieve rapid application development and reduced cost of development and ownership.*

- *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.*

- *MFS Web support provides access to existing IMS applications from WebSphere Application Server environments, to help protect your assets. MFS Web services enhancements expose attributes and extended attributed fields for Web services applications. MFS Web Enablement now includes access from IBM WebSphere Application Server for z/OS, in addition to Microsoft Windows® and IBM AIX®, and adds customizable display enhancements, allowing drop-down list boxes and infopops on familiar look-and-feel 3270-style Web pages. These items are provided through the IMS 9 service process.*

- *IMS TM Resource Adapter PL/I application support is provided using IBM 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 provided for IMS 9 applications.*

Additional IMS 10 functions of special interest for operations managers:

- *Operations Manager (OM) enhancements use the z/OS logger to provide an input/ output audit trail for IMS commands entered from a single point of control (SPOC). The user can configure this so each OM uses its own log, or all OMs use the same merged log for all SPOC activity. These enhancements also use the SPOC to display unsolicited messages and use the OM to track commands or responses to help ease operations management and improve output and auditability for commands entered through the SPOC.*

- *Systems management enhancements allow IMS to maintain global command status for databases, areas and transactions in the IMS Resource Manager Resource Structure to be applied to new or restarting IMS systems in a Sysplex that were down when the command was issued. This provides a consistent status for databases, areas and transactions among the IMS systems in a Sysplex. Other enhancements allow users to:*

   - *Control when messages get logged to the secondary master.*
   - *Allow users to queue messages and enter transactions from the OM API.*

   These enhancements help extend single point of operations support, simplify systems management and provide more granular control of logging of secondary master messages.

- *Sysplex Serialized Program Management (SSPM) utilizes the Resource Manager (RM) to manage serial program scheduling across the IMS Sysplex in a shared queues environment so that only one iteration of a serial program is running at a time in the IMS Sysplex. This helps ease operations application flow management.*

- *Application Control Block Library (ACBLIB) online change commit and /DISPLAY MODIFY ALL are changed so that they no longer treat messages on the local queues in a non-shared queue environment as work in progress for transactions indirectly affected by online change. This improves the usability of online change by increasing the chances that the commit will succeed, especially for an ACBLIB-only online change.*

- *Enterprise Workload Manager (EWLM) support provides for workload management tracking across environments, integrating IMS with EWLM end-to-end workload management. This enhancement flows EWLM Correlators with an IMS transaction, using an enhanced version of the existing workload manager services, thus enhancing workload balancing and easing operations.*

- *Transaction Level Statistics allows users to log application accounting information at the conclusion of each unit of work (commit) with logging done on a transaction-by-transaction basis at the discretion of the user. This provides a new option for obtaining application statistics for each unit of recovery. IMS logs the new records to reflect the messages processed within a commit scope, to help ease operations and offer more granular information.*

Additional enhancements

- *Base Primitive Environment (BPE) Trace Table enhancements provide for the contents of the BPE trace table to be written to external media to preserve them for improved serviceability and problem determination. Users can set trace parameters in the BPE configuration PROCLIB member, allowing the ability to trace the system over longer periods of time and increase the likelihood of getting diagnostic data the first time with fewer re-creates.*

- *Abend Search and Notification support can reduce problem determination time by providing real-time automatic e-mail notification that an event such as abnormal termination user/system abends has occurred. The e-mail notification contains hyperlinks (URLs) to IBM-supplied Internet resources for understanding, analyzing and resolving problems. This function not only automatically notifies system programmers of a system failure, but also provides direct, up-to-date, real-time access to abend information and descriptions, reducing the skill level necessary to identify and find solutions to problems, thus easing problem resolution and improving availability.*

- *MSC bandwidth enhancements use improved blocking technology to improve performance response times for transaction and output message throughput. Enhancements also allow for even larger link buffers with dynamic change of buffer sizes, inclusion of responses in the buffer, and sending it all with a single send/write.*

- *Large sequential data set enhancements support z/OS changes to remove the size limit of 64KB tracks per volume for sequential data sets for BSAM, QSAM, and EXCP. This reduces the need to use multiple volumes for single datasets and relieves capacity restrictions.*

- *ACBLIB Member Online Change (OLC) provides for individual ACBLIB members to be added or changed (though not deleted) without a library switch, which earlier was required for a full OLC. Only the resources associated with the change will be quiesced. This function coexists with existing full library switch OLC capability. This ACBLIB function makes online change for ACBLIB more usable and enhances availability.*

- *Application Control Block generation (ACBGEN) 31-bit enhancements utilize storage above the line to address problems with insufficient storage below the line that might occur when building an ACB with a large number of Program Communication Blocks (PCBs). PSBs can now have 2,500 PCBs, thereby increasing capacity and availability. This item is provided through the IMS 9 service process.*

- *IMS Connect enhancements ease usability by providing support for Commit Mode 1, Message flood detection, Alternate Client ID and enforced client ID uniqueness.*

- *Additional security enhancements include:*

  - *RACF error message reduction.*
  - *Faster RACF auditing.*
  - *Conversational Security enrichment items.*
  - *A mechanism on client input to the integrated IMS Connect function to change the password associated with the client ID. Customer-written applications will have the ability to change the client RACF password.*
  - *Users can define to integrated Connect the aging value used by OTMA within IMS for the aging value of the ACEEs used by RACF. The current default value is "forever."*
  - *RACF mixed-case passwords are supported, preserving the original password value rather than attempting to translate the password to uppercase.*

Additional IMS 10 functions of special interest for systems programmers:

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

- *Manageability through staging users to autonomic computing.*

- *Reduced system generation time/effort enhancements.*

- *Dynamic resource definition and management enhancements simplify these activities.*

  - *New commands are provided to allow you to dynamically add, change and delete MODBLKS resources (databases, programs, routing codes, and transactions) without having to go through the IMS system definition or online change process.*
  - *The Destination Creation user exit (DFSINSX0) has been enhanced and can be used to create transactions for scheduling, not just queueing, along with programs.*
  - *QUERY commands are provided to display both the definitional attributes and the status of MODBLKS resources.*
  - *EXPORT and IMPORT commands are provided to save and restore resource definitions to and from an external data source.*
  - *MSC resources can be dynamically updated and queried.*
  - *The IMS TSO SPOC has been enhanced with a new user interface that can be used to manage IMS resources.*

These enhancements provide for non-disruptive addition, change and deletion of resources in IMS, to help simplify operations, ease the installation/ generation effort, increase system control and extend transaction scheduling.

- *Syntax Checker enhancements add new support and update existing support for currently supported members, and add additional proclib and field options, new panels, and new keyword display options. These enhancements ease the installation effort.*

- *Installation Verification Program (IVP) enhancements are provided to support new IMS functions with step-by-step and menu-driven jobs and tasks that guide users to use and explore useful sample applications. For example, Java panels are added to the standard IMS IVP panels to contain the necessary steps to configure, deploy and run the applications. This greatly simplifies the necessary upfront work to verify that Java workload can be scheduled in an IMS-dependent region. These enhancements assist in reducing the installation effort.*

- *Knowledge-Based Log Analysis (KBLA) enhancements provide for the KBLA utility support of log record changes and the KBLA ISPF environment to generate JCL to accommodate all supported levels of IMS and support multiple concurrent releases of IMS. This allows concurrent KBLA access for multiple IMS levels without any setup reconfiguration, easing operations.*

- *Additional serviceability enhancements include:*
    - *Dump address space selection is enhanced to ensure that all needed address spaces are dumped.*
    - *Shutdown trace to assist in analyzing problems in the shutdown process.*
    - *Message Upgrade for DFS064 and DFS065 include destination name, QSCD Dump formatting improvements, LSMB Dump formatting improvements and improved DFSERA30 formatting of split records.*

- *APPC enhancements provide support for timeout granularity in seconds, and Local Logical Units (LUs). For LU 6.2 descriptors, users can specify a Local-LU at the descriptor level, thus providing more flexibility.*

- *Statistics Utilities Shared Queues support allows including shared queues in the Log Transaction analysis and Statistical analysis utilities, thus providing additional information for managing these environments.*

- *MSC Statistics are provided to ascertain performance and make adjustments. These enhancements offer more efficiency, better hardware utilization, improved performance, fewer link requirements and a more manageable environment.*

- *OTMA autonomic enhancements include:*

  - *Callout Descriptors that identify alternate destinations and allow you to define routing information, thus eliminating the need to code OTMA routing exits to perform these tasks.*
  - *Ability to activate message flood detection by suppressing input messages, if needed.*
  - *The detection of wait synchpoint hangs and taking the timeout action, if needed.*
  - *Member start/stop to suppress new input transactions and to resume the stopped member to accept new input transactions.*
  - *Member-level security with each member having its own security level.*
  - *Additional information on the DISPLAY commands.*

- *Selectively Display System Parameters provides improved visibility of the startup parameters values, and shows the actual value of each parameter after reading the log. This improves system parameter visibility and can help determine actual values for optimal configurations and user response times. These enhancements help ease operations, reduce customer/vendor usermods and offer more granular information.*

- *Virtual Storage Constraint Relief enhancements provide a new option to move blocks from 24-bit to 31-bit storage, allowing CICS and Open Database Access (ODBA) applications to use the larger PSBs without putting further pressure on below-the-line storage. This provides increased capacity.*

Additional IMS 10 functions of special interest for database administrators:
The enhancements to DBRC in IMS 10 include:

- *Parallel Recovery Control (RECON) Access provides an option to use Record Level Sharing for the RECON via use of the Transactional VSAM (DFSMStvs). Serialization of access to the RECON at the dataset level is replaced by concurrent processing of DBRC requests from multiple IMS systems, thereby reducing contention to the RECON data set. This provides the ability to improve transaction throughput and response time that will result from reducing or eliminating RECON contention. This strategy helps reduce or eliminate transaction response time issues, unplanned system quiesces for OLDS switches, and growth constraints, and enhances availability and recoverability in a Sysplex environment.*

- *DBRC API enhancements allow the RECON dataset to be updated as well as read, and to secure the RECON by limiting the level of access to individual users. This further enhances the API, which was first introduced in IMS 9 to provide users with a single release-independent interface to the RECON. These enhancements provide enhanced architected access to simplify tooling and programming efforts, offering release independence, additional functionality and enhanced usability and migration.*

- *READONLY RECON dataset access support removes the requirement that all users have CONTROL access to the RECONs. Users can now be assigned one of three levels of access—READ, UPDATE, or ALTER. READONLY access is supported by the DBRC Utility (DSPURX00 or DSPURXRT) as well as the DBRC API.*

- *DBRC Timestamp Precision enhancements provide full DBRC support of timestamps with microsecond precision, reducing timestamp collisions, thus increasing reliability and availability.*

Database utilities enhancements

- *Image Copy 2 (IC2) enhancements include support for the fast replication capability of Data Set FlashCopy on Enterprise Storage Servers and SnapShot on RAMAC Virtual Array (RVA) DASD subsystems for database image copy/restore processing. Enhancements also include an improved, statement-driven, interface of the SET Patch feature of DFSMSdss. Support is provided for recording alternative DB backup methods as concurrent/fuzzy user image copies. These items speed and improve recovery by exploiting the latest storage technology and alternative/ concurrent methods, and provide additional information to ease use.*

- *Sort enhancements increase the core size available to OEM sort utilities called by IMS Change Accumulation and Prefix Resolution. The default is also changed. This allows more OEM Unit Control Blocks (UCBs) to be allocated below the 16MB line, thus increasing the available number of sort work datasets, providing for efficiency in change accumulation and prefix resolution and improving performance.*

- *Indirect List Data Set (ILDS) Rebuild Utility enhancements improve the performance of ILDS creation by avoiding Control Area (CA) and Control Interval (CI) splits, observing the VSAM free space requirements so the ILDS can be provided for reorganization, by sorting Indirect List Entry (ILE) records in data spaces and inserting them into the ILDS sequentially, and taking advantage of VSAM KSDS free space. This support improves overall recovery time for recoveries requiring the ILDS to be rebuilt and improves performance of subsequent offline reorganization reloads using the ILDS with free space as input.*

Additional IMS 10 functions of special interest for Fast Path System Programmers, DBAs, operators:
These enhancements include improved Expedited Message Handler (EMH), increased buffers and availability/usability items.

- *FP EMH enhancements add command support to reset FP response mode for static nodes and dynamic users. This provides the capability to free up hung terminals in Fast Path Response mode without requiring an IMS restart.*

- *The 64K DEDB buffer limit is removed. There is no longer a maximum number of buffers that can be defined for the DEDB buffer pool.*

- *Additional enhancements for DEDB users are the ability to start the DEDB and all of its areas with a single command and an option for not unloading the randomizer when UPDATE DB is used. This eliminates the need to start the areas of a DEDB individually and improves ECSA usage.*

- *For Virtual Storage Option (VSO) users, automatic compression of the Shared VSO (SVSO) private pool at XRF tracking is provided.*

Summary and Conclusions

IMS continues to provide leadership in the marketplace.

The on demand business cycle focuses on leveraging your existing knowledge and information, transforming your core business processes, managing technology in building new applications and providing organizational efficiency — all of which require a high performance, available, scalable, secure environment. For virtually every cycle — whether it's using existing data to sharpen decision making and responsiveness, prioritizing which processes and applications need to be extended, building new reusable applications integrated with existing ones or maximizing deployment on secure platforms, IBM IMS solutions can help.

Built on the power of System z, billions of dollars worth of IMS applications have been developed to run your mission-critical work in a safe environment. Think of it this way: If you have money in a bank, feed, house, clothe your family, or protect them with health or insurance services, or use educational or government information, etc., most of this information is probably kept securely in IMS databases, accessed through high-performance IMS transactions and rapidly processed across the Internet for wider use.

IBM will continue to invest heavily in IMS to enhance IMS to meet the stringent requirements of its customers — to help them transform their core business processes with emerging technologies using IMS. Exploiting the latest in technologically advanced hardware and software, IMS can help customers achieve new levels of price performance and, at the same time, leverage their exiting investment in skills and applications for information access across the Internet.

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TAKE BACK CONTROL WITH **Information Management**