The Evolution of IMS Information

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When IMS™ was first introduced in the 1960s, the product information was, in a word, predictable: books! As IMS has evolved alongside information technology, the IMS User Technology writing team has delivered a succession of advancements in how we deliver product information. BookManager™ was first delivered with IMS Version 3. The IMS Softcopy Master Index shipped with IMS Version 5. IMS Version 6 saw the first offering of PDF, then in its infancy. Now, with the general availability of IMS Version 9, the IMS writing team is pleased to deliver new information tools for our customers: an information center, a product roadmap, and a web site dedicated to IMS examples. This article describes each of these new information tools.

Figure 1

The IMS Information Center

Have you ever asked, "where can I find this information?" Have you searched on the web endlessly for some helpful information? Or, did you ever ask yourself, "where do I look first?" The answer to these questions is an information center. What is an information center? It is a unique online information resource, a one-stop-shop, where you can access and retrieve all the information for the products that you use. An information center brings together the product information for many of the products that you use with IMS, in one centralized location, using IBM's Eclipse framework.

In April of 2004, the IMS Version 8 library was shipped as part of the DB2 Information Management Software Information Center for z/OS Solutions shown in Figure 1. All of the IMS Version 8 product information (with the exception of licensed-only publications) is available online, in HTML format, with the product information for DB2® Universal Database™ for z/OS Version 8, DB2 QMF™ Version 8, and several IMS and DB2 Tools.

Since April, we have added the IMS Program Directory, IMS Control Center information, IMS Connect information, and now the entire IMS Version 9 library. Also included are convenient links to IBM Redbooks™, the new IMS Roadmap, IMS Educational offerings, the LookAt facility for messages, and more.
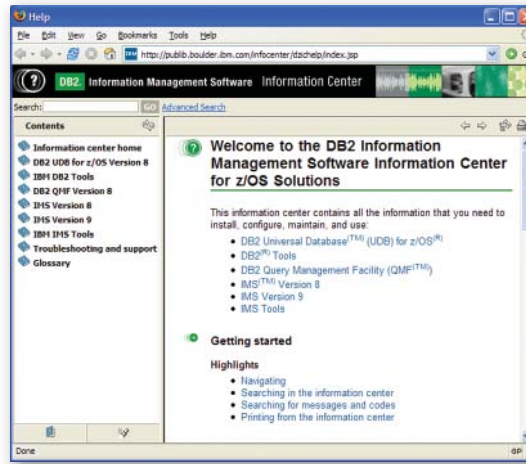
You can find the latest DB2 Information Management Software Information Center for z/OS Solutions at publib.boulder.ibm.com/infocenter/dzichelp/index.jsp.

The IMS Roadmap

IBM provides many sources of information about IMS, including the IMS documentation, Redbooks, white papers, presentations, and educational materials. While most of this information is available on the IMS Web site, we want to provide you with an easier way to find the information that is relevant to you.

IMS User Technology has developed an IMS Information Roadmap, now available on the IMS Web site at www.ibm.com/ims. The IMS Information Roadmap provides links to information and educational resources for the IMS product and some IMS tools. The IMS Information Roadmap is organized so that you can easily find information related to specific IMS tasks and functions, such as installing, developing, and security. Figure 2 shows how the contents of the roadmap are organized.

Start using the IMS Information Roadmap today and tell us what you think. Do you find this roadmap useful? Do you like the way the information is organized? Would you prefer to see a separate roadmap for IMS user roles, such as administrator, developer, or system programmer?

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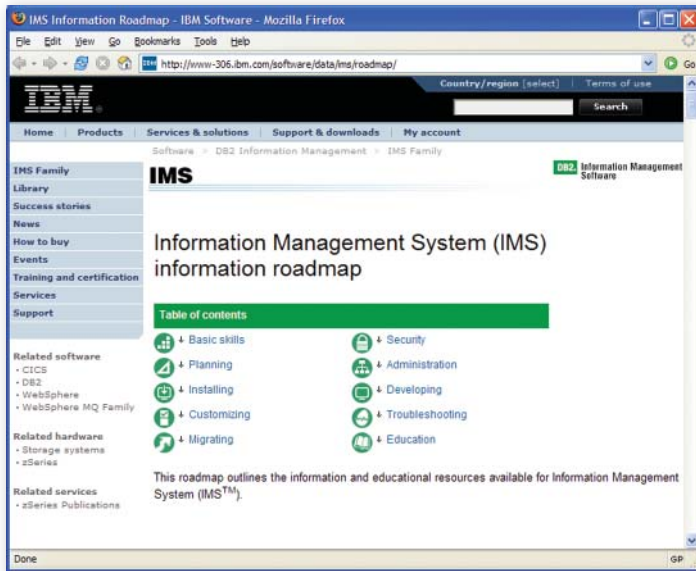*Figure 2*

Figure 3

IMS Examples Web Site

IMS User Technology has also developed a web site dedicated to something we know is important to our customers: IMS samples and examples. The web site shown in Figure 3 is called the IMS Examples Exchange. This web site allows you to not only view examples but also to submit your own examples for others to use. A special feature of the site is a feedback and rating system that allows you to assign each example a rating that ranges from 1 (worst) to 5 (best) stars. This helps to assure the quality of the examples posted on the site.

The idea for the site came in response to the need for more and easier-to-find IMS examples. As this site grows, we hope that it will become a more and more valuable source of information for the IMS community. Check out the IMS Examples Exchange today at www.ibm.com/software/data/ims/examples/exHome.html.
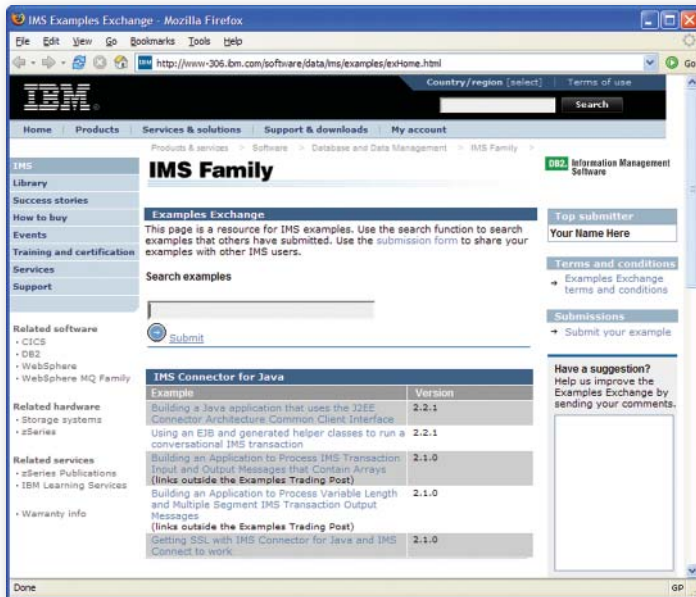
As always, your IMS User Technology team, comprised of the writers, editors, visual designers and writer's assistant that develop the IMS product information, would love to hear from you. Send your email to imspubs@us.ibm.com!

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IMS User Technology

Letter to Customers

IMS education is an issue that has come up more and more often over the last few years. The combination of reduced staff, poor economy, and stable applications through the 1990s dropped the IMS education student rates to a point where it was difficult to get the class minimums required to provide IMS education. As a result, no new IMS courses were added, classes that did exist were not updated to current version levels, and many of the offered classes were canceled due to low enrollments. In the last couple of years, we have seen increased application activity as customers increase the access to legacy IMS transactions and data from web-based solutions. This has increased requests for classes on IMS with XML, IBM WebSphere Application Server for z/OS and OS/390, IBM WebSphere MQ for z/OS, and TCP/IP. The continued migration to sysplex for IMS customers has renewed interest in data sharing and shared queues education. The introduction of HALDB in IMS Version 7 has sparked a noticeable increase in education on HALDB, data sharing, and database fundamental courses. The end result is that IMS education lagged behind renewed customer interest as we entered the new century.

To address this issue, IMS agreed with IBM Learning Services to help bring IMS education current. During 2004, we upgraded all of the courses to IMS Version 8 levels. We took existing IMS courses like IMS Data Sharing, Fast Path, and Logical Relationships (some of which existed only in old hardcopy student guide form), and recreated Version 8 softcopy source materials. We also started to introduce new courses for debugging, performance, and security. We continue to improve the courses that cover the newest technology in the on demand world; the IMS Connector Workshop that Suzie Wendlerand Ken Blackman (from the Advanced Technical Center) developed is kept updated to current IMS and WebSphere Application Server for z/OS levels.

Customers also face increased pressure to reduce costs, including education, and to support their installations with smaller staffs. This can make it difficult to get permission to travel to remote classes and to let more than one or two persons attend together. In North America, we have attempted to address these issues by changing the way we provide education. Throughout 2004, we began to offer the majority of the IMS courses in a virtual classroom environment. We use instructors, and they present the material live, using teleconferencing for audio. We mail the materials in hardcopy before the class starts, and we present the materials online using web conferencing techniques. Web conferencing also allows spontaneous chat and allows instructors to share student screens for assistance and demonstrations. When the classes include labs, we use IBM Learning Services Lab systems and provide the students with software to connect them to the systems for lab work. The classes are scheduled in half-day increments, from 10:00 -12:00 AM, and 1:00 -3:00 PM Central time. Anyone in North America can attend during prime shift time. Half-day courses also allow customers to approve multiple attendees, because they still have time for important day-to-day work. Overall costs are reduced because travel is eliminated, and the price of the course itself is reduced.

Registration is unchanged, and the most current class plans and listings are provided at the IMS home page at www.ibm.com/ims (follow the links for Training). For 2005, we will work on new courses, look for ways to use Voice Over Internet Protocol (VOIP) for audio, and provide more lead time in the catalog so you can better plan for education. We are looking for ways to take education on the road, and we plan to offer the Version 9 enhancements class in a number of cities worldwide in 2005. Courses will be delivered in a series order, so students can take several courses in a short period of time; fundamental courses precede intermediate courses, which, in turn, precede advanced courses. We plan to deliver the bulk of IMS education, in series, twice a year.

Not all IMS education in the Americas will be delivered in this virtual classroom environment. Some courses, like DB and DC Application Programming, require significant instructor interaction. The IMS Version X Installation Workshop, IMS Sysplex Workshop, and IMS Web Connector workshops also require a level of interaction or a lab environment that can't be duplicated virtually. We will continue to deliver these courses in a physical classroom. Our hope is to offer them throughout the Americas, but we might focus on a few locations to contain student and course costs, as well as our costs, as much as possible.

In Europe and the rest of the world, using web conferencing to provide IMS education is challenging due to language differences and country boundaries. Student populations are even more segmented than in the Americas. In 2004 we addressed this by creating a low cost, non-profit organization to deliver IMS education with the lowest possible overhead. This focus on cost means we can offer smaller classe sizes, hopefully reducing cancellations. In Asia and Australia, our goal is to deliver 1- to 3-day "mini" technical conferences and road shows. Concentrated education that covers multiple topics allows customers to get approval for the necessary travel cost and absence. Wherever possible outside of the Americas, we are trying to present the education in the local language. In 2004, we did presentations in Spain, Korea, China, and Japan using personnel from development and the field that presented in their respective languages. These events were well received, and we plan to continue that practice in the future. For 2005, we look to improve our delivery abilities in the world with classes in South America, and more organized deliveries in Asia.

In summary, IMS is making a determined effort to address what was presented to us as a serious impediment to IMS use and support. We welcome additional ideas and requirements and hope to make each year a little more successful for education that the previous one.

Donald Streicher
Manager, IMS Education and Product Introduction

More Application Programming Recommendations and Considerations for OTMA Clients

In the Spring 2004 issue of the IMS Newsletter, we printed a number of recommendations on how to effectively design an OTMA client. That article covered commit modes, CM1 synclevels, and what happens when you run with too much IMS storage. We indicated then that we hoped to provide additional recommendations in future newsletters. Below are more application programming recommendations and considerations to help you design an OTMA client.

Your IMS Connect Application Might Need to Send an ACK or NACK to IMS

If you are not using CM1 with synclevel=none, your IMS Connect application needs to send an ACK or NACK back to IMS for every IMS output message. This is needed to confirm the receipt of the IMS message. If your IMS Connect application fails to return an ACK or NACK to IMS for a CM1 output message, the IMS dependent region that processes the transaction is in "wait-syncpoint" status. If your IMS Connect application fails to return an ACK or NACK for a CM0 output message, the IMS tpipe that delivers the transaction output will hang.

Do I Use OTMA Resynchronization?

The OTMA resynchronization interface ensures that there are no duplicate CM0 input and output messages by using a unique recoverable sequence number in every CM0 message. The client can optionally initiate this during connection time. MQSeries is the primary program that exploits this OTMA interface extensively. An MQSeries® application program can send a "persistent" message to IMS to take advantage of the resynchronization benefit. However, sending an MQSeries "non-persistent" CM0 message to IMS bypasses the resynchronization service.

Do You Need to Support Time-out in Your Application?

Having the time-out feature in your application is always a plus. This time-out feature helps to detect a long-running transaction in IMS, or a missing OTMA protocol message, such as a CM1 deallocation message, which carries the result of the IMS syncpoint.

Which OTMA Security Option is Needed for My Application?

In general, OTMA security is controlled by the IMS system administrator. The security can be set to FULL, CHECK, NONE, or PROFILE. If the security is PROFILE, the client application program can set its own security option to FULL, CHECK, or NONE. When OTMA security is set to CHECK, OTMA checks every input command and transaction using the RACF® resource classes CIMS and TIMS. When OTMA security is set to FULL, the same security processing as CHECK is used, but additional RACF calls are used to create the security environment for IMS dependent regions. When OTMA security is set to NONE, no RACF call is used for security verification.

What Do I Need to Know About IMS Program-to-Program Switches?

If your application program deals only with CM0 messages, then the IMS program-to-program switch is not a issue. However, if you are sending CM1 messages, and there are program-to-program switches in IMS to process your transaction request, you might need to ensure that your application can receive a CM1 output message for the transaction. This was described in the "OTMA Program-to-Program Switch" article in the Spring 2003 issue of IMS Newsletter. Additional information can be found in *Open Transaction Manager Access Guide and Reference*, SC27-1303.

A Note about Sending an IMS Conversational Transaction

An IMS conversational transaction involves multiple input and output iterations. If the conversation is not ended at the last iteration, or your application program does not initiate the "end conversation" request, then the IMS conversation and the associated IMS storage will exist in the system for a long time. This orphaned IMS conversation could prevent the system from completing the online change. You can issue the /DISPLAY CONV command to see whether you have any orphaned IMS conversation in the system. This orphaned IMS conversation can only be ended by an IMS restart.

What Happens if You Received an IMS ALT-PCB Output?

Standard message flow is one message in and one message out; however, your application program might receive an IMS ALT-PCB output, which is the result of an IMS CHNG call. For example, an IMS program might route a legacy message or printer output to an OTMA tpipe, which then delivers the output message to your application program. Your application program needs to detect it and handle it properly. In the case of IBM IMS Connect for z/OS (IMS Connect), all of the ALT-PCB output is stored in a special asynchronous message hold queue to be retrieved by the RESUME TPIPE command.

If your transaction can be processed by a back-end shared queues system, and if the system will generate ALT-PCB output, then your OTMA client application might need to connect to one or more IMS shared queues back-end systems to retrieve the ALT-PCB output. Based on the current IMS shared queues design, if an ALT-PCB output destined for an OTMA client is created at an IMS shared queues back-end system, the system attempts to deliver the output directly to the OTMA client. If the client is not connected, the output is queued at the IMS back-end system. If the OTMA client is IMS Connect or an application of IMS Connect, then the ALT-PCB output is stored in the asynchronous hold queue.

In Summary

There are many decisions to make when designing an OTMA client. Hopefully this article, together with the article in our previous edition, will provide information to help you make those decisions. OTMA provides many capabilities and benefits for an application program to easily access IMS data from any platform. With the proper application design, the possibilities are endless.

Mike Artobello
IMS Developer

Jack Yuan
IMS Developer

Elvis Halcrombe joined IBM's "Quarter Century Club" - 25 years with IBM - this past July. For 20 of those 25 years, Elvis has been in the IMS organization. He came to IMS after spending 5 years as an IBM Customer Engineer, working on IBM Selectric typewriters and copy machines. In IMS, Elvis is part of the Change Team, but he also contributes to Service and Development. Most recently, Elvis lead a team charged with building the Service structure for the the IMS e-business product set. "I love to solve problems," says Elvis. "I love to analyze, love to debug, love to code solutions." Elvis remarked that the best thing about working in the IMS organization is "the people. I really think that the folks that work in IMS are dedicated, hard workers that you can trust and have confidence in." When Elvis isn't debugging and solving problems for IMS, he's having fun with his kids Malcolm, 15, and Patrice, 14. You also might be able to find him at an Oakland Raiders football game, or on a nearby softball field - sporting a batting average of .636!

Yuhui Li started her IBM career as an IMS coop from City College of New York. Twelve years later, she is still enjoying herself as an IMS tester. Yuhui is a tester in the IMS Transaction Manager area. As a tester, she focuses mainly on new releases of IMS, writing test cases and trying to break the code. "You can be very creative," she says, "thinking of ways to break the code." She remarked that customers often use IMS in ways that we don't think about, so she and her team have the opportunity to develop unique test cases that are both challenging and creative. Yuhui is most proud of the creativity she brings to her job as a tester. Having been in the same department for her 12 years with IBM, Yuhui said that the teamwork she sees inspires and motivates her. "It doesn't matter what kind of problem there is; everyone is very helpful; everyone shares their knowledge." Yuhui's time away from the office is devoted to her family: she has a 7-year old daughter, Michelle, and a new 6-month old baby boy, Jake, who fill up most of her schedule!

What's New in IMS Tools?

2004 has been a busy year, and it certainly will not be remembered as a dull year! To date, we have had 2 IMS Tools announcements in 2004 – June 1st, and September 21st. With these announcements, we've added 3 tools to the IMS Tools portfolio, provided new versions of 3 tools, and provided new releases of 3 tools. That makes a total of 9 IMS Tools in 2004 that were either newly announced or updated.

For those of you who attended the IMS Technical Conference in Orlando, you were able to hear all about our two announce-ments first-hand from our IMS Tools development team. We had presentations on almost all of these IMS Tools in EXPO; we had a total of 12 pedestals in the IMS booth, and we had 7 different hands-on workshops for you to get "down and dirty" using IMS Tools – some of our new tools, and some of our tried-and-true tools.

For our European folks who attended the IMS Technical Symposium in Koenigswinter, Germany, you too were able to hear about our 2004 IMS Tools announcements. We had 6 presentations on some of the newly announced IMS Tools, as well as sessions on IMS Tools trends and directions. In EXPO we had 2 IMS Tools booths, and for the first time at the IMS Technical Symposium, we had 2 hands-on workshops for folks to "test drive" some of our tools.

Here's a recap of the June and September 2004 IMS Tools announcements:

New Tools
IBM IMS Connect Extensions for z/OS, V1.1 (5655-K48) enhances the basic IMS Connect product with extended features and functions in the areas of availability, security, and performance monitoring. The availability extensions provide enhanced services for user exits, transaction pacing, dynamic routing, workload balancing, and extended control and reporting. The security extensions provide protection against access by unauthorized clients. The performance monitoring extensions provide performance measurements and basic reporting, with more extensive reporting being provided by the IBM IMS Performance Analyzer for z/OS product.

IBM IMS Parameter Manager for z/OS, V1.1 (5655-L59) simpli-fies parameter management and provides increased levels of parameter control. It enables IMS system programmers to better control the specification and maintenance of IMS parameter library members. With IMS Parameter Manager V1.1, you specify IMS start-up, performance, and operational parameters with either ISPF dialog panels or the integrated ISPF editor. IMS Parameter Manager performs syntax and value checking, automatic parameter card construction, and provides history files of your IMS parameter members. IMS Parameter Manager reduces both system programmer time and the risk of programmer errors in defining IMS operational parameters

and performance characteristics. IMS Parameter Manager also provides reliability and migration assistance when upgrading to newer versions of IMS.

IBM IMS High Performance Fast Path Utilities for z/OS, V2.1 (5655-K94) provides you with all of the features and functions currently available in IMS Fast Path Basic Tools for z/OS and IMS Fast Path Online Tools for z/OS. Now there's just one tool your Fast Path DBA needs that contains all the right components to analyze, maintain, tune, and migrate IMS FP data entry databases (DEDBs). In addition, there are components that will boost system availability by allowing your DBA to perform a variety of key functions without taking your IMS FP databases offline. Included in the IMS HP FP Utilities is a new component called High Performance Fast Path Reorganization, which increases FP DBA productivity even more with enhancements like JCL ease-of-use when loading and unloading IMS DEDBs.

New Versions of IMS Tools
IBM IMS Parallel Reorganization for z/OS, V3.1 (5655-M28) provides the infrastructure to integrate the IMS database reorganization tools and to operate them in a single job step. This integration significantly improves administrative pro-ductivity for reorganizing IMS full-function databases, HALDB databases, or both. Provided in this latest version of IMS Parallel Reorganization V3.1 are new capabilities to execute the image copy task with optional hash pointer checking in a parallel reorganization job step that runs concurrently with the unload, reload, and index builder tasks. Also, databases that have internal logical relationships can now execute the prefix resolution/update task in a parallel reorganization job step. With HALDB, selected consecutive HALDB partitions can be reorganized in a single parallel reorganization job step, improving HALDB administrator productivity. And the remaining productivity and ease-of-use addition to IMS Parallel Reorganization is the support of the IMSDALIB DD statement, which is used for specifying the library of dynamic allocation members.

IBM IMS High Performance Load for z/OS, V2.1 (5555-M26) pro-vides a high performance database reloading capability for IMS full-function databases, HALDB databases, or both. With the latest version of IMS HP Load V2.1, database reloading perfor-mance has been improved by restructuring code to reduce CPU time utilization, improving I/O processing to reduce I/O wait, and exploiting the High Performance I/O driver. IMS HP Load now supports IMS Parallel Reorganization for z/OS Version 3 capabilities such as image copy creation during database reor-ganization. IMS HP Load works with IMS HP Unload to enable you to load compressed data that was previously unloaded in a compressed format.

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IBM IMS High Performance Prefix Resolution for z/OS, V3.1
(5555-M27) enables you to resolve and update prefixes of IMS
databases involved in logical relationships as a single job step.
A data transfer service called HPPRPIPE (eliminating Work File 2
[WF2] and Work File 3 [WF3] data sets) avoids much of the I/O,
tape handling, and DASD requirements associated with prefix
resolution and prefix update. This gives you better perfor-
mance and faster running prefix resolutions and updates. Using
these new functions rather than the existing base IMS Utilities
improves database maintenance considerably.

New Releases of IMS Tools
IBM IMS Connect for z/OS, V2.2 (5655-K52) allows e-business
access to new and existing IMS applications. IMS Connect sup-
ports communications between one or more TCP/IP clients and
one or more IMS systems. IMS Connect provides two-phase
commit support for distributed environments across TCP/IP,
allowing an application running on Web Sphere Application
Server for z/OS in a non-OS/390®, non-z/OS environment
to connect to IMS through IMS Connect (with IMS and IMS
Connect initially in the same LPAR). IMS Connect provides
enhanced security and Message Format Services (MFS) Web
Services support to enable IMS customers to publish existing
MFS-based IMS applications on the Internet as web services.
IMS Connect V2.2 provides support for IMS Connect Extensions
to enhance performance and availability reporting. Command
enhancements are included for ease of manageability.

IBM IMS Performance Analyzer for z/OS, V3.3 (5655-E16) improves
IMS system performance by providing a wide variety of reports
that analyze performance, usage, and availability. These
reports include monitor reports, Fast Path Log reports, New
Transaction Transit reports, Transaction Statistics reports,
System Checkpoint reports, and Deadlock Reports. IMS
Performance Analyzer also provides an extract capability
that includes CPU usage and database update activity. IMS
Performance Analyzer Version 3.3 offers new reports and
features that include comprehensive reporting for IMS Connect
Extensions for z/OS event collection; a new Dashboard report
that provides a quick overview of critical system performance
indicators as well as being a springboard to other reports; a
new BMP Checkpoint report that measures batch checkpoint
frequency that can impact online performance and system
restartability; a Transaction History File, which allows you to
collect detailed transaction performance data and export it
into DB2 UDB for z/OS for help with long-term capacity plan-
ning and trend analysis; and an improved Report Analysis that
provides additional information to aid in the interpretation
of reports.

IBM IMS Database Repair Facility for z/OS, V1.2 (5555-E03) can
interactively, and in batch mode, repair VSAM- and OSAM-
organized IMS databases containing pointer or data errors.
With the latest release of this tool, V1.2, entire blocks of data
or individual IMS segments can be viewed; while viewing the
data, you can navigate to other segments, track changes, and
then undo them. IMS Database Repair Facility can work with
IMS High Performance Pointer Checker to find errors, report
them, and repair them quickly. When teamed together, these
two tools help to minimize downtimes for your IMS system.
IMS Database Repair Facility by itself is a useful addition to any
system programmer or DBA workbench.

IBM IMS High Performance Image Copy for z/OS, V3.2 (5655-K96)
enables you to run the image copy function with the hash
checking of IMS High Performance Pointer Checker for z/OS V2,
under the control of IMS Parallel Reorganization for z/OS V3 if
these tools are part of your IMS environment. As a result, with
this new release of IMS HP Image Copy, you can reduce the
run-time of the reorganization process for an IMS full-function
database, a HALDB database, or both. In addition, during IMS
Parallel Reorganization, you can check the accuracy of an image
copy while these processes are running in parallel.

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2004 has been filled with exciting news for IMS Tools. Continue
to watch this space to get the very latest on what's new in IMS
Tools, and check our website as well. We have many new things
in plan for early 2005.

For more information on these and all of IBM's DB2 and IMS
tools, visit ibm.com/software/data/db2imstools.

Margaret M Wilson
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CM0 Persistent Sockets for IMS Connect

IBM IMS Connect for z/OS, V2.1 (IMS Connect), supports three socket types: persistent, transaction, and non-persistent. These socket types define how IMS Connect manages client TCP/IP connections. The persistent socket eliminates considerable overhead associated with connect and disconnect for each transaction, improving network performance and resulting in greater throughput. Because customers value these performance benefits, we removed the restriction in IMS Connect 2.1, which supported only OTMA send-then-commit (commit mode 1, or CM1) messages for a persistent socket. APAR PQ80468, which was available at the end of 2003, now provides support for OTMA commit-then-send (commit mode 0, or CM0) messages for a persistent socket.

The following functions, which were only supported on transaction sockets prior to the IMS Connect APAR PQ80468, are now supported for CM0 persistent sockets:

- SENDONLY - non-response transactions
- RESUME_TPIPE - retrieve asynchronous messages from IMS OTMA hold queues
- Non-conversational transactions
- Non-fast path transactions
- A mix of SENDONLY, RESUME_TPIPE, non-conversational, and non-fast path transactions within a single connection
- Purge Not Deliverable option for CM0 synch level confirm
- Swapping of CM0 messages from port Tpipe to client Tpipe, placed there from a program switch

Persistent sockets now also support a mix of CM0 and CM1 requests. This means that client applications can mix CM0 requests such as SENDONLY, RESUME_TPIPE, and transactions, with CM1 requests.

CM0 Persistent Socket Non-Conversational Flow
With IMS Connect 2.1 APAR PQ80468, a CM0 persistent socket can be kept open for multiple transactions as follows:

1. Connect
2. Send a message (IMS command or transaction)
3. Receive one of the following:
    - an output message from IMS
    - a timeout notification
    - error notification
4. If the output is:
    - an output message, then send an ACK to IMS and then issue a READ to get the next output message or a timeout notification.
    - a timeout notification, then process the timeout notification and decide to send next input or disconnect
    - error notification, then process the error and issue disconnect.
5. Go to step 2 if no disconnect.

Usage Considerations for CM0 Persistent Sockets
Prior to PQ80468, a timeout for a CM1 persistent socket and CM0/CM1 transaction socket produced a notification with a return code (X'20' or X'24') sent back to the client. The socket would then be disconnected. With PQ80468, the timeout return code (X'28') is returned to the client application for persistent socket CM0 and CM1, and the socket is not disconnected.

A new RESUME TPIPE option for CM0 persistent or transaction sockets, SINGLE with WAIT, allows an IMS Connect client to retrieve one message from the IMS OTMA hold queue. If there are no messages when the resume Tpipe is processed by IMS OTMA, IMS OTMA waits for a message. After a message is available in the hold queue, IMS OTMA delivers the message to IMS Connect. See IMS V7 APAR PQ78912 or V8 APAR PQ79040 for more details.

TIME_OUT notifications for a persistent socket to the client application always require the client to either disconnect, go idle, or go to SEND state and, respectively, send in a new transaction, SENDONLY, or RESUME_TPIPE.

If a RESUME_TPIPE or ACK/NAK to a RESUME_TPIPE output timeout occurs, the RESUME_TPIPE must be resent to continue receiving output from IMS OTMA, even if the AUTO option had been selected.

If a NAK is sent to OTMA for an asynchronous output message from the hold queue, and the RESUME_TPIPE option had originally been set to AUTO, IMS OTMA changes the option to NO-AUTO. This feature also requires IMS V7 APAR PQ78912 or V8 APAR PQ79040.

CM0 persistent sockets with a NOWAIT timeout value timer option support only the following:

1. SENDONLY
2. Send of an ACK/NAK response to a RESUME TPIPE with SINGLE option
3. Send of an ACK/NAK response to a RESUME TPIPE with SINGLE option with NO_WAIT option.

After sending one of these options, receiving the output, and sending an ACK/NAK with a NOWAIT option, the client application returns to a SEND state. Any other function that specifies the NO_WAIT option defaults to a timeout value and would require the client application to return to a READ state to receive the timeout notification or a message output.

IMS Connect 2.1 APAR PQ87160 adds a new option, Purge Not Deliverable, to CM0. This option allows the client application to request CM0, synch level confirm, with Purge Not Deliverable. If an output message cannot be delivered to the client, IMS Connect responds with an ACK to IMS OTMA to request that the message be removed from the client message queue.

This function allows the client application to execute CM0 synch level confirm and request that the output be tossed if the message cannot be delivered. It also means that if the message is delivered to the client application, then an ACK/NAK is required; however, if the message cannot be delivered, the client application requests that the message be tossed because it is not needed. This function is extended to IMS OTMA and requires IMS V8.1 APAR PQ87087 or V9.1 APAR PQ87088 be applied to the corresponding IMS level.

IMS Connect 1.2 APAR PQ53414 and IMS Connect 2.1 APAR PQ86077 add a new option of "Swap Reroute Request for CM0 messages from port Tpipe to client Tpipe". The IOPCB ISRT from the second transaction can result in the message being placed on the port Tpipe when a CM1 transaction does a program switch to a second transaction that results in executing a CM0. The swap Reroute Request occurs automatically, initiated by IMS Connect, and requires no client action. This function also requires that IMS 7.1 APAR PQ80469, IMS 8.1 APAR PQ84254, or IMS 9.1 APAR PQ84255 be applied to the corresponding IMS level.

With IMS Connect 2.1 APAR PQ80469, the NOWAIT timeout value must be enforced. The NOWAIT value specified in the OMUSR_TIMER (set by a user message exit, from either the IRM_TIMER value or some customer logic in the user message exit) is analyzed by IMS Connect. Because it can be used incorrectly, it is now enforced as follows:

- NOWAIT (X'E9') timer is allowed for:
  - ACK/NAK for ASYNCH option of 'SINGLE'
  - ACK/NAK for ASYNCH option of 'SINGLE with WAIT'
  - SENDONLY request
- NOWAIT (X'E9') timer defaults to the configuration file timeout value for:
  - All ACKs for conversational transactions
- Input message types from the client for:
  - DATA (conversation continuation)
  - TRANSACTION
  - NOWAIT (X'E9') timer defaults to X'29' (2 seconds) for COMMANDS (RESUMETPIPE)
- NOWAIT (X'E9') timer is changed to X'19' (1/4 second) for:
  - ACK for CM1 synch level confirm; this ensures that the client receives the deallocate
  - All ACK/NAK for ASYNCH options of AUTO
  - All ACK/NAK for ASYNCH options of NOAUTO

Unpredictable results can occur if RESUME_TPIPE is used with both the AUTO option and an IRM_TIMER value that results in the timeout occurring. AUTO means just that: send the message to IMS Connect as soon as one appears in the IMS message queue. If a timeout occurs when RESUME_TPIPE with AUTO option is selected, and you want to now enter transactions, you must first exit the AUTO option processing mode by doing one of the following:

1. Issue RESUME_TPIPE with the AUTO option and set the value for IRM_TIMER to a larger value to insure that the receipt of an output message is NAK'd by the client application. By NAKing the output, OTMA changes the asynchronous mode from AUTO to NOAUTO to stop the sending of asynchronous output. The client then issues READ to get the timeout notification.

2. Issue RESUME_TPIPE with the NO_AUTO option, and set any value in the IRM_TIMER field. After receiving an output message that is ACK'd, repeat the READ of asynchronous output and SEND of ACK until a timeout notification is received. When the client application went from AUTO to NOAUTO, the asynchronous mode in OTMA was reset to NOAUTO. This does not support automatic sending of asynchronous output after the IMS Message Queue is empty. The client application then issues READ to get the timeout notification.

3. Issue RESUME_TPIPE with the NO_AUTO option, and set a small value in the IRM_TIMER field. After receiving an output message that is NAK'd, just as in option 2, the OTMA asynchronous mode is reset to NOAUTO, and the sending of the NAK terminates the process. The client application then issues READ to get the timeout notification.

4. Issue RESUME_TPIPE with the SINGLE option, and set any value in the IRM_TIMER field. The OTMA asynchronous mode is reset from AUTO to SINGLE, and no more asynchronous messages are sent. After receiving an output message that is either NAK'd or ACK'd with an IRM_TIMER setting other than NO_WAIT, the SINGLE option is satisfied, and the client application then issues a READ to get the timeout notification.

5. Issue RESUME_TPIPE with the SINGLE option, and set any value in the IRM_TIMER field. The OTMA asynchronous mode is reset from AUTO to SINGLE, and no more asynchronous messages are sent. After receiving an output message that is either NAK'd or ACK'd with an IRM_TIMER setting of NO_WAIT, the SINGLE option is satisfied, and the client application does not have to issue a READ to get a timeout notification.

After completing any of these options, the client can then start sending transactions to IMS Connect.

Jerry Hughes
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In order to fully understand the business value of IMS, we should first recognize that IMS is designed and developed as a key building block for the now-and-future on demand operating environment, just as it has been the foundation of information management technology for its customers for the past 36 years. In the on demand operating environment, business processes are integrated end-to-end across a company and with key partners, suppliers, and customers. IMS customers, for example, can respond with flexibility and speed to any customer demand, market opportunity, or external threat. IMS Version 9 strives to meet the needs of the on demand business.

for z/OS for data mining, replication, and business intelligence applications.

The on demand business needs to develop a service-oriented architecture (SOA) to better integrate business processes end-to-end in its enterprise and to transact and interact with customers, suppliers, partners, and employees. IMS applications and IMS transactions can be published on the internet as web services, connecting to IMS using SOAP and EJB bindings, within customers' SOA, assisting business-to-business application integration.

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

The on demand business needs rapid response for business transactions and inquiries from many customer, partner, supplier, and employee locations utilizing many types and volumes of devices. IBM IMS Connect for z/OS, and the IMS Connect function integrated into IMS Version 9, provides easy-to-install, easy-to-use, high-performance transparent access to IMS applications and data from any application environment, including LINUX™. Customers using IBM IMS Connector for Java can access their storehouse of IMS applications, as well as IMS and DB2 UDB for z/OS data, from any Java application virtually anywhere on the internet.

The on demand business needs to rapidly 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 investments 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.

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The on demand business needs 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.

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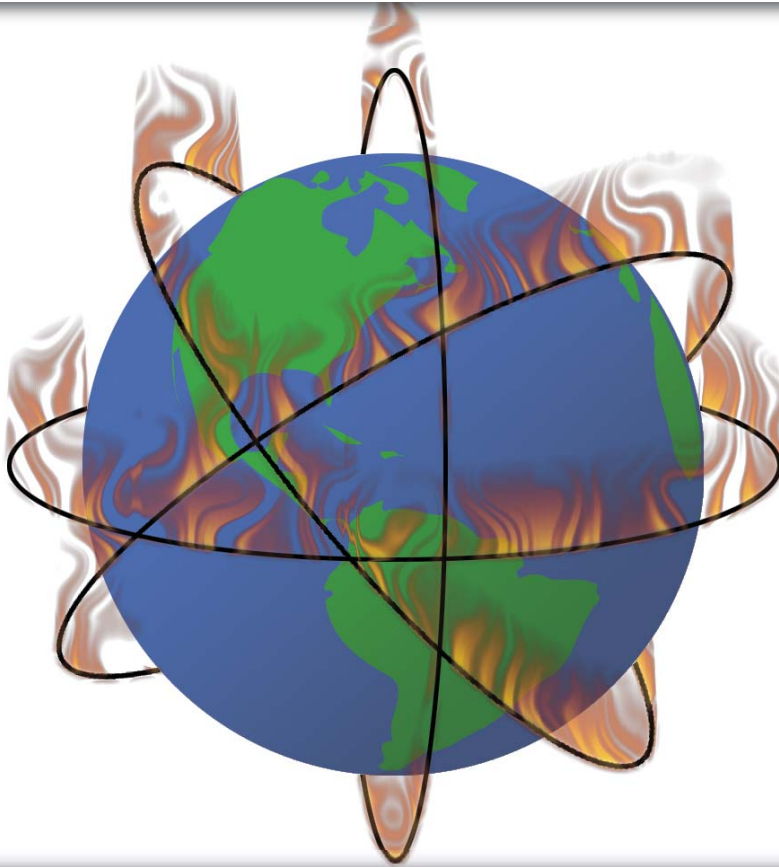
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IBM

They Must Be In Here Somewhere

With the year coming to a close, it is once again time to think about those holiday gifts you like to give to your manager and colleagues. The one gift that comes to mind is the IMS Newsletter. It provides ample reading on IMS topics and graphical elegance for any office desk or coffee table.

Once again you can find my children's pictures hidden somewhere in this issue. We will send an IBM IMS pin to every person who can correctly find the two pictures of my children in this issue of the IMS Newsletter.

If you would like to receive an IBM IMS pin, please e-mail your external postal address and the picture locations of my children to: imsmkt@us.ibm.com

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