Taking IMS to New Heights – What the Future Holds for IMS

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Agenda

- IMS 13 Preview
- Prerequisites for IMS 13
- Wrap Up

Introducing IMS 13 – Smarter Than Ever!

- **IMS 13 Quality Partnership Program (QPP) Announced on October 3, 2012**
  - Program began on December 14, 2012
  - QPP participants have installed and are testing IMS 13
  - General availability of IMS 13 will be announced at a later date.
- **Announcement Letter available on www.ibm.com**
- **Current Status**
  - **12 customers in IMS 13 QPP in 2013**
  - **All customers through Sandbox production**
  - **5 customers have IMS 13 in AD environments**
  - **3+ targeted for full production by GA**

IMS 13 Highest Efficiency
Lowest Total Cost of Ownership

Reducing Costs

- **Cross-platform focus on reducing mainframe software costs**
- **Major focus on reducing CPU usage**
- **Changes throughout IMS to improve performance, reduce storage usage and reduce CPU used to run IMS**
  - Using more efficient storage services
  - Improved algorithms
  - Reducing pathlength
  - Optimizing frequently used processes
  - Latch / lock improvements
  - Storage reductions
  - Use of System z hardware functions

Benefits

- Improved performance, lower cost per transaction, reduced cost of ownership

Specific Reduced TCO Enhancements

- **IMS logger LOG latch contention reduction**
  - Improves usage of log latch and log buffer management for increased logging bandwidth and more efficient processing

- **Shared Queues local first optimization now applies to program-to-program switch messages as well as ordinary input messages**
  - Avoids false scheduling on another IMS when the local IMS can process the program-to-program switch message

- **Exploitation of pageable 1M pages**
  - Based on usage of new zEC12 processors with Flash Express storage and z/OS 1.13 (Dec. 2012)
  - Provides improvements in dynamic address translation and usage of translation lookaside buffer (TLB)

Specific Reduced TCO Enhancements …

- **DB Space Management Block Serialization Latch Improvements**
  - Split from single to multiple latches to improve heavy BMP workloads

- **Memory Data Set ENQ Management Exploitation**
  - More efficient memory-based data set ENQ management improves allocation of large number of data sets
  - Must be enabled in z/OS ALLOCxx SYS1.PARMLIB member
    - SYSTEM MEMDSENQMGMT(ENABLE|DISABLE)

Other Reduced TCO Enhancements

- OTMA YTIB chain changed from a single linked list to a hash table, to improve FINDDEST performance.
- Convert OTMA and IMS Connect STORAGE calls to CPOOL
- Remove unnecessary clearing of OTMA buffers
- DFSCPY00 improved SVC directory entry search algorithm and removal of IVSK instructions.
- CQS mainline modules changed to use branch-relative branching
- Cache efficiency improvements (DPST blocks packed into a single IPAGE to keep cache references localized)
- IMS page load service algorithm optimization
- IMS dispatcher optimizations
- OSAM CML Lock Reduction
- General instruction optimization (replacing STCK with STCKF, long displacement facility exploitation)
- IMS cache manager spin loop elimination

OTMA Early Termination Notification

- **Allows Open Transaction Manager Access (OTMA) to leave the XCF group *earlier* in termination processing**
  - Notifies OTMA clients (IMS Connect, WebSphere MQ, OTMA Callable Interface) of the termination via their XCF Group Exit
    - Client can then route requests to other systems
  - Addresses issues associated with transaction messages being accepted but not processed

Benefits

- Autonomic enhancement for higher availability that allows OTMA clients to be informed of an IMS shutdown in order to choose more timely alternatives
  - Potentially reduces unsuccessful attempts to send in new requests
    - Can expedite shutdown processing

SECURITY Macro removed from System Definition

- **System Definition macro SECURITY is no longer used as part of the IMS system generation process**
- **Specify security settings through PROCLIB members**
- **RCLASS parameter added to DFSPBxxx**
  - RCLASS also supported in DFSDCxxx
  - DFSPBxxx RCLASS parameter value overrides DFSDCxxx if both specified
- **SECCNT parameter added to DFSDCxxx**
- **Other Security settings continue to be specified in DFSPBxxx**
  - SECLVL parameter is replaced by RCF, TRN and SGN in DFSPBxxx
  - TYPE parameter is replaced by ISIS in DFSPBxxx

Benefits

- Simplified system generation process
- Easier method to update security related settings

Preconditioning IMS 11 and 12 for SECURITY change

- **New parameters introduced to IMS 11 and IMS 12**

- **Allows preconditioning by specifying new security settings prior to IMS 13**
  - RCLASS added to DFSPBxxx
  - SECCNT added to DFSDCxxx
  - IMS 11 - PM48203 / UK74050 ; IMS 12 - PM48204 / UK74051

- **If specifying RCLASS in DFSPBxxx, the following APARs avoid an unnecessary error message**
  - IMS 11 PM72199; IMS 12 PM73558

Benefits

- Simplified migration process
- Easier method to update security related settings

Security User Exits removed from Nucleus

- **User exits DFSCSGN0, DFSCTRN0 and DFSCTSE0 now linked separately, loaded from STEPLIB (if present) into 31-bit storage**
- **New DFS1937I message indicates which user exits have been loaded**
  - Can be used in automation to ensure that exits are being used
- **DFSCSGN0 now called at IMS initialization**
  - Storage can be obtained and shared with the other exits

Benefits

- Simplifies process to customize IMS with user exits
- Simplifies writing of user exit DFSCSGN0
- Reduces 24-bit private virtual storage usage

/DIAGNOSE Command Enhancements

- **Users can now send formatted /DIAG SNAP command output to a SYSOUT data set, enabling easy submission to IBM support**
- **SYSOUT data set will contain documentation that is**
  - Formatted and readable
  - Easy to retrieve
- **SHOW() support added for LTERM, NODE, USER**
- **BLOCK – can now specify multiple single instance blocks and more block types can be snapped**
- **More blocks can be snapped for DB, LINE, LINK**
- **Support added for MSNAME**

Benefits

- Improve time to effort to capture diagnostic information
- Reduce time needed to resolve problems

IMS 13 Integration

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InterSystem Communication (ISC) Over TCP/IP

- **New option that supports TCP/IP network connectivity for Intersystem Communication (ISC) connections**
  - IMS TM - CICS
  - Supports both static and dynamic terminals
  - Leverages IMS Connect
  - Uses Structured Call Interface (SCI) to communicate between IMS and IMS Connect
  - Requires CICS Transaction Server for z/OS 5.1
    - Available December 14, 2012

Benefits

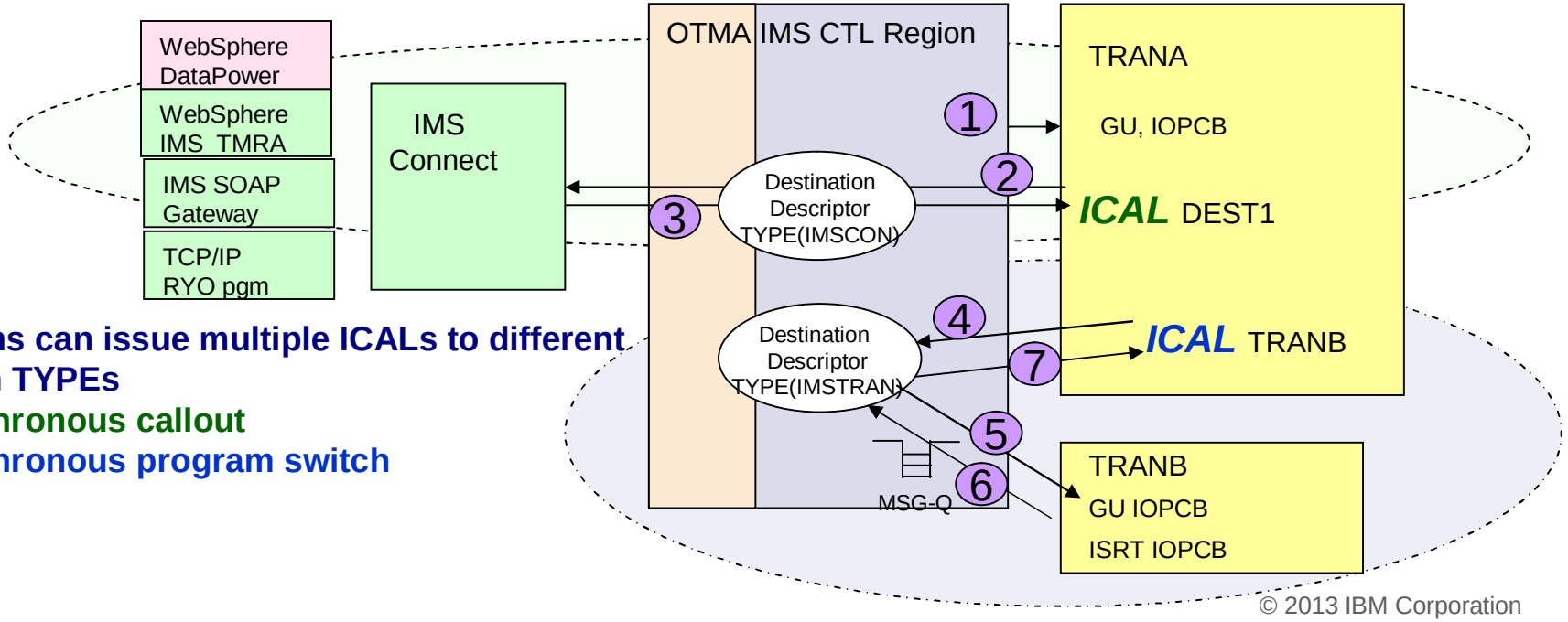
- Provides a strategic protocol alternative to SNA/VTAM
  - Allows an all inclusive TCP/IP solution for networks

Synchronous Program Switch (IMS 13)

- Extend IMS Synchronous Callout to invoke another IMS Application
  - Synchronous flows use DL/I ICAL
  - Asynchronous flows still use DL/I ISRT
- OTMA Descriptor defines the destination

Benefits

- Provides a single DL/I call to request a synchronous service regardless of where that service resides
- Simplifies integration and improves usability



Applications can issue multiple ICALs to different destination TYPEs

Synchronous callout

Synchronous program switch

Asynchronous Callout to WebSphere MQ via MQ Bridge

- **OTMA Descriptor enhancements**
  - New TYPE=MQSERIES to define WebSphere MQ destination
    - Provides asynchronous callout and messaging support (DL/I ISRT ALTPCB)
  - New option to allow exits to be called to override descriptor
    - Applies to all destination descriptors

Benefits

- Eliminates need to write an OTMA user exit to recognize an MQ destination
- Simplifies integration and improves usability

IMS Java Dependent Region use of ESAF

- **Allow Java Dependent regions to use the External Subsystem Attach Facility (ESAF)**
- **Allows connections for DB2 to be consistent across all region types**
- **Allows access to other subsystems such as WebSphere MQ**
- **Eliminates the need to use z/OS Resource Recovery Services (RRS) Attach for DB2**

Benefits

- Allows JMS access to MQ from Java
- Allows MQ access from COBOL and PL/I
- Simplifies external subsystem definitions
- Improved performance for DB2 due to eliminating extra signon processing

IMS 13 Core Capabilities

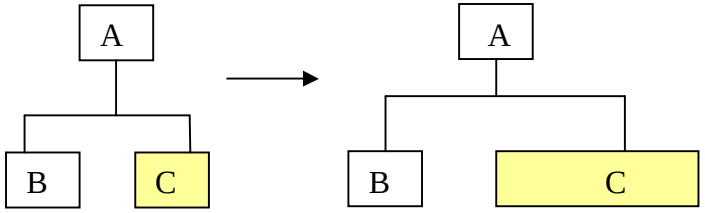
High Availability Large Database Alter

- **Change the structure of an IMS High Availability Large Database (HALDB) without a DB outage**
  - Add a new field to space at the end of an existing segment
  - Increase the length of an existing segment
  - Define new fields that redefine (overlay) existing fields and space in an existing segment
- **Built on HALDB Online Reorganization – no unload/reload required**
  - INIT OLREORG NAME(*masterdb*) OPTION(ALTER)
  - TERM OLREORG

Benefits

- Improves IMS HALDB availability by providing structure changes without taking the database offline
- Provides flexibility in rolling database changes into the system

Improves DB Availability



Fast Path Data Entry Database (DEDB) Alter

- **Allows DEDB Area changes without unload/reload of the area**
  - Dynamic change for UOW and ROOT parameters of an existing Area
  - Replace the randomizer

Eliminates DB Outage

- **Provides new DEDB dynamic change utility**
  - Runs as a standard Fast Path utility
  - Area remains online
- **Requires the use of a two-stage randomizer allowing Areas to be processed individually**
- **Supports Virtual Storage Option (VSO) Areas if /VUNLOAD is done before DEDB Alter is executed**

Benefits

- Improves DEDB Area availability by providing definitional changes without taking the Area offline
- Provides flexibility in rolling Area changes into the system

Database Versioning

Usability

- **Allows programs to use different versions of the same physical database**
  - Multiple views of the physical data maintained in the IMS Catalog
  - Existing applications can remain unchanged when the physical structure of the database changes
  - Recompile just those programs referencing changed fields/segment
  - Applies to **Full Function DB, HALDB, Fast Path DEDB**
  - Supports database types: **HDAM, HIDAM, PHDAM, PHIDAM, DEDB**

- **Database Versioning supports the following database structure changes**
  - For all supported database types
    - Increasing the length of a segment
    - Adding a new field to space at the end of a segment
  - For Full-Function and HALDB database types
    - Adding new field(s) that remap existing field(s) and space at the end of a segment

Benefits

- Provides greater flexibility in rolling out new versions of programs and databases
- Allows new programs to get out faster without waiting for all programs to be updated to the new database structure

Increase Number of Concurrent Application Threads

- **Increase the limit of concurrent application threads to 4095**
- **Limit applies to the total number of combined:**
  - Dependent Regions
  - CICS/DBCTL threads
  - Open Database Access (ODBA) threads
- **Change to MAXPST parameter on IMS control region**

Scalability

Benefits

- Increased capacity and scalability for IMS systems
- Allows vertical growth
- More dependent regions for use with synchronous callout and program switch

4 Times More Applications!

Refreshable User Exits

Eliminates System Outages

- **Refresh user exits without an IMS system outage**
- **Defines exit "types" to support a list of exit names**
  - BSEX - DFSBSEX0 (Build Security Environment Exit)
  - LOGEDIT - DFSFLGE0 (Log Edit Exit)
  - LOGWRT - DFSFLGX0 (Log Write Exit)
  - NDMX - DFSNDMX0 (Non-Discardable Message Exit)
  - RASE - DFSRAS00 (Resource Access Security Exit)
  - OTMAIOED - DFSYIOE0 (OTMA Input/Output Edit Exit)
  - OTMARTUX - DFSYRTUX (OTMA Resume Tpipe Security Exit)
  - OTMAYPRX - DFSYPRX0 (OTMA Destination Resolution Exit)

Benefits

- Improves availability
- Simplifies user exit management

IMS Connect Enhancements

- **Enhancements for ALL users**
  - Dynamically CREATE IMS Connect resources through commands
    - For PORT and DATASTORE

Availability

  - Reporting of overall health to Workload Manager (WLM)

Scalability

  - Configurable TCP/IP backlog (queue) size
  - Automatically refresh cached userids by listening to RACF events (ENF signals)

Security

  - Expanded Recorder Trace Records for external trace
    - For TCP/IP and SCI interactions

Usability

Benefits

- Provide better resiliency, and make IMS Connect easier to use and manage

IMS Connect Enhancements for SOAP Gateway

- **Enhancements specifically for IMS SOAP Gateway users**
  - Query support for XML Converters
  - Ability to increase the number of Converters that can be loaded
  - Automatic restart of the Language Environment when an XML converter ABENDs
  - Automatic refresh of the BPE User Exit for the XML Adapters after the ABEND limit (ABLIM) has been reached

Usability

Benefits

- Provide better resiliency
- Improved efficiencies during error conditions
  - Eliminates IMS Connect restart and user interactions

Scalability

Eliminates IMS Connect Outages

IMS 13 at a Glance

- Database Management
  - HALDB Alter
  - DEDB Alter
  - Database Versioning
- Transaction Management and Connectivity
  - Synchronous Program Switch
  - OTMA Descriptor Support for WebSphere MQ Bridge
  - OTMA Early Termination Notification
  - OTMA Enhancements
  - ISC over TCP/IP
  - IMS Shared Queues Local First Enh
  - IMS Connect SOAP Gateway Enh

- **Systems Management**
  - Reduce TCO
  - Increase concurrent applications
  - Elimination of SECURITY Macro
  - Standalone Security User Exits
  - Log Latch Reduction
  - User Exit Enhancements
  - JDR support for ESAF
  - DIAG Command Enhancements
  - IMS Connect Enhancements
- **Migration and Coexistence:**
  - DBRC: Allow IMS 11 and IMS 12 migration to IMS 13
  - Syntax Checker: Support for new and changed parameters

And More to Come!

Prerequisites

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IMS 13 Software Prerequisites *

- **IMS 13 Minimum Release Levels**
  - **z/OS V1R13 (5694-A01)**
    - RACF (included in separately orderable SecureWay Security Server), or equivalent, if security is used
    - High Level Assembler Toolkit Release 5 (5696-234)
    - APARs / PTFs
      - OA39392 / UA66823, OA36172/UA61786

***subject to change**

IMS 13 Software Prerequisites *

- **Other prerequisites for *optional* line items:**
  - Database Versioning requires the IMS Catalog
  - Java Dependent Regions require JDK 6.0.1 or later
  - IMS Universal Drivers require (depending on environment):
    - IBM JDK 6.0.1 or later
    - DB2 V9 or later (when used with DB2)
    - WebSphere Application Server V7 or later (when used with WAS)
    - CICS V4.1 or later (when used with CICS)

- **Other middleware requirements**
  - IRLM 2.3
  - DB2 9 or later
  - CICS 3.2 or later
    - ISC using TCP/IP requires CICS 5.1
  - WebSphere MQ V7.0.1 or later

* subject to change

IMS 13 Hardware Prerequisites

- **IMS 11,12 and 13 run *only* on 64 bit Processors running in z/Architecture mode that supports the Long Displacement Facility**
  - ESA mode is not supported by IMS 11, 12, or 13
  - For a list of System z machines see:
    - www.ibm.com/systems/z/hardware/
  - ➔ z900 machines must be at GA2 level (microcode level 3G or later)

- **Sysplex Data Sharing (including Data Caching and VSO Data Sharing)**
  - Coupling Facility (CF) level 9, or later
- **Shared Queues and Shared EMH support**
  - Coupling Facility level 9 or later
  - System-managed CF Duplexing
    - CF level 12, or later and bidirectional CF to CF links
- **EAV support for non-VSAM data sets**
    - EAVs are supported on DS8000 at microcode level R4.0 via bundle 64.0.175.0 (Sept 2008) or higher

IMS 11, 12 and 13 Requires a System z machine running in z/Architecture mode

IMS 13 Migration and Coexistence Considerations

- **IMS 13 supports migration/coexistence for IMS 11 and IMS 12**
  - DBRC Migration/Coexistence SPEs
    - IMS 11: APAR PM53134 / UK80026
    - IMS 12: APAR PM53139 / UK80027

- **IMS 12 is the last release to support the SECURITY system generation macro**
  - Security Migration/Coexistence SPEs
    - Allows RCLASS and SECCNT to be coded via PROCLIB members prior to IMS 13
    - IMS 11: PM48203/UK74050
      PM72199/UK82616
    - IMS 12: PM48204/UK74051
      PM73558/UK82617
  - 3 security exits no longer in IMS Nucleus - now standalone only
    - DFSCSGN0, DFSCTRN0, DFSCTSE0
    - DFSCSGN0 is now called at IMS initialization

- **IMS 13 supports RSR migration/coexistence from/with V11 and V12**

IMS 13 Packaging

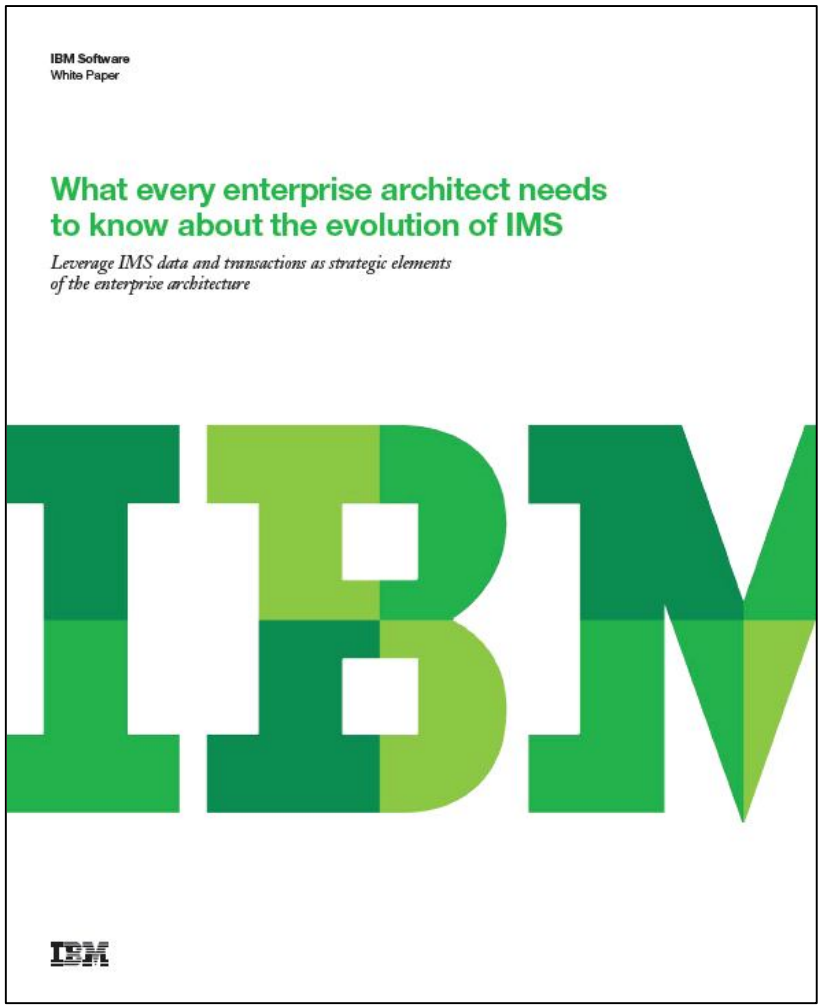
- **IMS 13 Program Number: 5635-A04**
- **FMIDs**
  - HMK1300 IMS System Services
  - JMK1301 IMS Database Manager
  - JMK1302 IMS Transaction Manager
  - JMK1303 IMS ETO
  - JMK1304 IMS Recovery Level Tracker
  - JMK1305 IMS Database Level Tracker
  - JMK1306 IMS Java on Demand
  - HIR2230 IRLM 2.3

WRAP UP

IMS Strategic Objectives

- **Reduce Total Cost of Ownership**
  - Reduce MIPS usage
  - Advanced autonomics – IMS is self-managing and self-tuning
- **Extend the lead in availability, scalability, and performance**
  - Consistently deliver IMS capacity limits that are well beyond customer needs
  - Provide IMS performance metrics that help you grow your business securely
- **Extend the lifecycle of IMS applications and transactions**
  - Pervasive integration capabilities enable reuse of trusted IMS resources
- **Enable high-volume transaction processing for next wave of applications**
  - Big Data, next gen Web Services, Cloud, Mobile and more

Two New IMS White Papers



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