



## IMS 14 Transaction Manager (TM) and System Enhancements

**SHARE Session 17756**

Nancy Stein - [ngstein@us.ibm.com](mailto:ngstein@us.ibm.com)

Suzie Wendler - [wendler@us.ibm.com](mailto:wendler@us.ibm.com)



*zGrowth IMS Team - Washington Systems Center*

*August 13, 2015*



SHARE is an independent volunteer-run information technology association  
that provides education, professional networking and industry influence.



# IMS 14 - Strategies

## **Agility**

- DEDB Alter enhancements
- User Exit enhancements
- IMS Connect Command enhancements
- OTMA Descriptor enhancements
- Dynamic MSC

## **Application Deployment/Management**

- Catalog - DDL interface
- IMS Management of ACBs
- Catalog Audit Trail
- ODBM Accounting
- Native SQL enhancements
- Cascaded Transaction Support
- DL/I ICAL support for control data
- Dynamic Refresh of (P)WFI regions

## **IMS & DB2**

- FDBR Resolve In-doubt Notification Exit enh
- ESAF Subsystem Definition enhancement
- ESAF Associate Thread Exit

## **Business Growth**

- OSAM DEB 24-bit storage VSCR
- OSAM HALDBs 8G support
- Automatic SDEP Buffer Management
- Fast Path 64-bit for high speed utilities
- OTMA TPIPE parallelism

## **Infrastructure**

- DBRC Migration and Coexistence
- DBRC REPAIR Command
- Reduced TCO enhancements
- IMS Repository enhancements
- 64-bit Storage Manager
- OTMA enhancements
- APPC Flood Control
- ISC VTAM Enhancement for ERP messages
- Shared Queues Overflow protection

# Transaction Manager Enhancements

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Cascaded Transaction Support

- **Challenge Addressed**

- For 2-phase-commit (SYNCLVL=SYNCPT), IMS Connect and the IMS Control Region must be on the same LPAR.
  - Otherwise IMS rejects the transaction with an error

**Target Market:**

**IMS TM Resource Adapter users who need IMS Connect and the IMS Control Region to run on different LPARS**

**Discussed in the application section**

- **Solution**

- Allow a Global Transaction using the IMS TM Resource Adapter to be spread across IMS Connect and an IMS Control region that reside on different LPARs

- **Business Value**

- Increases flexibility of IMS configuration across LPARs
  - Additional options for workload balancing
- Increases availability by allowing IMS Connect to route to an IMS on another LPAR
  - Useful when the IMS on the LPAR with IMS Connect is unavailable

# DL/I ICAL Support for Control Data

- **Challenge Addressed**

- ICAL DL/I call needs to support various user-provided control information, unlimited converter name override for soap messages, and unique security token for end client

**Target Market:**

IMS customers who use synchronous callout with the ICAL DL/I call

Discussed in the application section

- **Solution**

- Add a new optional control data area to the ICAL DL/I call so that any type of control data can be specified and passed to IMS Connect and its clients
  - E.g., with SOAP Gateway support, IMS Connect will be able to override the XML converter for the outbound message

- **Business Value**

- Provides flexibility for callout messages with additional control-type of data
  - E.g., XML converter override, security credentials, endpoint information
    - Strengthens callout security with the security token included in control data
    - Reduce the number of OTMA destination descriptors in the system due to unique converter names

# OTMA TPIPE Parallelism

Target Market:

IMS customers with callout applications  
that use OTMA and IMS Connect



- **Challenge Addressed**

- Queuing on TPIPEs which affects performance and throughput
  - CM0 output, including callout msgs require ACK before next
  - Only one Resume TPIPE (RT) can be active for any given TPIPE
    - Other Resume TPIPEs are queued until active RT terminates
  - Multiple IMS Applications issuing DL/I ICAL to a single TPIPE
    - TPIPE serialization makes them wait longer, holding the dependent regions, increasing region occupancy and transaction response times

- **Solution**

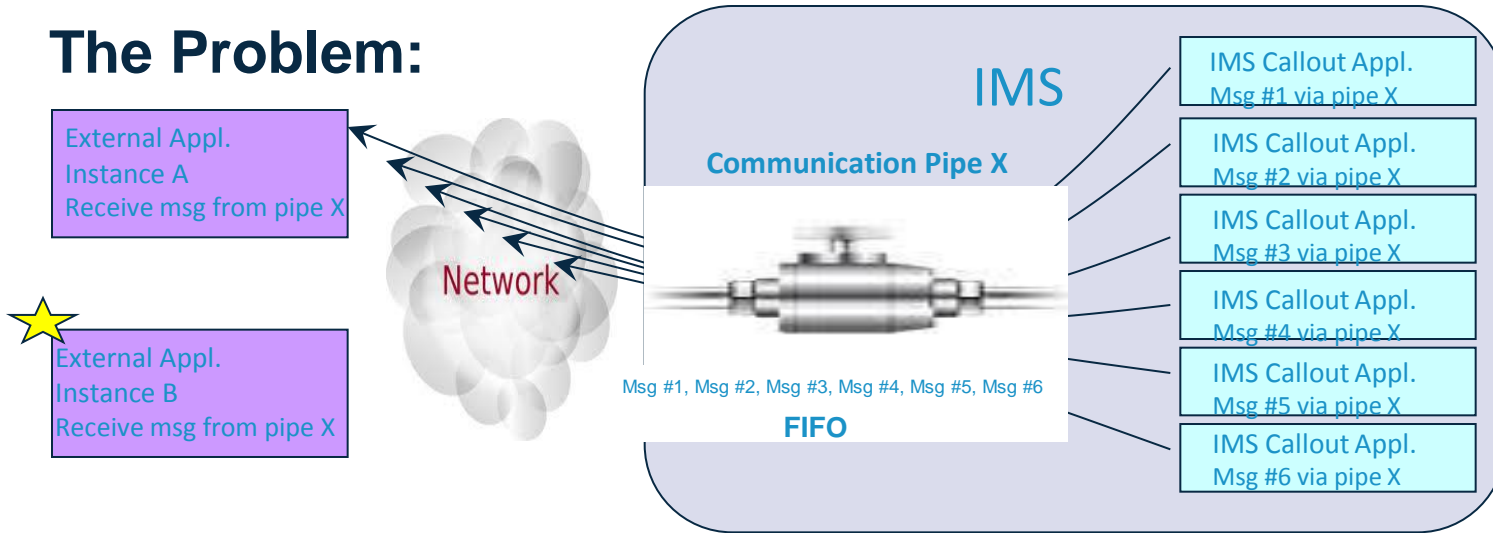
- Allow multiple active Resume TPIPEs for a single TPIPE
  - Can be set by OTMA or IMS Connect
- IMS and IMS Connect command changes for display and management

- **Business Value**

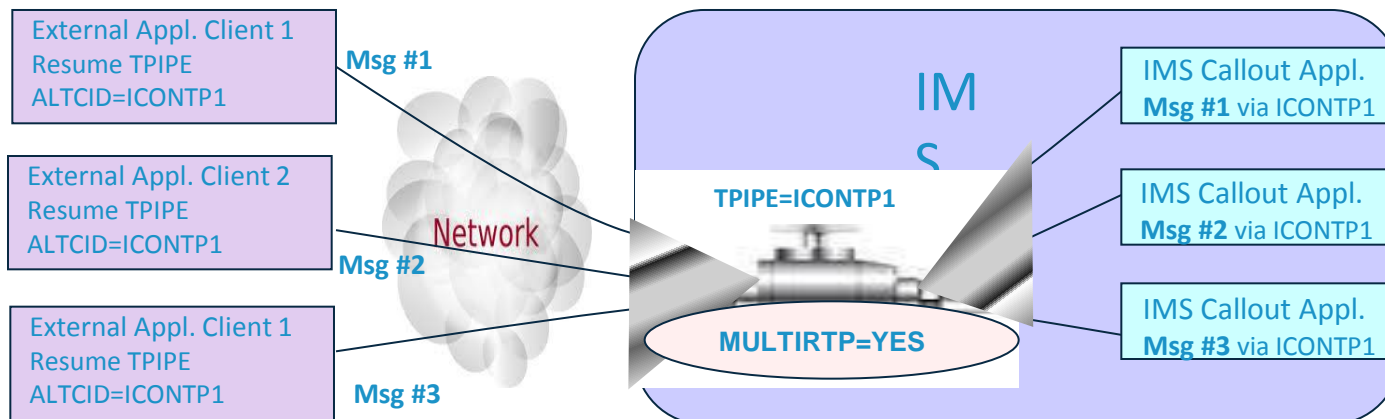
- Potential reduction in application wait time for synchronous callout to an external server
- Potential throughput improvement for asynchronous message delivery
- Provide additional Resume TPIPEs for failover; throughput or workload balancing

# OTMA TPIPE Parallelism

## The Problem:



## The Solution with TPIPE Parallelism:



# OTMA Descriptor Enhancements

Target Market:

All OTMA users

- **Challenge Addressed**

- Unable to scale past the fixed number of destination and member descriptors
  - IMS outage is required to add or change member descriptors

- **Solution**

- Allow both destination and member descriptors to be allocated dynamically
  - Eliminate fixed storage allocation at startup
  - Default limits are the same - 255 member / 510 destination
  - Can increase limits using DFSOTMA member descriptor (up to 4095)

- **Business Value**

- Reduces ECSA storage usage if fewer descriptors are needed than current limits
- Allows OTMA member descriptors to be added or changed without an IMS outage



# OTMA Enhancements

Target Market:

All OTMA users

- **Challenges Addressed**

- Several customer requirements

- **Solution**

- Allow user specified minimum and maximum limits for dynamic SAPs (18-255) to prevent selective dispatching for OTMA client (OIM) TCBs
- Listen for RACF ENF 71 messages to allow dynamic refresh of ACEE cache
- New OTMASE option for Join (J) security to indicate who can access OTMA, same as None (N) but provides RACF connection security (client-bid)
- QUERY OTMATI SHOW(CONVID) enhancement to show conversation ID for OTMA transaction instance

# OTMA Enhancements ...

Target Market:

All OTMA users

- Solution ...
  - OTMA routing exits DFSYPRX0 | OTMAYPRX and DFSYDRU0 | OTMAYDRU are now passed an ECB
    - Can be used to make system service calls (but be careful!!!)
  - OTMA Input/Output Edit Exit DFSYIOE0 | OTMAIOED receives a copy of the message prefix; it can modify the length or data of a message segment; or it can cancel the segment or whole message.
    - Previous releases received the message segment and OTMA prefix but not the system prefixes

- Business Value
  - Removes performance bottleneck for peak loads
  - Improves storage usage
  - Adds functionality while enabling efficiencies and reducing costs
  - Minimizes of performance bottleneck for peak loads

# Dynamic refresh of (P)WFI regions

- **Challenge Addressed**

- When application changes are rolled out into an IMS system, all instances of the application need to be refreshed. It is not easy to determine where the applications are running in order to recycle the regions

**Target Market:**

**IMS customers with applications that run programs in PWFI regions or with WFI=Y transactions**

- **Solution**

- **Command to terminate all instances of the application that are waiting for a message**
  - **UPDATE PGM .... START(REFRESH)**
    - Next time the application is scheduled a new copy is loaded
- Applies to message-driven BMP WFI and MPP/JMP (P)WFI regions
  - For a JMP region the JVM is recycled
  - Does not apply to IFP regions
- Preloaded programs in the DFSMPLxx list can only be deleted by recycling the region

- **Business Value**

- Enables faster rollout of application changes with less manual effort
- Reduces data integrity exposures due to missed application changes

# Dynamic MSC

- **Challenges Addressed**

- Eliminate planned outages for MSC definition changes
- Simplify the management and administration of MSC

**Target Market:**

**All IMS MSC customers**

- **Solution**

- **Storage relief**
  - Movement of the MSC control blocks to 31-bit storage
  - **Provides 24-bit storage relief for all MSC users**
- **Simplified enablement of the MSC environment**
  - **New startup parameters to select MSC feature and definition libraries**
    - MSC feature: MSC=N | Y in the DFSPBxxx proclib member
    - SYSID specification in the DFSDFXxx proclib member

# Dynamic MSC...

- **Solution**
  - **Commands enhancements to Create and Delete MSC links dynamically**
    - Use of dynamic definition for MSC is an option, users can continue to use sysgen MSC macros if desired
  - Automatic Export and Automatic Import of MSC definitions to a centralized repository for permanent retention (direction)
- **Business Value**
  - Eliminates planned outages to modify MSC definitions
  - Optionally Remove MSC from SYSGEN
    - Improves usability for cloning IMS's within a IMSplex
  - Reduces 24-bit private storage usage

# ISC VTAM enhancement for ERP messages

- **Challenge Addressed**

- Need the ISC VTAM session to stay active after the originating IMS receives an Error Recovery Procedure (ERP) message from the partner subsystem

Target Market:

All IMS ISC customers  
(CICS-IMS, IMS-IMS)

- **Solution**

- Provide a new option to keep the ISC VTAM session active after receiving an ERP message
  - ERPKPSES=Y | N in DFSDCxxx PROCLIB member

- **Business Value**

- Provides higher connectivity for ISC users

# Shared Queues Overflow Protection

- **Challenge Addressed**

- IMS does not provide enough information for tools to make decisions to prevent the message queue structure from becoming full

**Target Market:**

**All IMS Shared Queues users**

- **Solution**

- Provide information to the Queue Space Notification exit, DFSQSSP0, to indicate how much of the message queue structure is used
- Additional information passed to DFSQSSP0 for both the primary and overflow structures
  - Queue usage – Primary Structure
    - Number of entries and elements - in use
    - Number of entries and elements - total allocated
  - Queue usage – Overflow structure
    - Number of entries and elements - in use
    - Number of entries and elements - total allocated

- **Business Value**

- Vendor tools could provide additional capabilities for message queue overflow protection

# Systems Enhancements

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)



# IMS Connect Command Enhancements

- **Challenges Addressed**

- Unable to dynamically delete PORT and DATASTORE resources
- Unable to determine if certain IMS Connect commands complete successfully
  - Successful completion code but the command has an asynchronous component that does not result in a command response

**Target Market:**

**All IMS Connect users**

- **Solution**

- Introduce DELETE PORT and DATASTORE commands
- Enhance UPDATE PORT and DATASTORE commands to allow changes to selected attributes
- Introduce CREATE and DELETE IMSPLEX commands
- Convert selected IMS Connect commands to complete synchronously
  - Command response would reflect actual command result

- **Business Value**

- Availability is increased by allowing dynamic creates, deletes and updates for selected resources
- Usability is increased by providing a synchronous command response

# IMS Repository Enhancements

- **Challenges Addressed**

- Manual processes are required to harden resource changes to the repository
- Need to remove an IMS from the repository
- Need ability to determine if there are runtime resource definitions that have not been exported to the repository

**Target Market:**

**All IMS customers  
who use the IMSRSC  
repository**

- **Solution**

- Enable AUTOEXPORT to IMSRSC repository from IMS at end of IMS checkpoint
  - Only the resources modified or created since last export (via command or AUTOEXPORT) are updated in the IMSRSC repository
- Provide a /CHE LEAVEPLEX command to allow an IMS to be removed from the Repository
- Provide the ability through a command or utility to show new or modified resource definitions that have not been exported to the IMS repository

- **Business Value**

- Improves usability of the IMS Repository
- Reduces the chance of an IMS terminating without hardening changes to the IMS Repository
- For an IMS that terminates, the user can determine if any resource definitions need to be written to the repository

# ESAF Subsystem Definition Enhancement

- **Challenge Addressed**

- SSM PROCLIB member does not allow a subsystem type to be specified for any subsystem other than DB2
  - Unable to distinguish MQ or WOLA subsystems from DB2

**Target Market:**

All IMS ESAF users that use WMQ or WebSphere Optimized Local Adapters (WOLA)

- **Solution**

- New subsystem type (SST=) values for MQ and WOLA
  - **SST = DB2 | MQ | WOLA**
  - Positional SSM definitions assume SST=DB2
- Commands and log records changed to show SST value for subsystem

- **Business Value**

- Improves usability

# New ESAF Associate Thread Exit

- **Challenge Addressed**

- Multiple applications running in a single dependent region can cause extra overhead with the building and teardown of the DB2 structure for a given transaction instance.

- **Solution**

- **New ESAF Associate Thread exit that can be used by DB2 or other external subsystems** for connection pooling and to determine if the create thread and terminate thread exit processing is required
- External subsystems could use this exit in other ways
- The new exit gets control prior to the signon exit when signon is required

**Target Market:**

**All IMS External Subsystem Attach Facility (ESAF) users with applications that access DB2 that schedule multiple applications within a single dependent region that encounter performance overhead from the create thread and terminate thread calls to DB2**

- **Business Value**

- Can improve performance by eliminating overhead from excessive creation and teardown of structures for SQL processing by DB2

# Reduced Total Cost of Ownership Enhancements

## ▪ Challenge Addressed

- Continue the effort of reducing the IMS TCO while maintaining the IMS standard quality of service?

Target Market:

All IMS customers

## • Solution: the following items are included in IMS 14

- z9® processor enforced as lowest-level hardware
- IMS exploits z9® instructions where appropriate
- Remove BMP-inserted transaction message restriction for SQ “local-first” processing
- New 4518 “individual TCB” dispatcher statistics record
- Add 32K and 48K buffer sizes in CQS interface buffer manager

# Reduced Total Cost of Ownership Enhancements

- **Solution...**
  - Miscellaneous Logger performance fixes
  - Optimized OTMA Callable Interface used by WOLA
  - OTMA send-only with reroute optimization
  - Call DFSYLUS0 directly to avoid pass-thru call from DFS6LUS0 to DFSYLUS0

- **Business Value**
  - Continue to drive down the cost of CPU when running IMS

# User Exit Enhancements

- **Challenges Addressed**

- Need to take an IMS outage to refresh DFSAOE00
- Multiple vendor tools can replace/extend the IMS Monitor and need a clearly defined runtime entry point

**Target Market:**

**All IMS Customers using DFSAOE00 user exit or the IMS Monitor (or a similar tool).**

- **Solution**

- Additional support for enhanced user exit services introduced in earlier releases to include
  - Type-2 AOI User Exit (AOIE - DFSAOE00)
  - New IMS Monitor User Exit (IMSMON)

- **Business Value**

- Increases availability for IMS
- Improves usability for tools that provide monitor functions

# New 64-bit Storage Manager

- **Challenge Addressed**

- IMS components are using 64-bit storage to help alleviate below the bar storage constraints but there is no common service
  - Each IMS component must manage its own 64-bit storage

**Target Market:**

**Internal IMS components – could be any type of external user depending on which functions use it**

- **Solution**

- **Provide a systems service to manage IMS storage obtained above the bar**
  - The following IMS 14 line items plan to use the new 64-bit Storage Manager:
    - IMS management of ACBs
    - Fast Path 64-bit Follow-on for HSSP and HSRE Utilities

- **Business Value**

- Eliminates duplicate code spread throughout IMS. It also provides a central component to update in order to exploit new hardware and z/OS enhancements.



# IMS Prerequisites, Migration and Coexistence

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# IMS 14 Prerequisites

- Minimum level of Operating System - z/OS 2.1
  - z/OS 1.13 would be supported for QPP customers through EOS (September, 2016)
  -
- System z hardware - z9 or newer
  - z/OS 2.1 runs on a minimum of z9
  - Older machine types will not be supported
- Other software and hardware prerequisites are TBD
  - Java Dependent Regions require JDK 7 or later
  - IRLM 2.3
  - DB2 10 or later
  - CICS 4.1 or later
    - ISC using TCP/IP requires CICS 5.1
  - WebSphere MQ V7.0.1 or later
  - WebSphere Application Server 8.5
  - COBOL 5.1 or later – for Native SQL
  - RDz V9.0.1.1 or later – for SOAP Gateway

# IMS 14 Migration

- IMS 14 supports migration/coexistence for IMS 12 and IMS 13
  - DBRC Migration/Coexistence SPEs
    - IMS V12 – APAR PI10131
    - IMS V13 – APAR PI10132
  - RSR Migration/Coexistence
- OTMA TPIPE Parallelism Coexistence
  - To allow IMS Connect 12 or 13 to work with IMS 14 MULTIRTP IMS Connect previous versions require compatibility fixes
    - IMS Connect V12 PM93880 / UK98633
    - IMS Connect V13 PM93878 / UK98632
    - Requires MULTIRTP enabled through OTMA Member descriptors