What's New in IMS:
## Important News You May Have Missed

Data Management

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Introduction

- **For the past few years, the IMS developers in the Silicon Valley Lab have produced a steady number of enhancements and new functions that were not announced as part of a new IMS release**

  ▶ Made available as PTFs

- **Consequently, they have slipped quietly into the product, and may have escaped your notice**

  ▶ Quite often, PTFs have also been retrofitted to earlier releases than the target release

- **Some of these enhancements are automatically available and require no user action to activate them**

  ▶ You may well be exploiting them without realising it

- **Other enhancements require use of commands or setting parameters to exploit the new function**

- **Both types of enhancement are covered in this presentation**

Agenda

- **General IMS Facilities**

- **HALDB**

- **DEDB**

- **DBRC**

- **Data Base Sharing and Shared Queues**

- **IMS Java**

- **IMS Connectivity**

- **CSL**

- **Planned Enhancements for IMS 10**
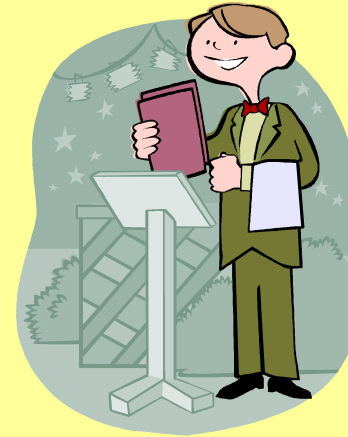
General IMS Facilities

General IMS Facilities - Topics

- **DL/1 RLSE (Release Locks) Call**

- **DL/1 ICAL Call (Synchronous Callout)**

- **Batch Exit (DFSISVI0)**

- **Log Data Edit Exit**

- **Enhanced DFSMSCE0 Exit Function**

- **Enhanced /DIAGNOSE and /DIS ACTIVE Commands**

- **Image Copy 2 Enhanced SMF Accounting**

- **KBLA Enhancements**

- **Physical Sequential Enhanced Data Integrity**

- **Support of Extended Address Volumes**

- **New Execution Parameters**

DL/1 RLSE Call

- **PK24342 (IMS 9), PK41780 (IMS 10)**

- **Requirement:**
  - Sometimes, an application can unnecessarily hold read-locks for "relatively long" times
  - Before this APAR, the programmer had to use tricks to release these locks
    - Use PCB to go to the end of the database and receive a 'GB' status code
    - GU an artificial or non-existent root
    - In BMP, take a "premature" CHKP

- **Solution**
  - New DL/1 call – RLSE - to release locks except those held for updates

- **Benefits:**
  - Eliminate need for programmers to use "tricks" to release locks
  - Minimise contention for non-updated data

DL/1 RLSE Call …

- **Uses DB PCB, or AIB referencing a DB PCB**

- **If Full Function DB PCB**
  - ▸ Releases locks for unmodified data for this PCB only
    - • Database position lock(s)
  - ▸ Does not release locks protecting updates

- **If Fast Path DB PCB**
  - ▸ Releases all FP locks for unmodified data
    - • Including those held for other FP DB PCBs
  - ▸ Does not release locks protecting updates

- **Database position is lost for the affected PCB(s)**
  - ▸ A subsequent unqualified Get Call would return the first segment in the database

DL/1 RLSE Call …

- **RLSE call format**

  ▸ PCB format

  ```
  RLSE pcb

    pcb - specifies a DB pcb
  ```

  ▸ AIB format

  ```
  RLSE aib

    aib - specifies the AIB for the call

          AIBRSNM1 (resource name) must contain the
          name of a DB PCB
  ```

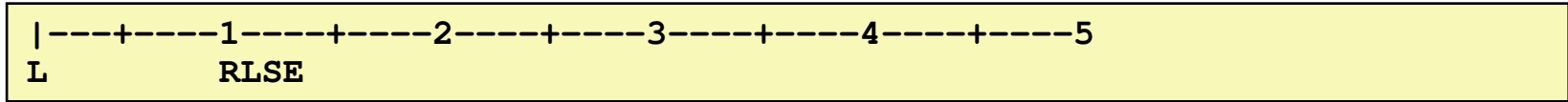- **COBOL example**

  ```
  CALL 'CBLTDLI' USING FUNC-RLSE DB-PCB-MAST.
  ```
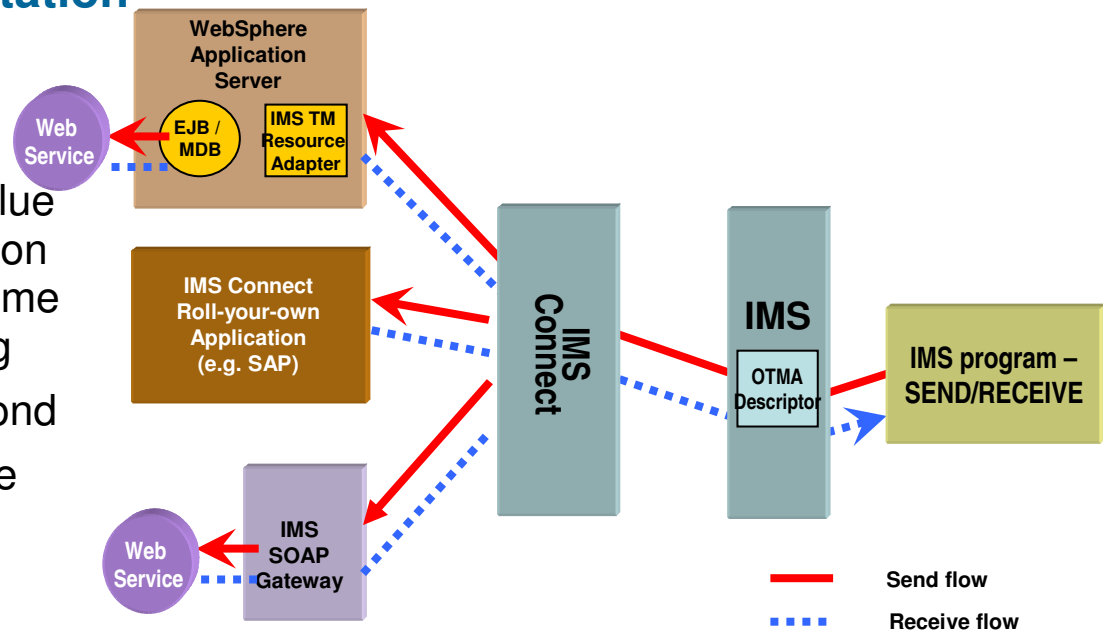
- **DFSDDLT0 example**

 ▸ Use a CALL FUNCTION statement to contain the RLSE function

  ```
  |---+----1----+----2----+----3----+----4----+----5
  L        RLSE
  ```

DL/1 ICAL Call - IMS Synchronous Callout

- **PK71135, PK74168, PK75460, PK75824 (IMS 10)**

- **Enable IMS applications to act as a client to synchronously invoke external applications and Web Services, and wait for responses**
  - ▸ Web Service, EJB or MDB in WAS, RYO TCP/IP application

- **A new DL/1 call, the ICAL SENDRECV synchronous call function, is added to allow an IMS application to communicate with external applications synchronously**

- **Relieve 32K segmentation limitation**
  - ▸ IMS message queue is not used

- **Timeout capability**
  - ▸ Optional user specified timeout value in the DL/1 call or OTMA Destination Routing Descriptor to control the time for synchronous callout processing
    - • Default timeout value is 10-second
  - ▸ Can terminate the request and free the dependent region

- **Supported by DFSDDLT0**

WebSphere Application Server
Web Service
EJB / MDB
IMS TM Resource Adapter

IMS Connect Roll-your-own Application (e.g. SAP)

Web Service
IMS SOAP Gateway

IMS Connect

IMS
OTMA Descriptor

IMS program – SEND/RECEIVE

— Send flow
··· Receive flow

IMS Batch Exit (DFSISVI0)

- **PK03617 (IMS 9)**

- **Exit called in Batch and BMP regions**
  - BMP, DLI, DBB and ULU
  - Called if exists in DFSRESL
  - Called immediately before link to application program

- **No pre-defined purpose**
  - Perhaps initialization of products that run with IMS

- **Input to exit**
  - Address of PCB list
  - Address of execution parameters (PXPARMS)

- **Return code (Reg 15)**
  - 0 - continue program schedule
  - 8 - terminate program schedule
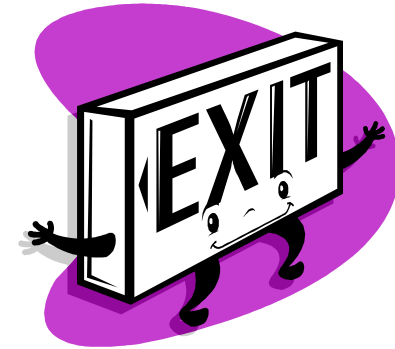
Log Data Editing Exit (DFSFLGE0)

- **PQ97109 (IMS 9)**

- **Allows replacement of sensitive message data in log records as they are created**
  - ▶ Intended for user security purposes
  - ▶ No sensitive data is written to WADS and OLDS (or archived to SLDS)

- **DFSVSMxx control statement specifies record types sent to the exit routine**
  - ▶ **LOGEDIT=(*t1,t2,t3,…*)** or **LOGEDIT=MSGLOG**
  - ▶ Record types allowed:
    - • 01 – input message
    - • 03 – output message
    - • 4002 – message queue checkpoint
    - • 5901 – Fast Path input message
    - • 5903 – Fast Path output message
    - • MSGLOG includes all these record types

Log Data Editing Exit (DFSFLGE0)…

EXIT

- **Exit can not directly edit log data**
  - ▶ Passed read-only copy of log message data
  - ▶ Returns displacement, length and value of replacement data
  - ▶ Can make none, one or multiple changes to each log record
    - • called once per change

- **Probably incompatible with message requeueing facilities of the IMS Tool, Queue Control Facility (QCF)!**
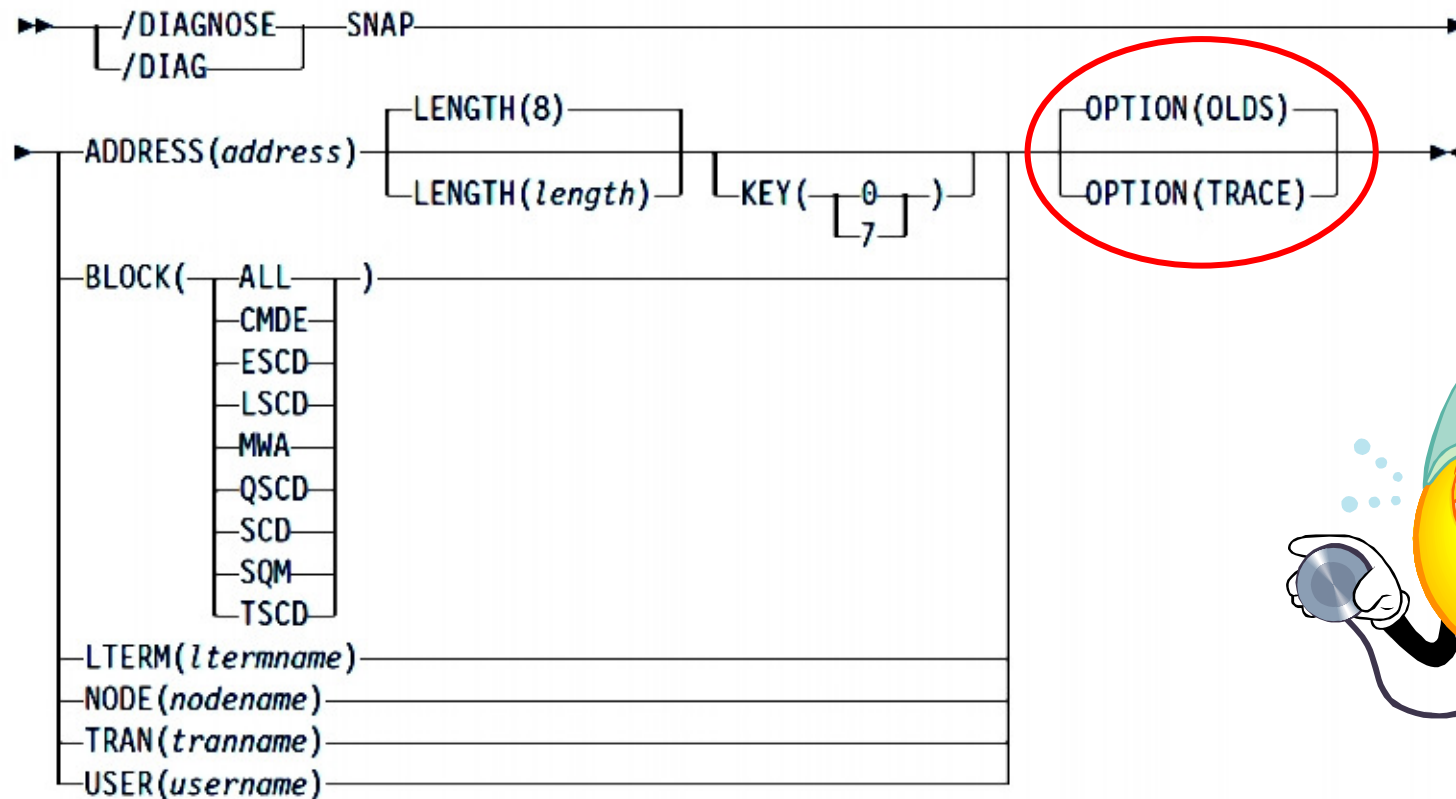
- **Use with care – think about implications for**
  - ▶ /ERE
  - ▶ BUILDQ restart

New DFSMSCE0 Exit Function

- **PK73423 (IMS 10)**

- **The TM and MSC Message Routing and Control User exit routine (DFSMSCE0) is used for Terminal Message Routing, MSC Link Receive processing, and Program Routing**

  ▶ e.g. replaces function of the defunct DFSNPRT0, DFSCMLR0, DFSCMPR0, DFSCMTR0 exits

- **Each function – depending on terminal type, MSC usage, etc – has an associated entry point**

  ▶ Potentially 11 EPs

- **Exit has facilities for building/handling a User-defined Message Prefix**

- **Originally, the exit could include entry points for application message ISRT and CHNG calls**

- **This APAR adds an additional EP for Application Message GU Call**

  ▶ No routing capability (of course!)

  ▶ But can read, update, or create a user-defined message prefix

    • Sample DFSMSCE0 exit supplied with IMS includes an example

/DIAGNOSE Command Output Option

- **PQ91970 (IMS 9)**

- **IMS 9 introduced /DIAGNOSE command to snap data to log**
  - ▶ Provides a way to obtain diagnostic data at any time in 6701 log records

- **PQ91970 adds new option to write data to an external trace data set**

```
►►──┬─/DIAGNOSE─┬──SNAP──────────────────────────────────────────────────────►
    └─/DIAG─────┘

                        ┌─LENGTH(8)──────┐                      ┌─OPTION(OLDS)──┐
►──ADDRESS(address)──────┼────────────────┼──┬──────────────┬────┤              ├──►◄
                        └─LENGTH(length)─┘  └─KEY(─┬─0─┬─)─┘    └─OPTION(TRACE)─┘
                                                    └─7─┘

  ─BLOCK(──┬─ALL──┬──)
           ├─CMDE─┤
           ├─ESCD─┤
           ├─LSCD─┤
           ├─MWA──┤
           ├─QSCD─┤
           ├─SCD──┤
           ├─SQM──┤
           └─TSCD─┘
  ─LTERM(ltermname)──────
  ─NODE(nodename)────────
  ─TRAN(tranname)────────
  └─USER(username)────────
```

New Status Indicators on /DIS ACTIVE

- **PK44568 (IMS 9), PK44497 (IMS 10)**

- **The status of a region's termination will be displayed with one of 5 new status indicators**
  - ▸ After issuing /STOP REG ABDUMP command, or
  - ▸ When a message region itself begins to abnormally terminate

- **Indicators:**
  - ▸ **TERM-ABDUMP PEND**
    - • /STOP REGION ABDUMP command has been issued, but an abnormal termination SRB has not been scheduled because the region is in an ineligible state
  - ▸ **TERM-ABDUMP SCHD**
    - • /STOP REGION ABDUMP command has been issued and an abnormal termination SRB has been scheduled for the region
  - ▸ **TERM-ABDUMP IN-P**
    - • /STOP REGION ABDUMP command has been issued, an SRB has been scheduled for the region, and abnormal termination is in-progress
  - ▸ **TERM-THREAD TERM**
    - • Abnormal termination is in-progress. Either a /STOP REGION ABDUMP command was issued or the region encountered an error and terminated independently
  - ▸ **TERM-BCKOUT IN-P**
    - • Abnormal termination is in-progress and backout processing has been initiated

Proper SMF Accounting of IC2 Utility

- **PK41220 (IMS 9), PK50685 (IMS 10), plus OA20831 (DFSMSDSS)**

- **Problem**

  ▸ Several different IC2 (DFSUDMT0) jobs can run concurrently using the same DFSMSDSS server to perform the copy in the background. This background job does not report any SMF accounting information that can be associated with a particular IC2 execution

- **Solution**

  ▸ IC2 "name" passed to DSS is included in SMF Type 30 records

  ▸ "Name" specified in new IC2 DD statement

```
//DFSMFIMS DD *
TYPE30=JOBNAME
    or
TYPE30='name'
/*
```

KBLA Enhancement

- **PK57245 (IMS 9), PK57354 (IMS 10)**

  ▸ KBLA originally required specification of the two active RECONs

  • Required LIST.RECON information, which could then change!

  ▸ After applying fix, KBLA Option 0.1 can specify <u>either</u> RECONs <u>or</u> Dynamic Allocation Library

  ▸ With Dynamic Allocation RECONs are accessed via DBRC modules, and will automatically use correct active pair

- **PK28737 (IMS 9), PK43150 (IMS 10)**

  ▸ New option (4.8) - 'Database Pointer Error Analysis' – for generating job to analyze cause of pointer errors

- **PK48504 (IMS 9), PK50328 (IMS 10)**

  ▸ New option (4.9) for generating job to analyze DB updating by program

  • e.g. to identify which program has caused a DB to fill

Physical Sequential Enhanced Data Integrity Support

- **PQ83940 (IMS 9)**

- **PS EDI was introduced in z/OS DFSMS V1R5**
  - ▶ PS EDI prevents concurrent opens of
    - • Data sets with DSORG=PS (e.g. OSAM, OLDS, WADS, RDS),
    - • allocated with DISP=SHR,
    - • and opened for output or update

- **Can use WARN or ENFORCE mode** (IFGPSEDI member of SYS1.PARMLIB)
  - ▶ Can also specify data sets to be treated as exceptions

- **Authorized programs may disable function for their data sets**
  - ▶ IMS, with these APARs, disables PS EDI for
    - • OSAM DB datasets
    - • For XRF only - WADS, OLDS, RDS and MSDB DUMP datasets

- **PS EDI is excellent function for other IMS data sets**
  - ▶ OLDS and WADS when not in XRF environment
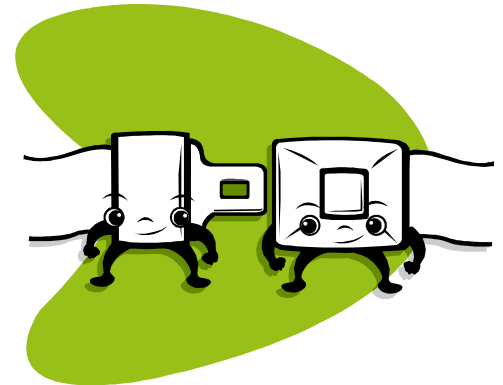
Support of Extended Addressing Volumes

- **z/OS 1.10 provides support for VSAM datasets on DASD volumes with more than 64K Cylinders (Extended Address Volumes)**
  - ▶ First 64K cylinders are managed in Tracks (as per normal)
  - ▶ Remaining space - Extended Addressing Space - is managed in cylinders
    - Requires a different addressing scheme

- **PK72529 (IMS 9), PK72530 (IMS 10)**
  - ▶ IMS Support of Extended Addressing Space datasets on EAVs
    - Full function VSAM DBDSs
      - ESDS and KSDS
    - DEDB AREA datasets
    - DBRC RECONs

- **Additionally need APARs for various IMS DB Tools (e.g. HP Pointer Checker)**

- **Does NOT (yet) support OSAM data bases**
  - ▶ Non-VSAM support will be provided in future releases of z/OS and IMS

Execution Parameters

- **RRS=Y|N** (DFSPBxxx)
  - ▶ Specifies whether or not the registration and connection to RRS should be made
  - ▶ Addresses concern expressed by IMS users over the automatic use of RRS by IMS

- **AOS=Y|N|F** (DFSDCxxx)
  - ▶ PQ88676 (IMS 9)
  - ▶ Controls Synchronous APPC/OTMA support with Shared Queues (RRS MultiSystem Cascaded Transaction support)
    - • e.g. Might <u>need</u> to enforce APPC transactions all run on inputting IMS system
      - – when they are within a protected conversation and share data locks
  - ▶ If one IMS has AOS=N, synchronous support is disabled on <u>all</u> systems with AOS=Y|N
  - ▶ Systems with AOS=F will support synchronous support regardless of capabilities of other IMS systems
    - • User responsibility to ensure transaction processing system has appropriate environment

Execution Parameters …

- **STM=<u>YES</u>|NO**   (DFSDCxxx)
  - ▸ PQ83721 (IMS 9)
  - ▸ Originally, Sysplex Terminal Management (STM) was automatically enabled with IMS Shared Queues when CSL included Resource Managers and a Resource Structure
  - ▸ The STM parameter enables STM to be turned off
    - • For users who want Global Online Change without STM
   - • For users of session manager products that use the same terminal node name multiple times

- **RCVYRESP=YES|<u>NO</u>**   (DFSDCxxx)
  - ▸ PK53423 (IMS 9), PK53989 (IMS 10)
  - ▸ Recoverable Response Mode allows Full Function Response Mode to be maintained <u>within a single IMS system</u> when a static terminal gets logged-off or an ETO User gets signed-off
    - • Next logon/signon will still be in Response Mode
    - • But Response Mode lost at IMS system restart
  - ▸ Ignored when Sysplex Terminal Management is enabled
  - ▸ Requires terminals/users to have SRMDEF=LOCAL (default in DFSDCxxx or set by exit)
    - • SRMDEF=NONE|GLOBAL disables the function

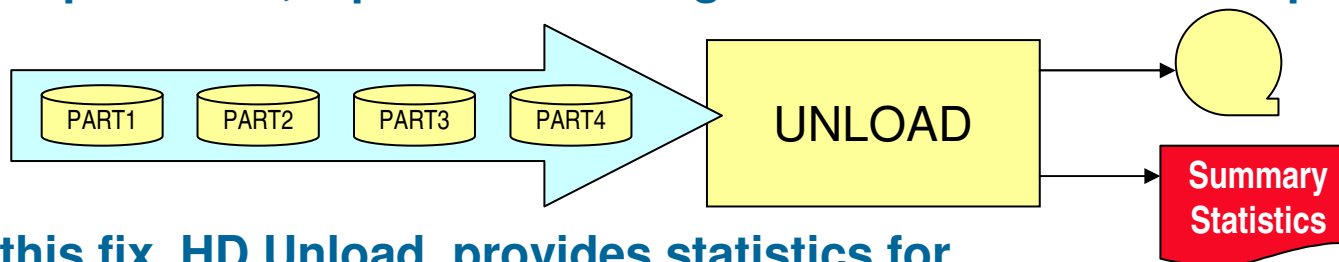# HALDB

HD Reload Supports Concatenated Input

- **PQ87961 (IMS 9)**

- **Originally, to use IMS unload/reload when re-partitioning a HALDB, required *all* partitions to be unloaded *in sequence***
  - ▸ To produce a single unload file as required by HD Reload

- **These APARs add HD Reload support of concatenated input from multiple HD Unloads**

- **Enables all partitions to be unloaded *in parallel***

- **Benefits**
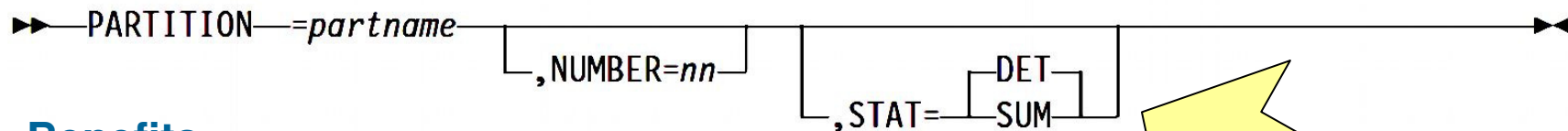 - ▸ Shortens elapsed time of repartitioning unload/reload process

```
UNLOAD
UNLOAD      Unloaded   Unloaded   Unloaded      RELOAD
            partition  partition  partition
UNLOAD
```
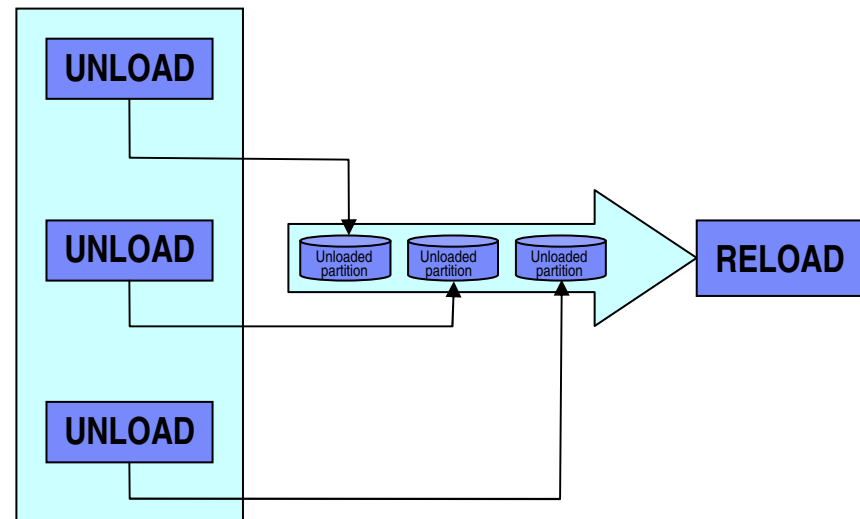
Parallel Unloads

HD Unload Statistics for HALDB Partitions

- **PQ87961 (IMS 9)**

- **Originally, when HD Unload (DFSURGU0) was used to unload multiple HALDB partitions, it produced a single set of totals for all the partitions**

| PART1 | PART2 | PART3 | PART4 | → | UNLOAD |

Summary Statistics

- **With this fix, HD Unload provides statistics for *each* HALDB partition, plus totals for *all* partitions**

```
►►──PARTITION──=partname─────────────────────────────────────────────►◄
                        └─,NUMBER=nn─┘        ┌─DET─┐
                                       └─,STAT=┴─SUM─┘
```

DET (detail) is the default

- **Benefits**
  - ▶ Easily obtainable statistics about the data **in each partition**
    - • Useful in "repartitioning" decisions

- **Statistics are also reported by HD Reload**
  - ▶ With a single input unload file, HD Reload statistics are for each output partition
  - ▶ When reloading with concatenated input unload files, HD Reload reports the same statistics gathered by the Unloads

HD Unload Statistics for HALDB Partitions

```
DFS340I    DATABASE RZL01A    HAS BEEN SUCCESSFULLY UNLOADED BY FUNCTION DU


          PARTITION R1P01              P A R T I T I O N   S T A T I S T I C S
               SEGMENT LEVEL STATISTICS                              RECORD LEVEL STATISTICS
    MAXIMUM      AVERAGE       MAXIMUM      AVERAGE       SEGMENT    SEGMENT    TOTAL SEGMENTS    AVERAGE COUNT PER
    TWINS        TWINS         CHILDREN     CHILDREN      NAME       LEVEL      BY SEGMENT TYPE   DATA BASE RECORD
       1         1.00             5         2.17         S01A1        1            24312                 1.00
       5         2.17             0         0.00         S01A2        2            52757                 2.17

          TOTAL SEGMENTS IN DATA BASE =           77069      AVERAGE DATA BASE RECORD LENGTH =  487  BYTE


          PARTITION R1P02              P A R T I T I O N   S T A T I S T I C S
               SEGMENT LEVEL STATISTICS                              RECORD LEVEL STATISTICS
    MAXIMUM      AVERAGE       MAXIMUM      AVERAGE       SEGMENT    SEGMENT    TOTAL SEGMENTS    AVERAGE COUNT PER
    TWINS        TWINS         CHILDREN     CHILDREN      NAME       LEVEL      BY SEGMENT TYPE   DATA BASE RECORD
       1         1.00             5         2.17         S01A1        1            27443                 1.00
       5         2.17             0         0.00         S01A2        2            57629                 2.10

          TOTAL SEGMENTS IN DATA BASE =           85072      AVERAGE DATA BASE RECORD LENGTH =  492  BYTES


                                       D A T A B A S E   S T A T I S T I C S
               SEGMENT LEVEL STATISTICS                              RECORD LEVEL STATISTICS
    MAXIMUM      AVERAGE       MAXIMUM      AVERAGE       SEGMENT    SEGMENT    TOTAL SEGMENTS    AVERAGE COUNT PER
    TWINS        TWINS         CHILDREN     CHILDREN      NAME       LEVEL      BY SEGMENT TYPE   DATA BASE RECORD
       1         1.00             5         2.17         S01A1        1            51755                 1.00
       5         2.13             0         0.00         S01A2        2           110386                 2.13

          TOTAL SEGMENTS IN DATA BASE =          162141      AVERAGE DATA BASE RECORD LENGTH =  490  BYTES
```

DBRC Retain Position High Key

- **PK07808 (IMS 9)**

- **Problem**

  - When changing a HALDB from using *high keys* to using a *Partition Selection Exit*, the high keys are cleared in RECON requiring the user to re-enter them for use by the Partition Selection Exit

    - **CHANGE.DB DBD(*dbname*) PARTSEL(*partition_selection_exit*)**
    - n x **CHANGE.PART DBD(*dbname*) PART(*part_name*) KEYSTRNG(*string*)**

- **Solution**

  - This APAR leaves the high keys in place, and they become the partition selection strings for potential use by the partition selection exit

- **Note**

  - When changing from selection exit to high keys, these fields will still be cleared in the RECON

  - In <u>both</u> cases, PINIT will still be set for all partitions

HALDB and PROCOPT=GON/GOT and Status GG/BA

- **PK23390 (IMS 9)**

- **Problem**

  ▶ When using PROCOPT=GOx, if an application issues a call for an unavailable partition, it receives a GG status code

    • Normally indicates problems with pointers due to a concurrent update

- **Solution**

  ▶ Treat an unavailable partition in the same way as any other unavailable data situation

  ▶ If program has issued INIT STATUS GROUPA call, return a BA status code

  ▶ If program has not issued INIT call, Abend U3303

    • **DFS3303I** PSB *psb* PCB *pcb* DBD *db* **PARTUNAV** JOBNAME *job* RGN *nnn*

- **PK17579 (IMS 9)**

  ▶ Introduces new DFSVSMxx parameter

    • PPUR=Y|N (Prevent Partition Unavailable Response)

  ▶ With PPUR=Y, if a partition is temporarily unavailable (e.g. /DBD or /STA in progress) –

    • Transaction (with PROCOPT=GOx) will be abended 777 and rescheduled after command completion

      – Not visible to user, no message, and no snap dump

HALDB Range of Partitions Processing

- **PK04880+PQ90255 (IMS 9)**

- **HALDB Range of Partitions Processing**
  - Can restrict a Batch/BMP PCB to one or a consecutive range of partitions
  - Up to 20 PCBs can be specified
  - Uses HALDB statement in DFSHALDB data set
    - Example:
      ```
      //DFSHALDB  DD  *
      HALDB PCB=(CUSTPCB,UK02)
      HALDB PCB=(SAMPLEDB,PART001,NUM=4)
      HALDB PCB=(5,ACCT501,NUM=6)
      /*
      ```

      - Limits PCB with name of CUSTPCB to partition UK02
      - Limits PCB with name of SAMPLEDB to 4 partitions beginning with PART001
      - Limits the 5th Database PCB to 6 partitions beginning with partition ACCT501

Note: The "next partition" is determined using either the high keys defined for the HALDB, or the processing order defined by the Partition Selection Exit

HALDB Online Reorganisation DBRC Enhancements

- **PK36909 + PK43203 (IMS 9), PK54615 + PK54616 (IMS 10)**

- **Originally OLR kept statistics as it was running of the number of bytes moved to the output dataset. This count was lost if the OLR was suspended (by TERM command or IMS restart), and so was reset to zero on resumption of the OLR**

- **These APARs add several enhancements**
  - OLR keeps statistics of **bytes**, **segments** and **roots** moved
  - These statistics are saved to the RECON when OLR is suspended
    - TERM OLR, OLR abend, or IMS normal shutdown
  - Statistics of suspended OLRs can be viewed
    - QRY OLREORG SHOW(BYTES|ALL) ⎫ On any
    - /DIS DB OLR   ⎬ IMS
    - LIST.DB (DBRC command)   ⎭

    ONLINE REORG STATISTICS:
    OLR BYTES MOVED = 245768
    OLR SEGMENTS MOVED = 1397
    OLR ROOT SEGMENTS MOVED = 124

  - Statistics can be changed!
    - CHANGE.DB DBD(*PartDB*) OLRBYTES(*n1*) OLRSEGS(*n2*) OLRROOTS(*n3*)
  - When OLR is resumed, counts are reset to values from RECON
    - Values in RECON are then cleared

HALDB Online Reorganisation DBRC Enhancements …

- **PK27261 (IMS 9)**

- **Originally, when IMS shuts down while OLR is active**
  - ▸ Current Unit of Reorganisation (UOR) is completed (or else backed out at /ERE)
  - ▸ At subsequent /NRE or /ERE, OLR is resumed

- **Some customers found it undesirable to have OLR resumed at this time**

- **This APAR provides a system-wide option to enable or disable automatic restart of OLR**

- **DFSVSMxx Parameter – FFROLR=E|D** (Enable/Disable)

- **FFROLR=D**
  - ▸ When IMS goes down, it still retains ownership of the OLR (in RECON)
  - ▸ At /NRE or /ERE,
    - • Ownership is released
    - • OLR is NOT resumed
    - • IMS issues message
      - – DFS2971W OLR RESUMPTION FAILED FOR NAME=partname RC=04 RS=36
        - – "OLR was terminated because FFROLR=D was specified"

DEDB

DEDB High Speed Reorg Segment Shunting

- **PQ90551 (IMS 9)**

- **High Speed Reorg (HSRE) is Online Reorg for DEDBs**

- **By default, HSRE places segments in available free space just as it does for application ISRTs (using 'most desirable block')**
  - No attempt to leave useful free space for future application activity

- **APARs add option of Segment Shunting for HSRE**
  - Place ALL specified DDEPs in overflow (DOVF if space, else IOVF)
    - Does not place them in RAP CIs

- **Benefits**
  - Retains space in RAP CIs for future inserts
  - Useful when -
    - database record sizes vary due to variable numbers of DDEPs
    - segment type is infrequently accessed

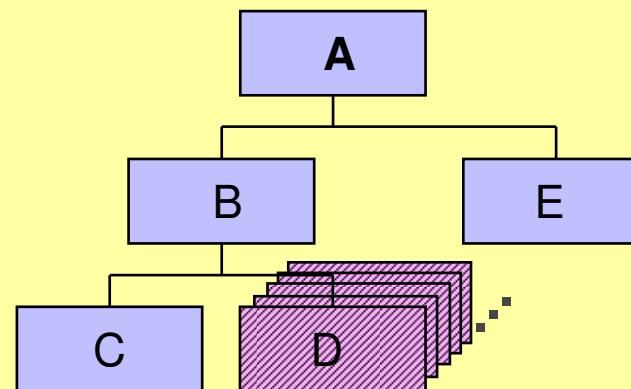- **Example of New Control Statement**

```
//INDD   DD   *
AREA=AR001
DSEG100
DSEG200
AREA=AR002
DSEG100
/*
```

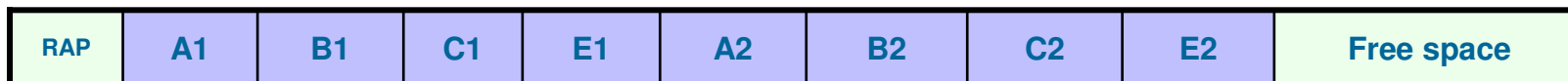Shunts segments DSEG100 and DSEG200 in area AR001, but only segment DSEG100 in area AR002.

DEDB High Speed Reorg Segment Shunting

- **Example of use**

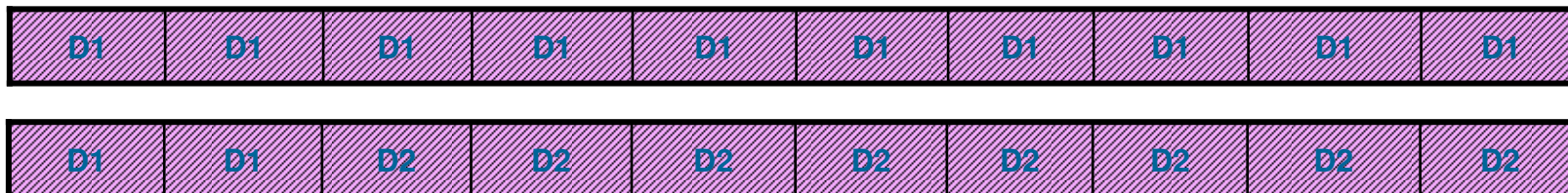- Shunting DDEP D
  - Increases likelihood that E will be in RAP CI with A
  - Increases likelihood that other database records will fit in RAP CI

```
        A
   ┌────┴────┐
   B         E
 ┌─┴─┐
 C   D
```

RAP CI

RAP	A1	B1	C1	E1	A2	B2	C2	E2	Free space

DOVF or IOVF CIs

D1	D1	D1	D1	D1	D1	D1	D1	D1	D1

D1	D1	D2	D2	D2	D2	D2	D2	D2	D2

Non-Recoverable DEDB with SDEPs

- **PK56321 (IMS 10)**

- **IMS 8 introduced Non-Recoverable DEDBs**
  - ▶ Defined in RECONs

- **Not allowed for DEDB with SDEP defined**
  - ▶ Though not checked/detected until DB Authorisation time

- **This APAR allows DEDB with SDEP to be registered as Non-Recoverable**
  - ▶ If IMS attempts REDO processing at emergency restart, XRF, or FDBR action, recovery for that DEDB will be skipped
  - ▶ DFS3711W NONRECOVERABLE DEDB INTEGRITY WARNING DEDB=dbdname AREA=areaname REGISTRATION INCLUDED SDEPS
    - • This message is an indicator that the continued use of a nonrecoverable DEDB with SDEPs may result in errors and ABENDU1026
    - • Issued at each AREA OPEN until action is taken
    - • Should reinitialize AREAs or restore from backups

- **Benefits**
  - ▶ Allows elimination of logging of <u>all</u> DEDB updates
    - • Single 5951 log record to flag that a non-recoverable update has occurred

DEDB DL/1 Calls to Extract DEDB Information

- **PK25294 (IMS 9)**

- **6 new DL/1 calls can be issued to obtain metadata about Data Entry Databases (DEDBs)**
  - ▶ Any online application can take advantage of these calls

Call	Purpose
AREALIST	return a list of areas which are part of the specified DEDB
DEDBINFO	return DEDB information from the DMCB
DEDBSTR	return a list of segments and segment data for a DEDB
AL_LEN	return the minimum length of the I/O area required for an AREALIST call
DI_LEN	return the minimum length of the I/O area required for a DEDBINFO call
DS_LEN	return the minimum length of the I/O area required for an DEDBSTR call

DEDB AREA Access Type

- **PK65582 (IMS 9), PK74403 (IMS 10)**

- **Previously, Access Type was set at the DEDB level - all AREAs of a DEDB had the same Access Type**
  - ▶ `/STA DB name ACCESS=RO|RD|UP|EX`
  - ▶ `UPD DB NAME(name) START(ACCESS) SET(ACCTYPE(BRWS|READ|UPD|EXCL))`
    - Requires all AREAs be unauthorised on command execution system

- **These APARs allows each AREA to have its own Access Type**
  - ▶ At Cold start, each area has access type of the DEDB
  - ▶ AREA access type can not be greater than DEDB access type
    - e.g. DEDB with UPD; AREA can have UPD, READ or BRWS
  - ▶ AREA Access Type can be set only with a type-2 UPDATE command
    - `UPD AREA NAME(area1,area2,ar*) START(ACCESS) SET(ACCTYPE(x))`
  - ▶ DL/1 update call against an AREA in READ or BRWS mode, will get an FH status code
  - ▶ QUERY command can be used to show AREA access type

DBRC

DBRC 'Intent to Reorg' Flag

- **PK15946 (IMS 9)**

- **"Intent to Reorg" is a new flag in DBRC DB record**
  - For Full Function DB only (including HALDB master and partition DB)

- **Set on/off by CHANGE.DB command**
  - CHANGE.DB DBD(name) REORGI | NOREORGI
  - If set for HALDB master DB, it is set for all partitions as well

- **Indicates intent to run an <u>Online Reorg</u> _Tool_ (i.e. <u>not</u> HALDB OLR)**

- **When on, DBRC refuses access to <u>off</u>line reorganisation utilities, HALDB OLR, and Batch jobs**
  - Allows access by online regions

- **Can be set on only if –**
  - No batch jobs authorised to DB
  - OLR is not active or suspended for any partition of the DB

- **Primary users will be tools such as IBM's "IMS Online Reorganisation Facility"**

```
FLAGS:
  BACKOUT NEEDED        =OFF
  READ ONLY             =OFF
  PROHIBIT AUTHORIZATION=OFF

  TRACKING SUSPENDED    =NO
  OFR REQUIRED          =NO
  PARTITION INIT NEEDED =NO
  OLREORG CURSOR ACTIVE =NO
  PARTITION DISABLED    =NO
  ONLINE REORG CAPABLE  =YES
  REORG INTENT          =OFF
```

Extract from RECON Listing

INIT.PART at Remote Recovery Site

- **PK15943 (IMS 9)**

- **Addresses a problem when recovering a HALDB at a remote site, once OLR has been used at the local site**
  - At local site, DBRC will have registered both the A-J,X and the M-V,Y datasets
  - If M-V datasets are active at time of recovery at remote site, they need to be registered in remote RECON
  - There is no way to register the M-V datasets at the remote site

- **Enhanced INIT.PART, primarily for use at remote site**
  - `INIT.PART MVDBDS|NOMVDBDS`
  - MVDBDS causes registration of both A-J and M-V datasets
  - Requires HALDB be flagged as OLR-Capable

RECON I/O Reduction for Signoff

- **PQ99655 + PK01097 (IMS 9)**

- **DBRC Performance Enhancement**
  - ▸ **Reduced RECON I/Os for unauthorising databases during DBRC Signoff**

- **Signoff occurs when an IMS subsystem (batch job, online system, or utility) terminates**
  - ▸ Signoff includes unauthorising databases, areas, and partitions which are authorised to the subsystem

- **Previously, each database/area/partition was unauthorized separately**
  - ▸ Write RECON multiple-update (MUP) record (needed in case of RECON backout)
  - ▸ Update DB and Subsystem records
  - ▸ Delete the MUP record

  > Once per DB/AREA/Partition

- **The new way – all unauthorisations performed together**
  - ▸ Write <u>one</u> RECON MUP record for <u>all</u> databases/areas/partitions
  - ▸ Update DB and Subsystem records
  - ▸ Delete the MUP record

  > Once Only

- **This significantly reduces the number of RECON I/Os required**

RECON I/O Reduction for Signoff …

- **At each logical OPEN of the RECONs, IMS has to check if a MUP record exists** (this does not apply if using IMS 10 Parallel RECON Access)
  - ▶ When it exists, DBRC reads it and backs out failed update of previous user

- **Since the MUP record format is changed by this APAR, <u>ALL</u> DBRC subsystems must have the APAR applied before the new format can be used**

- **Need a way of storing in the RECON an indicator of whether to use the old or the new format MUP records**

- ***Cross DBRC Service Level ID (CDSLID)***
  - ▶ Saved in RECON and displayed with LIST.RECON
  - ▶ Can be changed with CHANGE.RECON CDSLID(value) command
  - ▶ e.g. if CDSLID=1, a function requiring level 2 would not be used

- **A PTF will specify a required CDSLID on a ++HOLD card**
  - ▶ This is the case for the Signoff Performance Enhancement

- **User is required to update CDSLID to activate the new function**
  - ▶ Issue the CHANGE.RECON CDSLID(value) command after the maintenance is <u>applied to all systems</u> which share the RECONs

Change Accumulation Enhancement

- **PK53223 (IMS 10)**

- **Sometimes, a DBRC-generated Change Accum can become "invalid" before it is executed.**

  - ▶ An "image copy might complete" and so create a new CA Purge Time
    - • New Image Copy
    - • OLDS archive after a Concurrent IC finishes
    - • HALDB Online Reorganization
  - ▶ Offline Reorganization might take place

- **This APAR will allow the JCL generated for Change Accumulation to execute using the purge time in the JCL as long as input logs verify, and enable a usable change accumulated log to be created**

- **Generated Time-stamp Change Accum to a point before a subsequent offline reorg will also succeed**

- **Benefit**

  - ▶ Reduces opportunities for problems running Change Accum Utility, especially useful when running CA for a CA Group with many DBDSs

DBRC DELETE.DB Performance Enhancement

- **PK68143 (IMS 10)**

  ‣ Addresses the problem that excessive RECON I/O can occur when a **DELETE.DB** is submitted for a data base with a large number of AREAs or DBDSs that have a large number of associated ALLOC records

    • Some RECON records can get updated multiple times

  ‣ Previously, every update of a RECON record was accompanied by a write (and subsequent delete) of a MUP record (DBRC's RECON backout record)

  ‣ With this fix, only the first update of each record causes a MUP record to be built

Data Base Sharing
and
Shared Queues

IRLM Long Lock WAITs

- **PQ82687+ PK17824 (IMS 9), PK42705 (IMS 10)**

- **When using IRLM, you can specify a Lock WAIT Timeout value**

- **Specified in DFSVSMxx member (or DFSVSAMP DD)**

`LOCKTIME=xxxxx`

- ▸ Time xxxxx in seconds (1 to 32767) applies to all Lock Waits in an online system or batch job step (internally rounded-up to a multiple of deadlock time)
- ▸ When exceeded, application abends with U3310

`LOCKTIME=(xxxxx,STATUS|ABEND,yyyyy,STATUS|ABEND)`

- ▸ Second pair (optional) allows batch/BMP to have different values from message regions
- ▸ xxxxx and yyyyy are timeout values in seconds
- ▸ ABEND indicates timeout causes U3310 abend
- ▸ STATUS indicates to return a BD status code to application

- **In case of U3310 abend**
  - ▸ A dump is not produced
  - ▸ Transaction is discarded (not retried) by IMS TM
  - ▸ TRAN and PROGRAM are <u>not</u> stopped

> - IRLM informs IMS when LOCKTIME reached (IRLM has a default of 5 minutes).
> - IMS builds RMF 79.15 "Long Lock" record
> - If no LOCKTIME specified, this is repeated every minute

Reminder of Other IRLM Enhancements

- **PQ44791 (IRLM 2.1)**

- **IRLM deadlock times may be sub-second**
  - ▸ DEADLOK=(tttt,gdc) execution parameter
  - ▸ Allows deadlock time to be specified in tenths of seconds
    - • Before this APAR, minimum deadlock time was 1 second
  - ▸ Global deadlock cycle is always 1

- **PQ44791 (IRLM 2.1)**
  - ▸ Enables components of IRLM Lock Structure (in Coupling Facility) to be individually sized
    - • Lock Table (explicitly defined)
    - • Record List (remainder of structure)
  - ▸ LTE=mmmm execution parameter
    - • Number of lock table entries (LTE) – in units of 1M (1,048,576)
    - • Should be a power of 2
    - • Default is power of 2 nearest to half the structure size

FDBR Enhancements

- **PQ88192 (IMS 9)**

- **The problem – following an IMS failure:**
  - ▸ If /ERE starts while FDBR is still executing, it can result in data corruption
  - ▸ Previously, the use of ARMRST=Y by FDBR disabled ARM restarts for its IMS

- **These APARs ensure /ERE waits until FDBR completes its recovery, if necessary**
  - ▸ They also allow ARMRST=Y for both IMS and FDBR

- **When FDBR starts recovery, it takes an exclusive global-wide ENQ on a resource-name which includes the failed IMS's IMSID**
  - ▸ FDBR holds this ENQ until it completes the recovery

- **IMS emergency restart begins by issuing Test ENQ on same resource**
  - ▸ If resource already held (by FDBR), IMS waits three seconds and tries again
  - ▸ Continues until FDBR releases ENQ

Non-Recoverable Shared Queue Structures

- **PK50160 (IMS 9), PK54922 (IMS 10)**

- **Allows you to define queue structures as Non-Recoverable**
  - ▶ **CQSSGxxx member** (Global CQS PROCLIB Member)
    - • `STRUCTURE (…, RECOVERABLE=YES|NO, …)`

- **Non-recoverable is perhaps appropriate for test and development systems**

- **Might also be OK for production system if you use system managed duplexing**

- **Non-Recoverable Structure**
  - ▶ Truly not recoverable!
  - ▶ Structure failure causes all sharing CQSs to abend
  - ▶ Still uses Structure Recovery Data Sets (useful for diagnostic purposes)
  - ▶ CQS writes no log records to z/OS log stream
    - • LOGNAME= must still be specified in CQSSGxxx, but it will never get opened or used

Syncplex Support

- **PQ89508 (IMS 9)**

- **At IMS restart, DBRC will not grant authorisation for a database that is currently authorised to a Failed IMS system**

  - ▸ Can result in all DBs requiring manual start after the IMS restart

  - ▸ Situation is worst if multiple IMSs in an IMSPlex all fail together (e.g. power failure)

- **This enhancement provides option for expediting /ERE <u>after a multi-system failure</u>**

  - ▸ **/ERE OPTION SYNCPLEX**

- **OPTION SYNCPLEX causes emergency restart to issue WTOR after back outs and before attempting new work**

  - ▸ DFS3067A IMS *imsid* WAITING FOR SYNCHRONIZATION WITH OTHER FAILED IMS SYSTEMS. REPLY "OK" TO CONTINUE.

    - • This message indicates that this IMS system has released old DBRC authorizations but *has not yet attempted to get new authorizations*

  - ▸ When all IMSs have issued DFS3607A message, operator should reply 'OK' to each WTOR

    - • New authorisations will now succeed

IMS Java

IMS Java

- **PK37843 (IMS 9)**

- **IMS 10 requires SDK V5 for IMS Java Dependent Regions, whereas IMS 9 originally required SDK 1.4**

- **IMS 10 also introduced simplified application coding**
  - Removed need to take explicit Syncpoint in message processing programs
  - Removes need for message program to extend "IMSApplication" class
  - Removes need to call IMS's "begin()" method or to code the "doBegin()" method

- **PK37843 provides**
  - SDK V5 support for IMS 9
  - IMS 10 application facilities for IMS 9

- **Previous IMS java applications will continue to work without change**
  - But should be modified at some point to conform with the new design standards

- **Recommendation: if you are on IMS 9 and plan to start writing JMPs or JBPs, apply PK37843 first.**

IMS Connectivity

OTMA Enhancements

- **Many OTMA enhancements have appeared recently, and more will follow**

- **Includes enhancements to Reconnect, Reroute, Client Options and Sessions, Transaction Expiration and Monitoring, and User Exit support**

- **For example in IMS 10 -**
  - ▶ **PK74017** (Open) - OTMA Transaction Expiration
  - ▶ **PK70458** - OTMA/ICON Message Flood Monitoring
  - ▶ **PK41554** - OTMA Security Refresh By USERID

IMS Connect Performance Enhancement

- **PK57574 (IMS 10)**

- **New hashing mechanism for client ids**
  - ▶ Each port has its own hash table

- **Benefit**
  - ▶ Reduces CPU overhead
  - ▶ Increases throughput

  - ▶ Note: improvement varies based on environment
    - • IMS Connect benchmark in SVL (October 2008) with PK57574 applied
      - – 14,200 transactions per second (on a z10 E56)
      - – 16% reduction in CPU per transaction (compared with previous benchmark)

IMS Connect KeepAlive Enhancement

- **PK72652 (IMS 10)**

- **Exploits z/OS 1.7 facility for TCP/IP KeepAlive function at the port level**

- **IMS Connect TCPIP Configuration statement - new parameter**

  - **PORT=(ID=**portid, **KEEPAV=**nn)

    - ID= defines TCP/IP port number

    - KEEPAV= requests that a signal be sent at the specified interval (seconds)

      - Keeps a long running session active during periods of inactivity and detects when the partner is no longer available

      - Overrides the TCP/IP stack level value for a particular port

      - Default is 0 which turns off the override and reverts to the TCP/IP stack value

- **PORTID= and PORT= statements can be mixed and matched as appropriate**

  - But a specific port can only be defined once

Common Service Layer (CSL)

SPOC Print Options

- **PK50292 (IMS 10)**

- **Allows the user to control the format of printed output for**
  - TSO SPOC Print and Save_As Option (set in SPOC Preferences panel)
  - REXX SPOC (new parameters for CSLULOPT REXX function)
  - Batch SPOC (new execution parameter)
  - CSLULALE Audit Trail print (new parameter of PRINT control statement)

- **The printed output can be formatted in three styles:**
  - WRAP (default)
    - Lines of data are fit to the width of the print file and wrapped to the next line as needed
  - BYCOL
    - Lines of data are grouped together by column. For example, all records that include columns 1-8 are printed on one page, followed by columns 9-14 of same records on next page, and so on
  - BYRSC
    - Lines of data are grouped together by resource. All column headings and values are formatted on one page for as many resources as will fit.

DRD IMPORT and EXPORT Commands

- **PK66682, PK66704 (IMS 10) with preconditioning APARs**

- **Objective is to enable users to be able to -**
  - Explicitly export selected or all resources to a user-defined RDDS
  - Explicitly export all resources to a system RDDS
  - Explicitly import selected or all resources from an RDDS

- **Solution is the IMPORT and EXPORT type-2 commands**

- **These commands will enable several new possibilities, including –**
  - Creating backup of resource definitions
  - Enabling copying of resources from one system to another – e.g. from development to test
  - Starting a test system "empty" and then importing the required resources
  - Etc.

- **Watch for PK78337 (Open) to provide ISPF support**

DRD Maintenance Utilities

- **PK63186 (IMS 10)**

- **IMS 10 already provides RDDS Extraction Utility (DFSURDD0)**
  - ▶ **Generates CREATE commands or Stage 1 Macros from RDDS**

- **This APAR enhances it to list RDDS content**

- **PK71567, PK75794**

- **Additional Utilities including -**
  - ▶ **Create an RDDS** from
    - • MODBLKS data set
  - ▶ **Create an RDDS** from
    - • Log records (checkpoint records + x'22' records)
  - ▶ **Copy an RDDS**

- **Extend "Manage Resources" ISPF application to support these utilities**

MODBLKS	Existing RDDS	IMS Log
↓	↓	↓
DFSURCM0	**DFSURCP0**	**DFSURCL0**
↓	↓	↓
RDDS	**RDDS**	**RDDS**
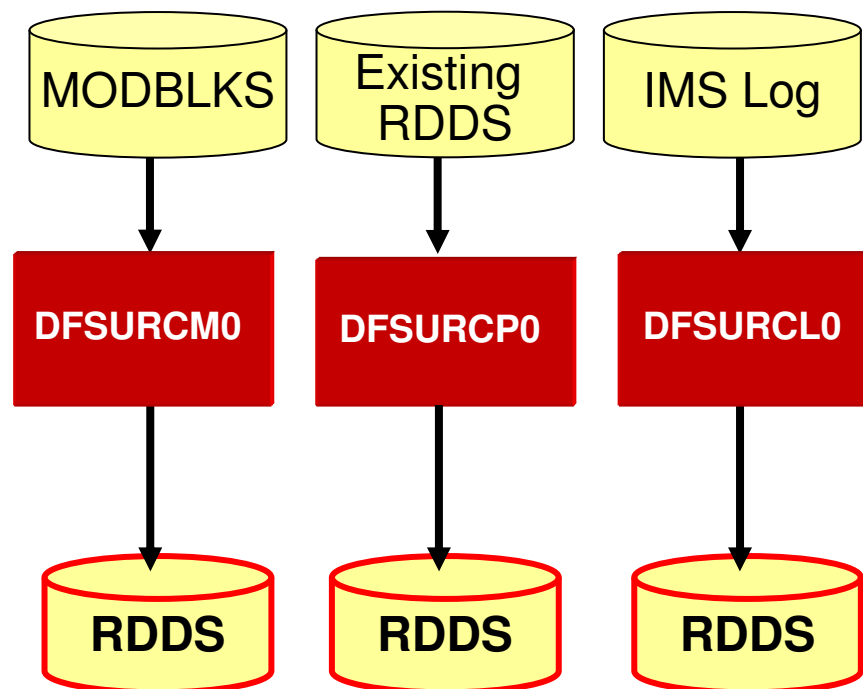
Yet More Planned Enhancements for IMS 10

Additional Items in Plan for IMS 10

- **DB Web Services - PK73190 (Open)**
  - ▸ DLIModel Utility used to generate a Web Service (a Data Access Service) from a DL/1 DB Call
  - ▸ Initial target runtime environment is WAS for System z on same LPAR as IMS

- **IMS Connect API**
  - ▸ Shield IMS Connect client application developers from dealing with complexities of TCP/IP sockets and the IMS Connect protocols

- **IMS SOAP Gateway support of multi-segment messages**
  - ▸ With additional support by IMS Connect

Summary

Summary

- **IMS releases generally come out every two years**
  - ▸ Although IMS 10 was an exception, coming 3 years after IMS 9

- **Customers sometimes want new functions in a more timely manner!**

- **This was "business-as-usual" for the web related components**
  - ▸ Resource adapters, DLIModel Utility

- **New base IMS functions may also now be delivered in between IMS releases**
  - ▸ Via PTF

- **These enhancements don't get formally announced, so it's easy to miss them**
  - ▸ Check for APARs with Symptom = "NEWFUNC", "NEWFUNCTION", or "ENHANCEMENT"
  - ▸ Look on IMS Web site: e.g. Barbara Klein's "What's New" presentations, et al
  - ▸ Release Planning Guide has chapter on <u>previous</u> release enhancements, including those that were not formally announced
    - • e.g. IMS 11 RPG documents twenty IMS 10 enhancements delivered through the "service process"

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