IMS V10 Overview

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IMS V10

- Product Enhancements Topics
  - System Enhancements
  - Dynamic Resource Definition (DRD)
  - System Management Enhancements
  - Transaction Manager and Connectivity Enhancements
  - Database Enhancements
  - Fast Path Enhancements
  - DBRC Enhancements
  - IMS Integration Suite
    - Covered in the "Architecting SOA access to IMS with the IMS Integration Suite" topic
- Migration Considerations

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System Enhancements

- FPCTRL Macro Elimination
- Enhanced Display of System Parameters
- Virtual Storage Constraint Relief
- Sysplex Serial Program Management
- Large Sequential Data Sets
- Log Statistics Analysis and Statistical Analysis Utilities Enhancements
- BPE External Trace
- Abend Search and Notification
- Security Enhancements
- Syntax Checker Enhancements
- Enterprise Workload Manager Support

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FPCTRL System Definition Macro Eliminated

- The system definition FPCTRL macro is ignored
  - Previous releases:
    - Macro was required to enable Fast Path capability
    - Set defaults for Fast Path parameters
- Execution parameters for IMS and DBC procedures
  - FP=Y|N used to enable Fast Path
    - Default is FP=N
  - DBBF=, DBFX=, BSIZ=, and OTHR= used to specify Fast Path parameters

- Benefit
  - Simplifies implementation of Fast Path

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IMS Version 10

Enhanced Display of System Parameters

- DFS1929I message is displayed <u>twice</u>
  - ◆ At initialization
    - Same as previous releases of IMS
    - Displays each system parameter and the user-specified value, or its default value if the user specified nothing
  - ◆ After restart is complete
    - Added in IMS V10
    - Displays actual system parameters that are in effect after reading the log
    - Enhanced information

- Benefits
  - ◆ Provides accurate information about actual parameters used

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VSCR - Savings

- PVT to EPVT
  - ◆ AMODE 31 <u>option</u> for DIRCA control blocks for ODBA and CCTL(CICS)
    - Must be requested on DFSPRP macro to take effect
  - ◆ DIRCA contains the application copy of the PCBs
    - Each ODBA or CCTL address space can have multiple threads
      - • Each thread has its own DIRCA storage
  - ◆ Savings are dependent on the installation
    - DIRCA size * number of threads

- Benefits
  - ◆ Allows larger PSBs and greater number of concurrent threads
  - ◆ Opportunity to move the line between CSA and Private for the LPAR

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Sysplex Serial Program Management (SSPM)

- Optional enforcement of program level serialization across IMSplex
  - SCHDTYP=SERIAL on APPLCTN macro
  - ◆ Previous releases
    - Enforced only within each IMS system
  - ◆ IMS V10
    - Optionally enforced across all IMSs in IMSplex
    - Requires Shared Queues and RM with an RM structure

- Benefits
  - ◆ Only one copy of the IMS TM program will be scheduled across the entire IMSplex
  - ◆ Removes requirement for specialized customer procedures
  - ◆ No program changes or definition changes

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Enhanced Log Record Statistics

- Transaction level statistics (new x'56FA' log record)
  - ◆ Specified 'on' or 'off' for the system in PROCLIB member
    - Commands to set 'on' or 'off' by transaction or program (PSB)
    - Commands are persistent across IMS restarts
  - ◆ Fields in addition to those in the x'07' log record
    - VSAM I/O reads and writes
    - OSAM I/O reads and writes
    - Total ESAF (DB2) calls
    - CPU time in TOD clock format
    - Elapsed time of database I/Os
    - Elapsed wait time for database locks
    - More…

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Enhanced Log Record Statistics

- Additional information in existing log records
  - Application start accounting log record (x'08')
    - Waits for pool space, waits for intent conflicts, scheduling elapsed times
  - Application termination accounting log record (x'07')
    - I/O counts, I/O times, lock wait times, ESAF (DB2) call counts, …
  - CPI-C driven transaction termination log record (x'0A07')
    - Similar to x'07' additions

- Benefits of enhanced log record statistics
  - Improved performance data - by transaction or commit
  - Improved accounting data - by transaction or commit
  - Provides additional accounting and performance data

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Large Sequential Data Sets

- IMS V10 adds large sequential data set support
  - More than 65,535 tracks on <u>one volume</u> for a data set on DASD
  - GSAM/BSAM and OSAM data sets
    - OSAM database data sets
    - Logs
    - Trace data sets
    - Message queue data sets
    - GSAM/BSAM files
- Benefits
  - May be used to avoid multiple volume data sets
  - May be used to create larger OLDS

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System Utilities Enhancements

- Log Transaction Analysis Utility and Statistical Analysis Utility rewritten
  - Support for shared queues
  - Log Merge utility not required for MSC input
  - Support for non-recoverable transactions
  - Single step execution for Statistical Analysis Utility
- Benefits
  - Simplified execution
  - Improved performance
  - Additional capabilities

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BPE External Trace

- Applies to BPE address spaces
  - IMS Connect, CQS, OM, RM, and SCI
- BPE Trace facilities enhancements
  - Writes trace tables to external storage as pages of trace entries are filled
  - Commands to DISPLAY and UPDATE the trace table attributes and settings
  - IPCS support to format and print the trace entries
  - New TCB in the BPE address space for tracing
- Benefits
  - Ability to trace activities over longer time periods
  - Fewer console dumps required
  - More timely access to diagnostic information
  - Minimizes the need to recreate problem scenarios

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IMS Abend Search and Notification

- Notification mechanism for IMS failures
  - E-mails to user-specified recipients
  - Text messages to user-specified cellular devices, …

- Provides direct and real time access to the ABEND information and description
  - Automatic creation of hyperlinks (URLs) to IBM-supplied Internet resources for analyzing and resolving problems
  - Security
    - E-mails are sent internally from the IMS system task to pre-defined e-mail addresses
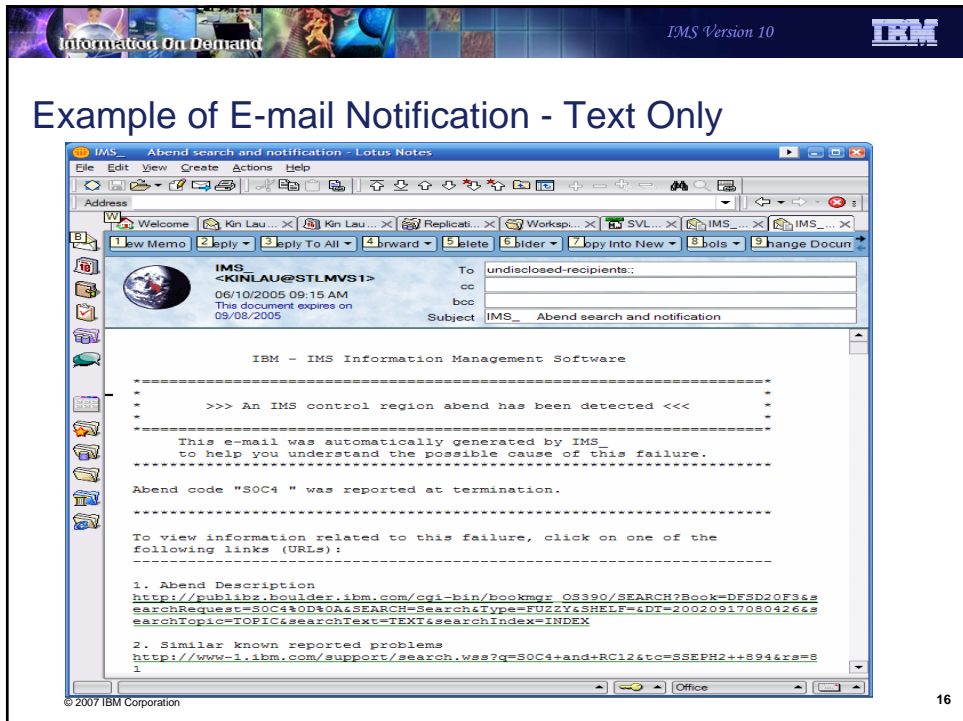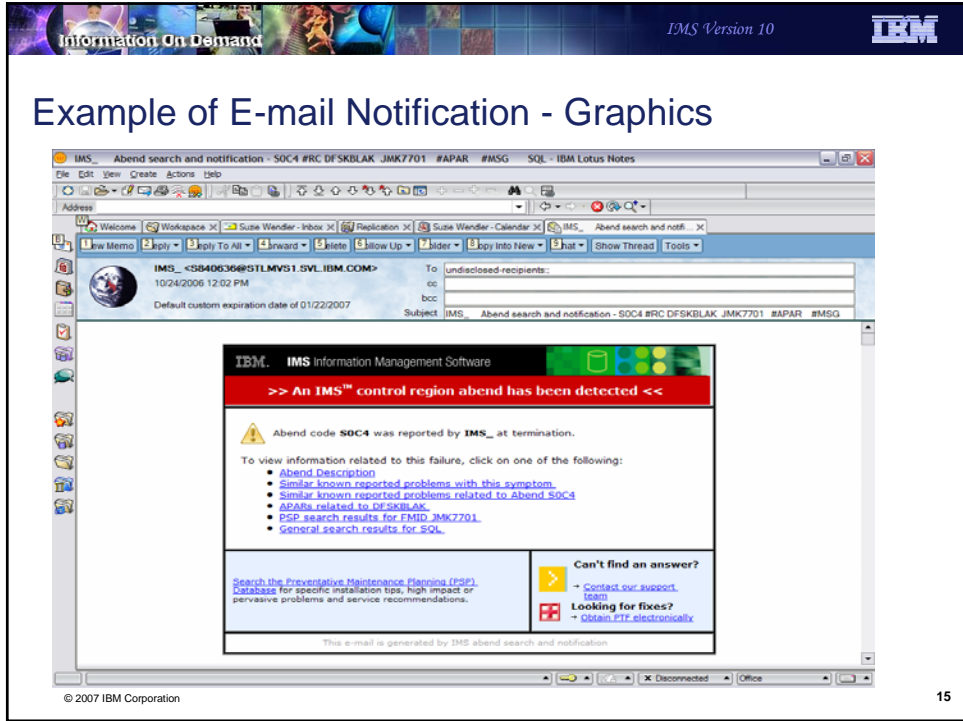   - No sensitive information, such as customer data, is sent

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IMS Abend Search and Notification

- E-mail or text messages (SMS) are sent after a system failure to a specified list of recipients
  - "Event driven" – automatic and immediate e-mail message for IMS Control Region Abends
  - "On demand" – e-mail creation through ISPF panels

- System driven and Knowledge-based e-mail text construction provides:
  - Direct hyperlinks to the ABEND problem description and analysis
  - Direct hyperlinks to hits resulting from the search of the failure using:
    - Known problems Database (APARs)
    - User errors Database
  - Direct hyperlink to the latest PSP for the current version
  - Direct link to internet-based PTF ordering facility

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Example of E-mail Notification - Graphics

Example of E-mail Notification - Text Only

The IMS Abend Search and Notification

- Benefits
  - Provides
    - Timely and automatic notification of IMS system problems
    - Quick access to explanation of the error and possible causes
    - Quick and direct access to IBM-supplied diagnostics

  - Facilitates problem determination
    - Inclusion of links that are of interest to the problem

  - Reduces problem resolution time

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Security Enhancements

- Support for mixed-case passwords
  - Implemented with IMS startup parameter in conjunction with RACF support
- Auditing improvements
  - Logging of requests is always done with one call to RACF
  - DFSDCxxx parameter to specify auditing for AUTH calls
    - SMF logging and ICH408I messages
  - Auditing may be done by IMS when the Security Reverification exit is used
    - The use of this exit disabled auditing by IMS in previous releases
- SMU is not supported in IMS V10
  - Migration to RACF should be completed before migration to V10

- Benefits
  - Standardization of IMS security consistent with other subsystems

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Syntax Checker Enhancements

- Support for more members of PROCLIB
  - Supports the 3 IMS.PROCLIB members as in previous releases:
    - DFSPBxxx, DFSDCxxx, DFSSQxxx
  - Adds support for 10 additional members:
    - DFSDFxxx, DFSCGxxx, CSLOIxxx, CSLRIxxx, CSLSIxxx, CQSIPxxx, CQSSLxxx, CQSSGxxx, IMS Connect configuration member
  - To facilitate migration to IMS V10, the Syntax Checker adds support for many of the same members in IMS V8 and IMS V9
  - Additional usability enhancements on the panels

- Benefits
  - Improved productivity especially for migration from previous releases

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Enterprise Workload Management (EWLM)

- EWLM extends that WLM support to other platforms as part of IBM's Virtualization Engine (VE)
- IMS V10 will provide EWLM information for EWLM-enabled IMS transactions
  - Transaction includes EWLM correlation in the OTMA header
  - Transactions must come in through IMS Connect and/or OTMA
    - IMS TM Resource Adapter (IMS Connector for Java) through IMS Connect and OTMA
    - MQBridge through OTMA
- Benefits
  - EWLM's view of the workload on the z/OS system will include IMS transaction data

Dynamic Resource Definition

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Dynamic Resource Definition (DRD)

- Type-2 commands to create, delete, and update MODBLKS resources
  - Programs
  - Transactions
  - Routing codes
  - Databases
- Query functions
- Import and export of definitions

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CREATE Command

- Creates resource definitions
  - Programs, transactions, routing codes, and databases
    - Appropriate attributes for each resource type may be set or defaulted

- Examples:

```
CREATE PGM NAME(PGM1) SET(RESIDENT(Y))

CREATE TRAN NAME(TRN1) SET(PGM(PGM1) CLASS(4))

CRE    DB NAME(DB001) SET(RESIDENT(Y))
```

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CREATE Command with LIKE Parameter

- LIKE parameter uses default attributes from another resource or descriptor

- Examples:

```
CRE PGM NAME(PGM1) SET(RESIDENT(Y))
CRE PGM NAME(PGM2,PGM3) LIKE(RSC(PGM1)

CRE TRAN NAME(TRN1) SET(PGM(PGM1) MAXRGN(5)
        PARLIM(6) CLASS(4))
CRE TRAN NAME(TRN2,TRN3) LIKE(RSC(TRN1)
        SET(PGM(PGM23))

CRE TRANDESC NAME(TRNCONV) SET(PGM(PGM1)
        CLASS(1) PARLIM(3) CONV(Y) SPASZ(2000))
CRE TRAN NAME(TRN5) LIKE (DESC(TRNCONV)
        SET(PGM(PGMC1) CLASS(5))
```

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UPDATE Command

- Updates existing resource definitions or descriptors

- Examples:

```
UPDATE PGM NAME(PGM1) SET(RESIDENT(N))

UPD    TRAN NAME(TRN1,TRN2) SET(PARLIM(4) MAXRGN(2))

UPD    TRANDESC NAME(TRANCONV) SET(SPASZ(3000))
```

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DELETE Command

- Deletes existing resource definitions or descriptors

- Examples:

```
DELETE PGM NAME(PGM1)

DELETE TRAN NAME(TRN1,TRN2)

DEL    TRANDESC NAME(TRANCONV)
```

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QUERY Command to Show Attributes

- Queries resource definitions or descriptor definitions
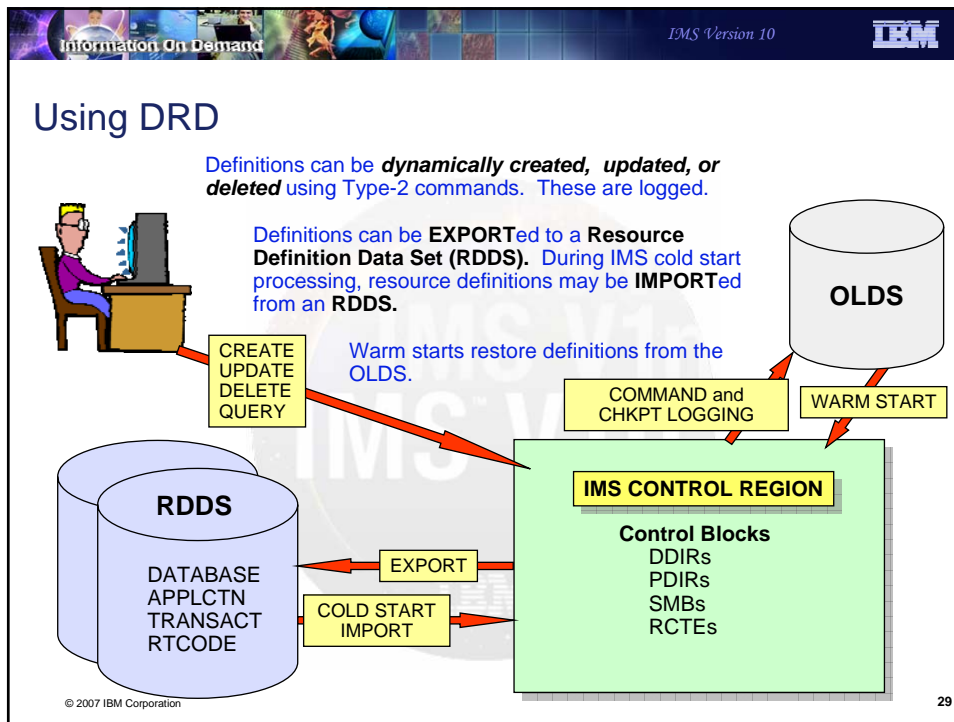 - Including attributes defined with SET(…) parameter on CRE or UPD command

- Examples:

```
QUERY PGM NAME(PGM1) SHOW(BMPTYPE,RESIDENT)

QRY    TRAN NAME(TRN1,TRN2) SHOW(ALL)

QRY    TRANDESC NAME(TRANCONV) SHOW(ALL)
```

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Resource Definition Data Sets (RDDS)

- Optional data sets holding resource definitions
  - Programs, routing codes, transactions, and databases
  - At least two data sets used in round robin fashion

- Written (export) at system checkpoints
  - Always written for restart checkpoints
  - Otherwise, written if at least one definition has changed since last checkpoint

- Read (import) for system cold starts
  - Optional
    - Otherwise, definitions are read from MODBLKS

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Using DRD

Definitions can be *dynamically created, updated, or deleted* using Type-2 commands. These are logged.

Definitions can be **EXPORT**ed to a **Resource Definition Data Set (RDDS).** During IMS cold start processing, resource definitions may be **IMPORT**ed from an **RDDS.**

Warm starts restore definitions from the OLDS.

CREATE
UPDATE
DELETE
QUERY

OLDS

COMMAND and CHKPT LOGGING

WARM START

RDDS

DATABASE
APPLCTN
TRANSACT
RTCODE

EXPORT

COLD START IMPORT

IMS CONTROL REGION

Control Blocks
DDIRs
PDIRs
SMBs
RCTEs

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Manage Resources Application

- TSO SPOC-like application
  - Support for Dynamic Resource Definition
  - Invoked from IMS Application Menu

- Panels for defining resources without a knowledge of DRD commands
  - Actions
    - Create, delete, update, query
  - Resource types supported are those supported by DRD
    - Databases, programs, transactions, routing codes
  - Primary technique is "fill in the blanks"
    - Choices for each parameter are provided
  - Help available for all fields
  - Panels and navigation similar to TSO SPOC panels

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Dynamic Resource Definition (DRD)

- Benefits
  - Eliminates the requirement for system definition for MODBLKS resources
    - Programs, routing codes, transactions, and databases
  - Allows for online updates to definitions
  - Definitions persist across warm and emergency restarts
  - Export and import capability
    - Maintains definitions across cold starts

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System Management Enhancements

- Dynamic Updates of MSC Resources
- Online Change Enhancements
- Command Enhancements
  - QUERY Resource for Work
  - Query Resource for Related Resources
  - Queue Command for Messages
  - Command Completion Text in Response
  - Resource Timestamps
- Global Status
- Operations Manager Enhancements
- REXX XML Parser
- Batch SPOC Utility
- Secondary Master Terminal Enhancements

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Command Support for MSC Definitions

- UPDATE and QRY support MSC resources
  - Supports modifications to resources without requiring system definition changes or an IMS restart
    - MSPLINK names and MSLINK names may be changed
    - MSLINKs may be associated with different MSPLINKs
    - SYSIDs for MSNAMEs may be changed

  - Usage
    - "Dummy" resources may be defined during system definition and activated with UPD commands

- Benefits
  - MSC resources may be dynamically "created" without IMS restarts

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Command Support for MSC Definitions Example

- Example of using dummy definitions

System definitions on IMSA and IMSB:
```
DUMMY1  MSPLINK TYPE=VTAM,NAME=DUMY1,SESSION=2,BUFSIZE=4096
DUMMYA  MSLINK  PARTNER=XA
LINKA1  MSNAME  SYSID=(101,100)
DUMMYB  MSLINK  PARTNER=XB
LINKA2  MSNAME  SYSID=(102,100)
```

Commands issued to IMSA:
```
UPD MSPLINK NAME(DUMMY1) SET(MSPLINK(IMSAB),NODE(IMSB))
UPD MSLINK  NAME(DUMMYA) SET(MSLINK(IMSAB1),MSPLINK(IMSAB))
UPD MSLINK  NAME(DUMMYB) SET(MSLINK(IMSAB2),MSPLINK(IMSAB))
UPD MSNAME  NAME(LINKA1) SET(SIDR(30),SIDL(20))
UPD MSNAME  NAME(LINKB1) SET(SIDR(31),SIDL(21))
```

Commands issued to IMSB:
```
UPD MSPLINK NAME(DUMMY1) SET(MSPLINK(IMSAB),NODE(IMSA))
UPD MSLINK  NAME(DUMMYA) SET(MSLINK(IMSAB1),MSPLINK(IMSAB))
UPD MSLINK  NAME(DUMMYB) SET(MSLINK(IMSAB2),MSPLINK(IMSAB))
UPD MSNAME  NAME(LINKA1) SET(SIDR(20),SIDL(30))
UPD MSNAME  NAME(LINKB1) SET(SIDR(21),SIDL(31))
```

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ACBLIB Member Online Change

- Add or change individual members of active ACBLIB
  - Moves ACBLIB member from a staging data set to active ACBLIB
    - Does not switch active and inactive ACBLIBs
    - Only reads the "staging" library
      - A library containing only the changed members
  - Only quiesces resources that are affected by the online change
- Coexists with full library switch capability
  - Switch of inactive and active ACBLIBs

- Benefits
  - More efficient than traditional online change
  - Complements DRD for adding or changing programs and databases

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Online Change Commit Processing Enhancement

- Online change will not fail commit for indirectly affected transactions
  - Transactions on queue which have no attributes on the TRANSACT macro that are being changed by an online change
  - Transaction just references a program or database being changed
    - Program in MODBLKS being changed
    - PSB in ACBLIB being changed
    - Program in MODBLKS that references a database being changed
    - PSB in ACBLIB that references a database being changed
  - Implemented for shared queues in previous releases
    - Added for local queues in IMS V10
- Benefits
  - Improves chances of successful online change commit

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QUERY Resource for Work

- For all query resource commands

```
QRY rsc-type NAME(names) SHOW(WORK)
```

  - rsc-type is DB, PGM, TRAN, or RTC

  - SHOW(WORK)
    - Indicates reasons that would prevent online change or some DRD commands from completing successfully
      - Online Change MODBLKS
      - Online Change ACBLIB
      - CREATE resource
      - DELETE resource
      - UPDATE resource

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QUERY Resource for Related Resources

- Query Database for PSBs referencing it

```
QRY DB NAME(names) SHOW(PGM)
```

  - Returns names of programs that reference the database in their PSBs
    - Uses intent lists from ACBLIB to find the information
    - These PSBs would prevent a DELETE DB command from completing

- Query TRAN for the program it invokes

```
QRY TRAN NAME(names) SHOW(PGM)
```

  - Returns the name of the program that the transaction invokes
    - Uses the definition control blocks to determine the program

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QUERY Resource for Related Resources

- Query RTC for the regions where it is active

```
QRY RTC NAME(names) SHOW(REGION)
```

- Returns the IFP regions where the routing code is active

- Query program for related transactions, databases, or routing codes

```
QRY PGM NAME(names) SHOW(TRAN|RTC|DB)
```

- TRAN returns the names of the transactions which invoke the program
  - Uses the definition control blocks to determine the transactions
- RTC returns the names of the routing codes associated with the program
  - Uses the definition control blocks to determine the transactions
- DB returns the databases referenced by this PSB
  - Uses PSB's intent list from ACBLIB to find the information

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QUEUE Command for Messages

- Option to queue message to
  - Local or shared Transaction or LTERM queues
  - User can provide message data in command
    - All messages must be single segment

```
QUEUE TRAN|LTERM NAME(xxx) OPTION(ENQ) DATA(msg-data)
```

- Option to dequeue messages from
  - Local or shared Transaction queues or LTERM queues
  - Can dequeue one or all messages for specified destination

```
QUEUE TRAN|LTERM NAME(xxx) OPTION(DEQ1 | DEQALL)
```

- Benefits
  - Enhanced command capability for managing queues
  - Usable by automation programs with interface to OM

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Completion Code Text in Response

- Explanation of non-zero CCs included in output of all Type-2 commands
  - If all CCs are zero, TSO SPOC does not display CCText column

```
UPD DB NAME(ACCTMSTR) STOP(ACCESS)
```

DBName	MbrName	CC	CCText
ACCTMSTR	IMS1	AA	DB IN USE-BMP
ACCTMSTR	IMS2	0	

```
QRY DB NAME(ACCTHIST,CUSTHST) SHOW(ACCTYPE,LOCAL)
```

DBName	MbrName	CC	CCText	ACCTYPE
ACCTHIST	IMS1	0		UP
CUSTHST	IMS1	10	NO RESOURCES FOUND	

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Resource Timestamps in QRY Responses

- QRY Command Timestamp Attributes
  - TIMECREATE – time resource or descriptor was created
    - CREATE command, IMPORTed from RDDS, Loaded from MODBLKS, Created by DFSINSX0 (transaction or program)
  - TIMEUPDATE – time resource or descriptor was last updated
    - UPDATE command that updates a definitional attribute – not a status
  - TIMEACCESS – time resource or descriptor was last accessed or used as a model
    - DB   time DB was last accessed by an application program (DL/I call)
    - PGM   time program (PSB) was last scheduled
    - TRAN time message was last enqueued or dequeued by a program
    - RTC   time message was last enqueued to BALG using this routing code
    - DESC time descriptor last used as a model in CREATE command
  - TIMEIMPORT – time resource was imported from RDDS
- Benefits: Improved information about use of IMS resources

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IMS Version 10

Global Status

- Global status for databases, HALDB partitions, DEDB areas, and transactions
  - Maintained in RM structure
    - Requires CSL with RM
  - Created by:
    - Type-1 command with GLOBAL parameter for DB, area, or partition
      - /START, /STOP, /DBD, and /DBR
    - Type-2 command with SCOPE(ALL) for DB, area, partition, or transaction
      - UPDATE
  - Global status commands
    - Processed by all active IMS systems
      - Change the local status
    - Set status in RM structure for the DB, area, partition, or transaction

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Global Status

- Resources (databases, partitions, areas, and transactions) have local status and global status
  - Examples:
    - Transaction may be stopped globally but started locally in an IMS
      - This transaction may executed in this IMS system
    - Database may be started globally but "DBRed" in an IMS
      - This database is not accessible in this IMS system
  - Global status is used to set local status only when
    1. Global status is set while an IMS system is down
    and
    2. IMS system is restarted
      - This IMS system assumes the global status set while it was down

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Global Status

- Benefits
  - Resources may be treated globally
    - Databases and areas
      - START(ACCESS), STOP(ACCESS), STOP(UPDATES), STOP(SCHD), LOCK, OPEN, DBALLOC
    - Transactions
      - START(Q), STOP(Q), START(SCHD), STOP(SCHD), LOCK
  - Each IMS system has its own local status
    - This is effective within this system
  - Restarted IMS systems assume the status that was changed while these systems were down
    - Local status is set to the global status

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Operations Manager Enhancements

- Audit trail of IMS commands using OM
  - Audit trail contents
    - Commands from OM clients (TSO SPOC, IMS Control Center, etc.)
    - Reponses to commands
  - Consists of log records written to z/OS System Logger log stream
  - DFSERA10 exit routines provided for formatting the audit log
    - Interpreted listing and "Dump" listing
  - TSO SPOC and REXX have support for reading the audit trail

- Unsolicited messages from IMS may be sent to OM clients
  - Messages generated by IMS systems can be sent to OM and delivered by OM to an OM "AOP client"
    - AOP client may subscribe to OM for unsolicited messages

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REXX XML Parser

- REXX XML Parser for interpreting command responses from OM
  - Responses to OM-submitted commands always encapsulated in XML
    - Commercial REXX XML parser does not exist
  - Parses XML output directly into a "stem variable" and "suffix"
    - Without parser function the suffix is the number of the response row
      - For example, stemname.1 or stemname .2
        - Program must parse each row for data within XML tags
    - With the parser function the suffix is the XML tag in the response
      - For example, stemname.verb or stemname.kwd

- Benefit
  - Makes interpreting command responses easier for REXX programmer

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Batch SPOC Utility

- Provides a capability to submit IMS commands from a batch job step
  - Uses the Operations Manager (OM) interface
- IMSplex environment defined in execution parameters
  - IMSplex name, command routing, wait time
- Commands defined in SYSIN file
- Output to SYSPRINT
  - Responses formatted to look like SPOC screen format

- Benefits
  - Batch jobs may include steps with "online" commands
    - For example, steps to /DBR, reorganize, and /START databases

Secondary Master Terminal Enhancements

- New MSG keyword on /SMCOPY command to control system messages on the secondary master
  - Prior to this enhancement, system messages were always sent to the secondary master

```
/SMC MSG ON | OFF
```

- Type-2 AOI Exit (DFSAOE00) enhanced
  - Can control logging of secondary master messages on a per message basis
    - Prior to this enhancement, exit called only for messages sent to primary

- Benefits
  - Enhanced control of messages sent to the secondary master

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Transaction Manager and Connectivity Enhancements

- MSC Enhancements
- APPC Enhancements
- OTMA Enhancements
- IMS Connect Enhancements

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MSC Enhancements

- Increased bandwidth to improve MSC link performance
  - Capability to allow multiple messages to be sent in the same buffer
    - Bandwidth mode
  - Reduction of logger I/Os by reducing number of CHECK WRITE calls
  - Expansion of maximum link buffer size to 64K
    - Capability to dynamically increase or decrease size by command
  - Enhanced link QUERY Statistics command
    - Detailed statistics for link performance tuning
- MSC VTAM Generic Resources support
  - Remote IMSs may use a generic resources node name for local IMS

- Benefits
  - Improved performance, capacity, availability, and usability

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APPC Enhancements

- Enhanced timeout granularity
  - Support for APPC/MVS timeout in seconds
    - Timeout waiting for APPC client to respond
    - Prior releases provided the timeout capability in minutes
- Support for /LOCK and /UNLOCK
  - From both APPC and OTMA clients
  - Keywords DATABASE, PROGRAM, and TRANSACTION are supported
- Local LU Support
  - Outbound asynchronous conversations may use a local LU name
    - Security may differ between base and local LUs

- Benefits
  - Enhanced availability, usability, and security

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OTMA Enhancements

- OTMA Destination Routing descriptors
  - Asynchronous outbound (ALTPCB) messages
    - Eliminates requirement for exit routines to assign a destination
  - Benefit
    - Simplified application development

- Member Level Security
  - Allows each OTMA member to have its own security setting
    - FULL, CHECK, NONE, or PROFILE
  - Implemented with enhanced /SECURE OTMA command
  - Benefit
    - Enhanced security flexibility

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OTMA Enhancements

- Resume TPIPE security for asynchronous output messages
  - New RIMS SAF/RACF security resource class
    - Security definition association between
      - TPIPE name and Userid/group that can access the TPIPE
  - OTMA security user exit routine DFSYRTUX
  - OTMA ACEE aging value support
    - Checked when userid initiates Resume TPIPE
  - Benefit
    - Enhanced security for asynchronous output messages

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OTMA Enhancements

- Message Flood Detection and Control
  - Rejects new input messages from OTMA member
    - If there are more than 5000 unscheduled, unprocessed, or orphaned input messages from the OTMA member
    - User can change the default value from 5000
  - Benefit
    - Prevents out of memory abends due to large number of OTMA control blocks associated with the queued requests
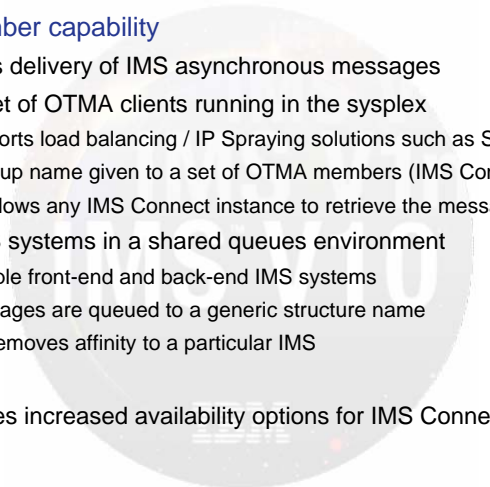

OTMA Enhancements

- CM1 (Send-then-Commit) Time-out Control
  - For Synclevel=confirm or synclevel=syncpt processing
    - IMS waits for an ACK/NAK after sending the response
  - New backout logic implements time-out capability (default is 5 minutes)
    - Transaction back-out
    - A deallocation message with new time-out flag is sent to the member
    - System console message
  - Benefit
    - Frees dependent region
    - Releases locks

OTMA and IMS Connect Enhancements

- Super Member capability
  - Facilitates delivery of IMS asynchronous messages
    - By a set of OTMA clients running in the sysplex
      - Supports load balancing / IP Spraying solutions such as Sysplex Distributor
      - A group name given to a set of OTMA members (IMS Connects)
        - Allows any IMS Connect instance to retrieve the message
    - By IMS systems in a shared queues environment
      - Multiple front-end and back-end IMS systems
      - Messages are queued to a generic structure name
        - Removes affinity to a particular IMS
  - Benefit
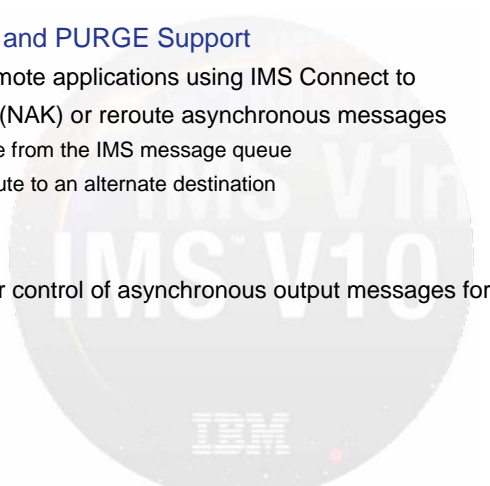   - Provides increased availability options for IMS Connect users

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OTMA and IMS Connect Enhancements

- REROUTE and PURGE Support
  - Allows remote applications using IMS Connect to
    - Reject (NAK) or reroute asynchronous messages
      - Purge from the IMS message queue
      - Reroute to an alternate destination

  - Benefit
    - Greater control of asynchronous output messages for IMS Connect

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Asynchronous Message Enhancements …

- REROUTE and PURGE Support
  - For OTMA hold queue capable clients ONLY
    - OTMA members, e.g. IMS Connect
      - That keep asynchronous messages on the IMS message queue until requested by the remote application

  - Extended support that allows remote applications to
    - Reject (NAK) or request action on asynchronous messages
      - Purge from the IMS message queue
      - Reroute to an alternate destination

- Also delivered in previous releases:
  - IMS V9 and IMS Connect: PK16934, PK22480, PK24907, PK09543, PK12013
  - IMS V8 PK21868, PK09542, IMS Connect V2.2: PK12012

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IMS Connect Enhancements

- Support for OTMA enhancements
  - ACEE aging support
  - Message flood control
  - CM1 (send-then-commit) timeout support

- Password support enhancements
  - Remote client can request a password change in SAF/RACF
  - Support for RACF mixed case passwords

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IMS Connect Enhancements

- XML Adapter Support
  - Translation between XML messages and IMS messages
    - IMS Connect client such as IMS SOAP Gateway
      - Sends an XML message with a request for translation
    - IMS Connect
      - Inbound: invokes the XML Adapter to translate message for IMS
        - Removes XML tags
        - If necessary, convert from UNICODE to EBCDIC
      - Outbound: invokes the XML Adapter to prepare an XML message
        - If necessary, converts from EBCDIC to UNICODE
        - Creates XML tags
  - Benefit
    - Allows input messages to be in XML without requiring IMS application program changes

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Database Enhancements

- HALDB ILDS Rebuild Enhancement
- Image Copy 2 Fast Replication
- Fuzzy User Image Copy Support
- ACBGEN Exploitation of Storage Above 16M

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HALDB ILDS Rebuild Enhancement

- New option for HALDB Index/ILDS Rebuild utility (DFSPREC0)
  - ILDS entries (ILEs) are written to ILDS sequentially in load mode
    - Avoids CI/CA splits during rebuild
    - Creates free space according to data set definition
  - ILDS entries are sorted in data spaces before they are written

- Benefits
  - Much faster execution of DFSPREC0 when rebuilding an ILDS
  - Free space may improve performance of subsequent reorganizations
    - Reduce CI/CA splits

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Image Copy 2 Fast Replication

- Fast replication highlights
  - Uses DFSMSdss COPY command with FASTREP(REQ) parameter
    - Invokes FlashCopy on ESS, DS8000
    - Invokes SnapShot on RVA
  - Copy is done in one phase
    - Time is comparable to the logical copy time for concurrent copy
  - Copies database data sets to other data sets on the same storage system
    - Output is in same format as database data set
  - Supports both fuzzy and clean image copies
  - DD statements for the output data sets are not required
  - Support in Database Recovery utility for these image copies
    - Restores the data set with a DFSMSdss COPY command with FASTREP(PREF) parameter

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Image Copy 2 Fast Replication

- Benefits
  - Exploits FlashCopy and SnapShot
    - Single phase copies
    - Copies produced in seconds
  - Supports both clean and fuzzy image copies
  - Full DBRC GENJCL support
    - Image Copy 2 and Database Recovery utilities

Fuzzy User Image Copy Support

- DBRC support for fuzzy user image copies
  - Fuzzy image copies taken by utility or tool without a DBRC interface
    - Pack dump, DFSMSdss DUMP or COPY not invoked by IC2, etc.
  - Support:
    - NOTIFY.UIC can specify a fuzzy user image copy
      - With BATCH and STOPTIME(time) parameters
    - GENJCL.RECOV can be used to generate recovery from logs after fuzzy user image copy has been restored
- Benefits
  - Integration of fuzzy user image copies into DBRC environment

ACBGEN Exploitation of Storage Above the 16M Line

- Previous releases were limited in the number of PCBs per PSB
  - Limitation was due to use of "below the line" storage
    - PSBs with more than approximately 500 PCBs could result in S80A abend

- IMS V10 ACBGEN allocates most of it working storage above the 16M line
  - Eliminates these out-of-storage abends

- Benefit
  - Allows up to 2500 PCBs per PSB

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Fast Path Enhancements

- Command Enhancements
- Capacity Enhancements
- EMH Enhancement

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Starting All Areas with UPDATE DB command

- Option to start all areas when starting a DEDB

```
UPDATE DB NAME(name) START(ACCESS) AREA(*)
```

- AREA(*) starts all areas of the database

  - In previous releases areas had to be started separately

- Benefit
  - Separate UPDATE AREA commands are not required for each area

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Keeping Randomizer Resident when Stopping DB

- Option to keep the randomizer resident when stopping access to DB

```
UPDATE DB NAME(name) STOP(ACCESS) OPTION(NORAND)
```

- OPTION(NORAND) does not unload the randomizer

  - In previous releases, the randomizer would be unloaded if not used by any database

- Benefit
  - Avoids ECSA fragmentation from unloading and reloading randomizers

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Maximum Number of FP Buffers Increased

- IMS V10
  - Up to 4,294,967,295 FP buffers may be specified (DBBF=)
    - Theoretical limit since available storage will limit the practical size

- Previous releases:
  - Maximum number of FP buffers was 65,535

- Benefit
  - Fast Path can exploit large capacities of new processors

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Maximum Number of FP Output Threads Increased

- IMS V10
  - Maximum number of FP output threads is 32,767

- Previous releases:
  - Maximum number of FP output threads was 255
    - OTHR cannot exceed MAXPST value

- Benefit
  - Fast Path can exploit large capacities of new processors

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Module DBFCONT0 Converted to Multiple Modules

- Previous releases:
  - Most Fast Path control blocks and buffers were placed in one module (DBFCONT0)
    - DBFCONT0 contents included: ECNTs, MSDBs, MSDB blocks, Buffer Headers (DHMRs), Buffers, DEDB blocks, output threads, and BALGs
- IMS V10
  - These Fast Path control blocks and buffers are placed in five modules

- Benefit
  - More efficient use of ECSA storage
    - Required contiguous area is smaller

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Resetting FP Response Mode for EMH

- IMS V10
  - Command support to reset Fast Path Response Mode
    - Start and stop node (static terminal) or user (dynamic user)

- Previous releases
  - Hung FP response mode nodes and users typically require an IMS restart (or complex sequence of commands) to get them working again

- Benefit
  - Improved usability/availability
    - Allows hung nodes and users to be reset without bringing IMS down

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DBRC Enhancements

- DBRC Timestamp Precision
- RECON READONLY Access
- Improved SAF Support for RECONs
- DBRC API Enhancements
- Parallel RECON Access

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DBRC Timestamp Precision

- DBRC timestamps will be recorded to microsecond
  - Previously recorded to tenth of second
    - Could lead to duplicate timestamps (log open, log close, allocation)
  - Increased precision not in effect until MINVERS('10.1') is specified
    - For compatibility with previous releases
  - Abbreviated timestamps still supported
    - Unspecified part of time will be padded with zeros

- Benefits
  - Avoids possible duplicate timestamps

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READONLY Support for RECONs

- V10 READONLY support
  - Specification:
    - PARM(READONLY) on DSPURX00 EXEC statement
    - READONLY=YES on DBRC API FUNC=STARTDBRC macro
  - Use for users with only READ authority
    - Causes RECONs to be opened for input

- Benefit
  - Users need only READ authority to list RECON contents

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Improved SAF Support for RECONs

- IMS V10 SAF authority for RECONs
  - READ is sufficient for readers
  - UPDATE is sufficient for accesses except DELETE and DEFINE
  - ALTER required for DELETE and DEFINE
  - CONTROL is never required

- Previous IMS releases
  - Required CONTOL authority for all RECON access

- Benefits
  - Users need only UPDATE authority for DBRC commands

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IMS Version 10

DBRC API Enhancements

- DBRC API introduced in IMS V9

  - Provided release independent programming interface to RECON data
    - Assembler language macros

  - IMS V9 provided a query capability (no updates to RECONs)

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DBRC API Enhancements

- IMS V10 enhancements:
  - RECON update capability via DBRC command support
    - INIT, CHANGE, and NOTIFY
  - QUERY enhancements
    - Queries for DBDS, Partition, Log
    - Wildcard support
  - Alternate RECON and IMS DD names
    - May be used to access multiple sets of RECONs and ACBLIBs easily
  - Application may register as subsystem and authorize databases
    - Allows application to do utility functions with authorization integrity
  - SAF(RACF) invocation for API security
    - Extension of DBRC command authorization
- Benefits
  - Complete API interface for users and IMS tools

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Parallel RECON Access

- Allows multiple DBRC instances to access the RECONs concurrently
  - DBRC instance: IMS Online subsystem, batch job, or utility
- Eliminates serialization of accesses between DBRC instances
  - Data set RESERVE (or global enqueue) eliminated
- Reduces RECON contention
  - Could provide better responsiveness from IMS online and batch
  - Removes growth constraint

- Parallel RECON Access is optional
  - Specified by DBRC command for a set of RECONs
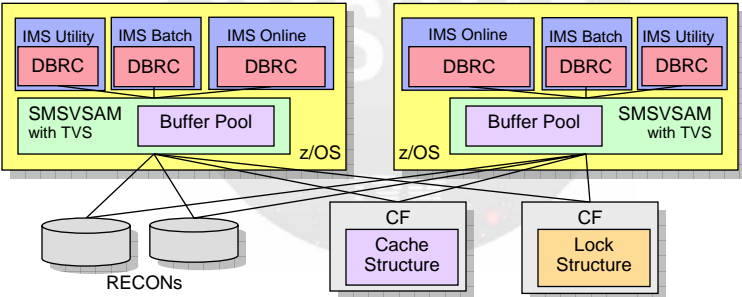
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Parallel RECON Access

- Uses Transactional VSAM
  - System facility that provides locking, logging, caching, and commit for concurrent updates to VSAM data sets (RECONs)
    - Exploits Parallel Sysplex
- Prerequisites
  - Hardware
    - Parallel Sysplex environment
      - Requires Coupling Facility
  - Software
    - z/OS DFSMS Transactional VSAM (DFSMStvs)
      - Requires RRS for DFSMStvs (IMS use of RRS is not required)
      - DFSMStvs is an optional feature
        - Software license required
        - Special bids will be considered

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Transactional VSAM (DFSMStvs) Overview

- TVS uses a cache structure in CF and a buffer pool in SMSVSAM address space
  - When a buffer in one SMSVSAM is updated, buffers with the same record in other SMSVSAM address spaces are invalidated
- VSAM record is locked when accessed by a user of TVS
  - SMSVSAM has its own lock manager
  - RECON record locked by a DBRC instance

IMS Utility	IMS Batch	IMS Online		IMS Online	IMS Batch	IMS Utility
DBRC	DBRC	DBRC		DBRC	DBRC	DBRC

SMSVSAM with TVS	Buffer Pool	z/OS	z/OS	Buffer Pool	SMSVSAM with TVS

CF	CF
Cache Structure	Lock Structure

RECONs

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Transactional VSAM (DFSMStvs) Overview

- Recovery of failed users
  - Each DFSMStvs instance has an undo log
  - Used for backout after failures
- Recovery for failed SMSVSAM address space
  - Restarted automatically if it fails
    - Backs out in-flight work and releases retained locks
- Recovery for failed z/OS system
  - Peer recovery
    - Back outs done by another SMSVSAM address space on another LPAR
    - Locks released

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Parallel RECON Access Implementation

- PRA is turned on with a RECON setting

  `CHANGE.RECON ACCESS(SERIAL|PARALLEL)`

  `INIT.RECON ACCESS(SERIAL|PARALLEL)`

  - PARALLEL turns on PRA
  - SERIAL turns off PRA

- IMS does <u>not</u> have to be shut down to change access

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PRA Migration and Coexistence

- Parallel RECON Access cannot coexist with serial access for a set of RECONs
- PRA requires MINVERS('10.1')
- PRA requires DFSMStvs environment
  - IGDSMSxx parameters
  - Structure and log stream definitions
  - SHCDS data sets
  - RACF authority
  - RRS
  - SMSVSAM address space
  - Updated operation and recovery procedures

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PRA Summary and Benefits

- Parallel RECON Access
  - Exploitation of Transactional VSAM
  - Concurrent RECON activity by multiple DBRC instances
- Benefits
  - Reduction of RECON contention
  - Increased throughput
  - Reduction of interference with online systems from batch jobs and utilities
  - Removal of growth constraint

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Migration Considerations

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Migration Considerations

- Availability date
  - Not announced
  - Currently in Quality Partnership Program (QPP)

- Prerequisites
  - z/OS V1.7 or later
  - DBRC Parallel RECON Access requires z/OS DFSMStvs
    - Special bids will be considered for those who do not already have DFSMStvs
  - Image Copy 2 fast replication support requires z/OS V1.8

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Migration Considerations

- Migration for IMS V8 and V9 is supported
  - RECON upgrades directly from V8 and V9
  - DB recovery utilities accept V8, V9, and V10 image copies, logs, and change accum data sets
- Applications and databases are compatible
  - Program recompiles and relinks are <u>not</u> required
- Coexistence support
  - Data sharing, ISC, and MSC are supported with V8 and V9
- Support removed for
  - SMU security
  - BTAM
  - DFSCMTR0, DFSNPRT0, DFSCMLR0, DFSCMLR1, and DFSCMPR0 exits
    - Replaced with DFSMSCE0 exit in V7, V8, and V9

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