

# *IMS V10*

## *System Enhancements*

*Diane Goff*

*IMS Advanced Technical Support*



# Agenda

- IMS V10 Systems Enhancements
- IMS V10 Systems Management Enhancements



# System Enhancements

- Usability
  - ◆ FPCTRL Macro Elimination
  - ◆ Enhanced Display of System Parameters
  - ◆ Virtual Storage Constraint Relief
- New functionality
  - ◆ Sysplex Serial Program Management
  - ◆ Enhanced Log Record Statistics
  - ◆ Large Sequential Data Sets
- Utility improvements
  - ◆ Log Statistics Analysis and Statistical Analysis Utilities Enhancements
  - ◆ Syntax Checker Enhancements
- Serviceability improvements
  - ◆ BPE External Trace
  - ◆ Abend Search and Notification
- Security Enhancements
- Multi-platform support
  - ◆ Enterprise Workload Manager Support

# 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

# Enhanced Display of System Parameters

- DFS1929I message is displayed twice
  - ◆ 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

# VSCR - Savings

- PVT to EPVT

- ◆ AMODE 31 option 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

# 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

# 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...



# 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

# Large Sequential Data Sets

- IMS V10 adds large sequential data set support
  - ◆ More than 65,535 tracks on one volume 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

# 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

# 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, BPE exit list member
  - ◆ To facilitate migration to IMS V10, the Syntax Checker adds support for most 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

# 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

# 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

# IMS Abend Search and Notification

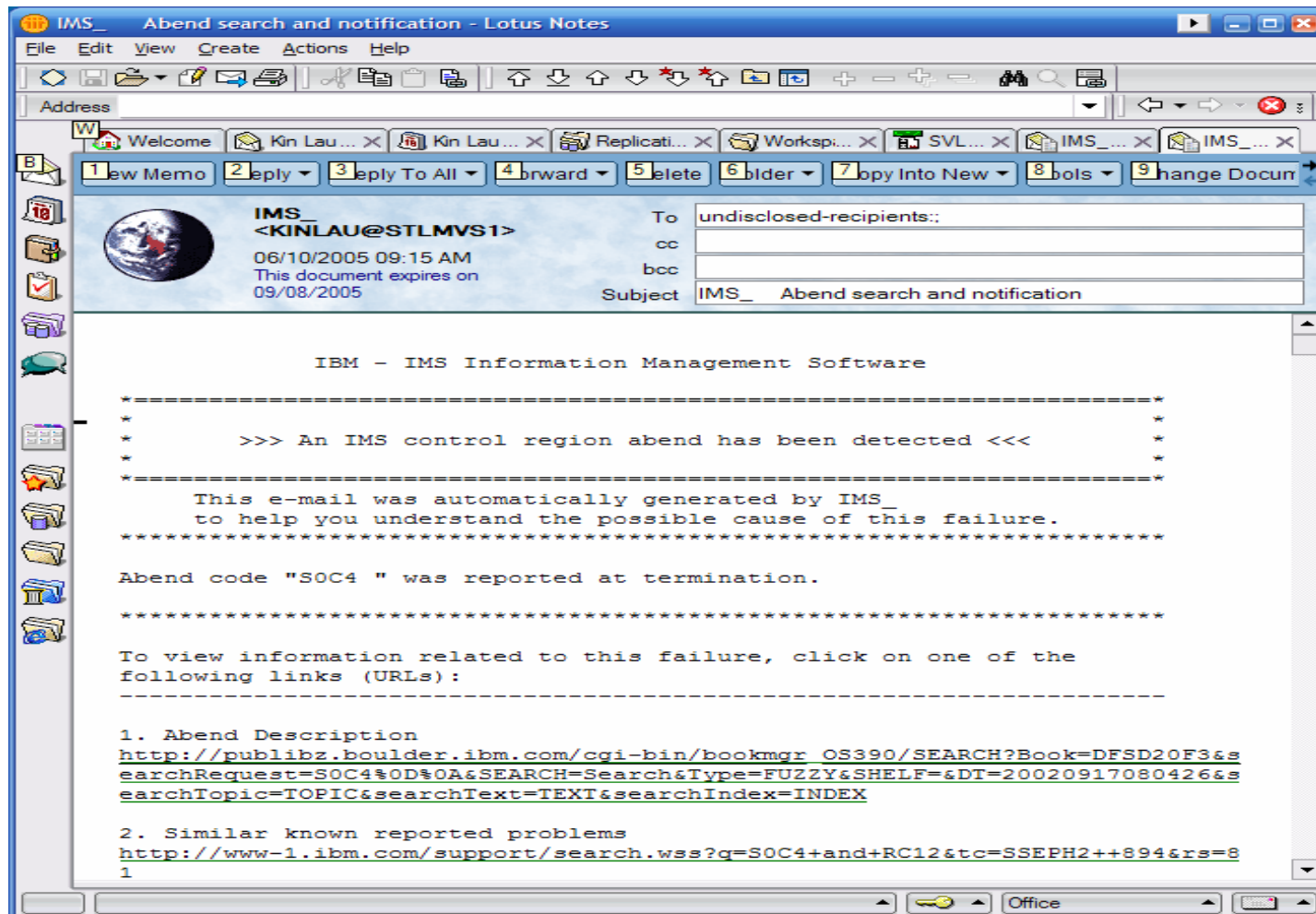
- E-mail or text messages (SMS) are sent after a system failure to a specified list of recipients
  - ◆ “Event driven” – automatic and immediate e-mail message for IMS Control Region Abends
  - ◆ “On demand” – e-mail creation through ISPF panels
- System driven and Knowledge-based e-mail text construction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

# Example of E-mail Notification - Graphics

The screenshot shows an IBM Lotus Notes email window. The subject line is "IMS\_ Abend search and notification - SOC4 #RC DFSKBLAK JMK7701 #APAR #MSG SQL - IBM Lotus Notes". The email content features a red banner with the text ">> An IMS™ control region abend has been detected <<". Below the banner, a warning icon is followed by the text "Abend code SOC4 was reported by IMS\_ at termination." A list of links provides further information, including "Abend Description", "Similar known reported problems with this symptom", "Similar known reported problems related to Abend SOC4", "APARs related to DFSKBLAK", "PSP search results for FMID JMK7701", and "General search results for SQL". A section titled "Can't find an answer?" offers links to "Contact our support team" and "Looking for fixes?" with a link to "Obtain PTF electronically". The footer of the email states "This e-mail is generated by IMS abend search and notification".



# 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

# 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
  - ◆ New SMU/RACF syntax conversion utilities for IMS V9 (PK35433/UK21894)
    - Info in IMS910 UPGRADE PSP BUCKET SUBSET SMU2RACFCON
- Benefits
  - ◆ Standardization of IMS security consistent with other subsystems

# Enterprise Workload Management (EWLM)

- EWLM extends 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

# 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

# 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

# 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))
```

# 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



# 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

# 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

# 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

# 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 routing codes
- ◆ DB returns the databases referenced by this PSB
  - Uses PSB's intent list from ACBLIB to find the information

# 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

# 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	

# Resource Timestamps in QRY Responses

- QRY Command Timestamp Attributes

- ◆ TIMECREATE – time resource or descriptor was created
  - CREATE command, IMPORTed from RDDDS, 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 RDDDS

- Benefits

- ◆ Improved information about use of IMS resources

# 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



# 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 be 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

# 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

# Operations Manager Enhancements

- Audit trail of IMS commands using OM
  - ◆ Audit trail contents
    - Commands from OM clients (TSO SPOC, IMS Control Center, etc.)
      - Includes identification of client
    - Responses 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

# 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

# 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 (DFSABOE00) 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

# IMS Version 10

## • System Enhancements

- ◆ FPCTRL Macro Elimination
- ◆ Enhanced Display of System Parameters
- ◆ Virtual Storage Constraint Relief
- ◆ Sysplex Serial Program Mgmt.
- ◆ Enhanced Log Record Statistics
- ◆ Large Sequential Data Sets
- ◆ Log Stat. Analysis and Statistical Analysis Utilities Enhancements
- ◆ Syntax Checker Enhancements
- ◆ BPE External Trace
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- ◆ Security Enhancements
- ◆ Enterprise WLM Support

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