



# Introducing the IMS Catalog: Open Access to IMS DB Metadata

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IBM IMS Advanced Technical Skills  
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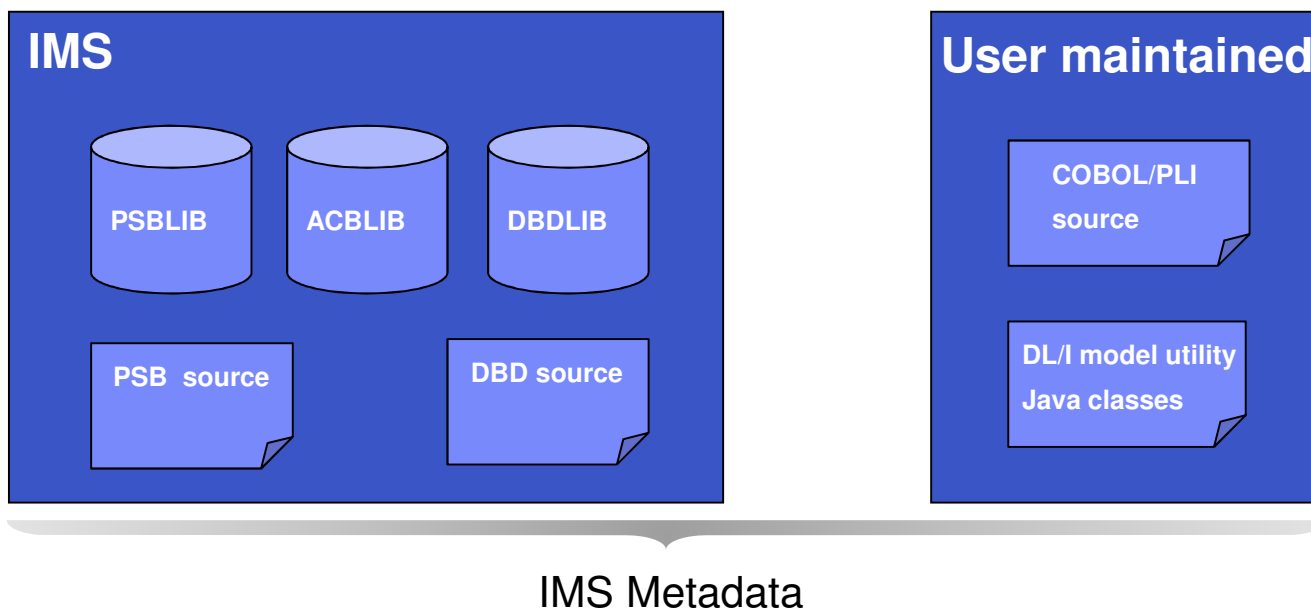
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# Agenda

- IMS Metadata
- Local File Metadata vs. IMS Catalog Metadata
- IMS Catalog Database
- Enablement and Implementation of the IMS Catalog
- Application Programming with the Catalog

# IMS Metadata

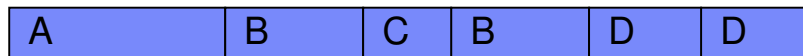
- Databases partially defined in the IMS DBD
  - Only key/searchable fields needed by applications
  - Remaining segment data is not defined
- Remaining database segment definition is within Applications
  - COBOL COPYBOOKS and PL/I INCLUDEs map all the segment data
  - Applications can have different mappings for one segment



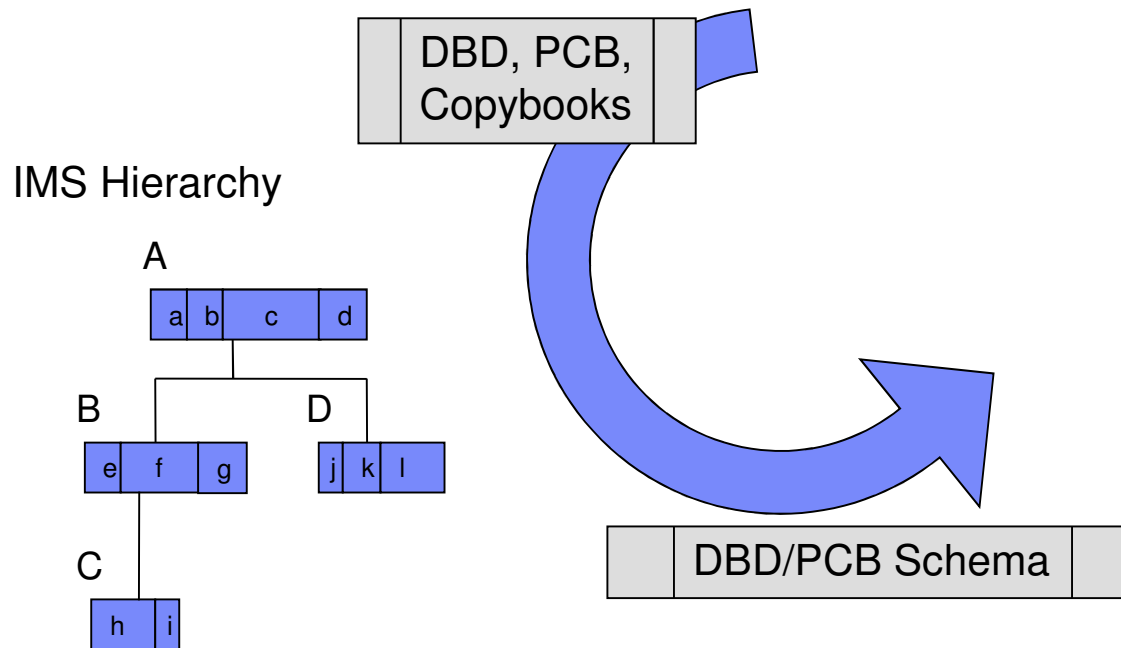
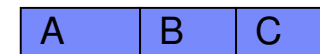
# DBD + PSB = IMS DB Schema



Physical Disk Data



Program I/O Area



# IMS Metadata



ord# INT	lastName CHAR	firstName CHAR	payment CHAR	type CHAR	date DATE
1011000100110	101100000101001001101	101101100100010100110	0101101010110110010101001010100101010	011010001	0101010010111101010
011101010010	011101011001001001001	011101110001100100100	0000111011101100101011101010000010101	0110111001	0000100111010010111

*Defined in  
DBD*

*Defined in  
Appl Cpylibs  
(IMS Java)*

*Defined in  
XML Schema:  
Local file or  
IMS Catalog*

```
<PurchaseOrder number="113246 ">
  <lastName> IBM      </lastName>
  <firstName> IMS     </firstName>
  <date>04/26/1968 </date>
  <payment type="MC"> 5414 2263 4895 1145 </payment>
```

# Changes to DBD Statement



- **DBD**
  - ENCODING=
    - Specifies default encoding of all character data in the database defined by this DBD
    - Value can be overridden in individual segments or fields
- **SEGM**
  - EXTERNALNAME=
    - Optional alias for NAME= parameter used by Java application programs to refer to segment
- **FIELD**
  - CASENAME=
    - Name of the map case when alternative mappings are defined for fields in a segment
  - DATATYPE=
    - Specifies the external data type of the field
  - EXTERNALNAME=
    - Optional alias for the NAME= parameter used by Java application programs to refer to field
- **DFSMARSH**
  - Specifies the DATATYPE converter routine to transform binary data to external data format
- **DFSMAP**
  - Defines alternative field mappings in a segment
- **DFSCASE**
  - Defines a map case for a segment type that uses DFSMAP alternative field mapping
- **REMARKS=**
  - Optional user comments: 1- to 256-character field added to DBDGEN statement

# Data Types



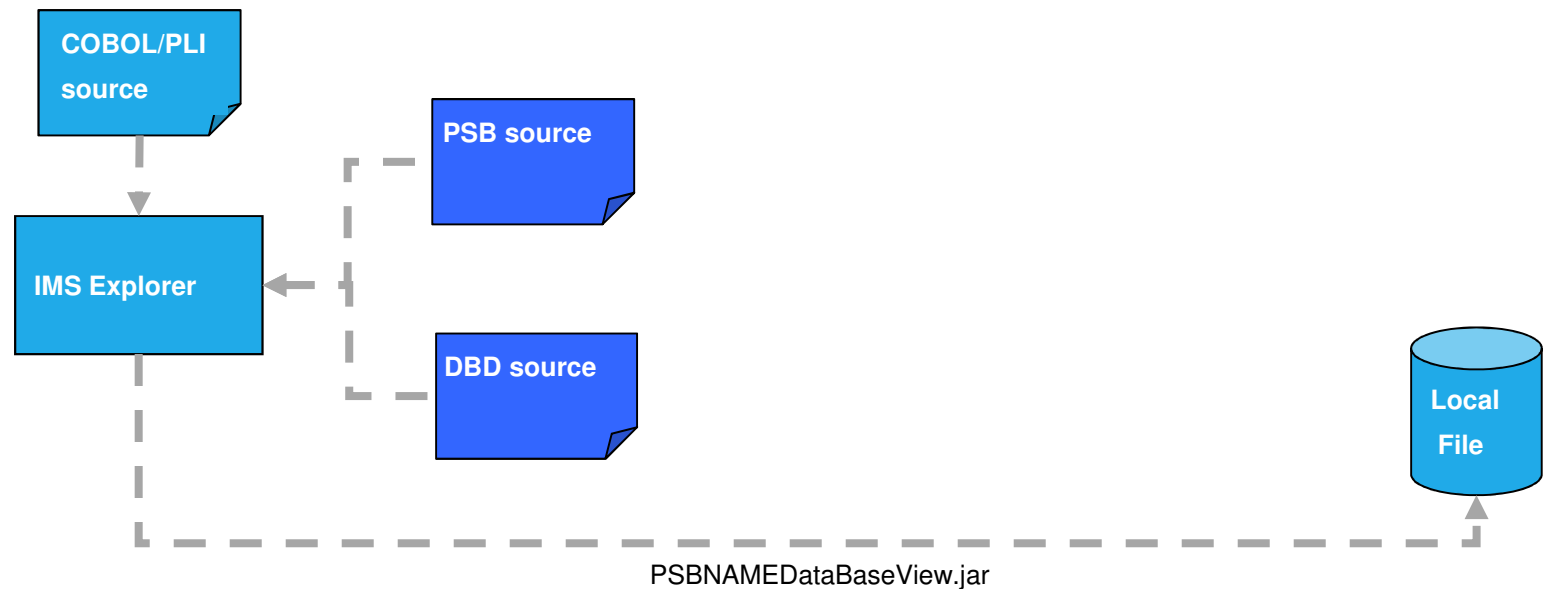
- Data types have multiple metadata elements
  - **Application data type**
    - Universal drivers use application data type to present data to clients
  - **Physical data type**
    - Universal drivers use physical data type to marshal/unmarshal data to and from the database
  - **Example**
    - Application data type is DECIMAL(10,2) [decimal with precision 10 and scale 2]
    - Physical data type is a signed packed decimal (AD community doesn't need to know this)
- New data type support
  - **Structs** (nested n levels with no constraint on element data types)
    - Accessed via SQL and DLI
  - **Arrays** (nested n levels with no constraint on element data types)
    - Accessed via SQL and DLI
  - **User-defined**
    - Name of UDT can be defined to the catalog and intended to be used at runtime by Universal drivers to marshal/unmarshal data
    - Can be part of a Struct or Array element



# Changes to PSB PCB Statement

- **PCB**
  - EXTERNALNAME=
    - Optional alias for the PCB label or the PCBNAME= parameter
    - Java application programs use the external name to refer to the PCB
  - REMARKS=
    - Optional user comments: 1- to 256-character field added to PSBGEN statements

# Local File for IMS Java Metadata



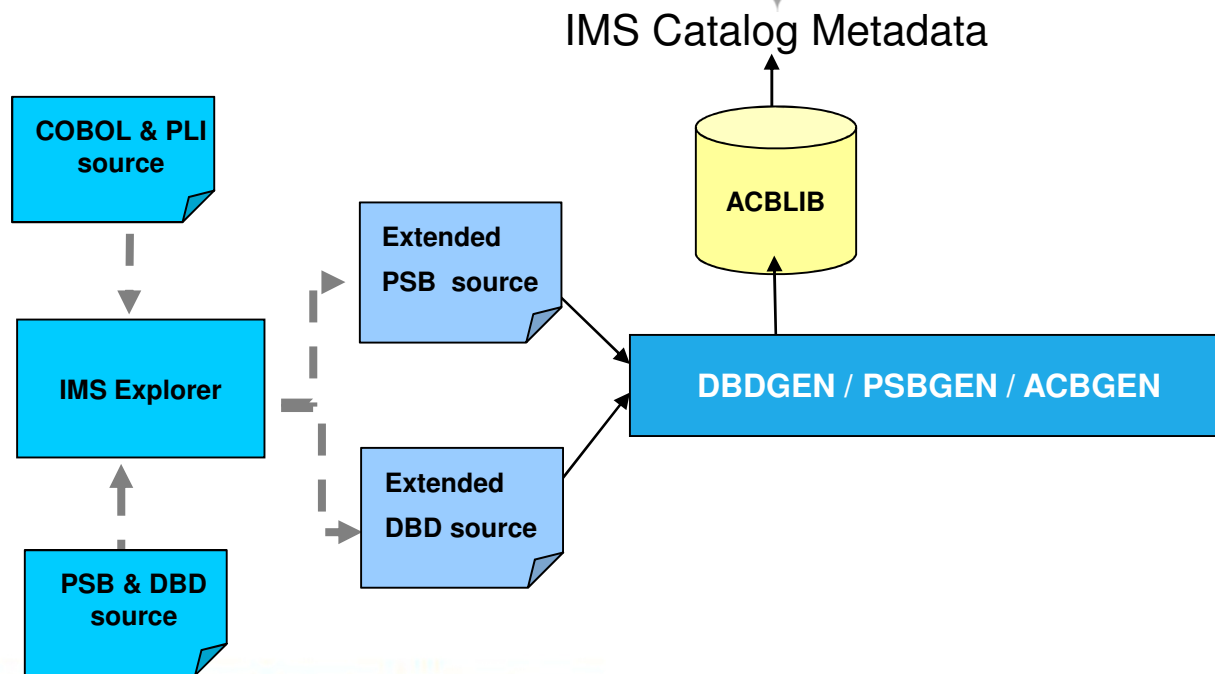
- IMS Explorer parses DBD, PSB and COBOL or PL/I source code
  - Generates PSBNAMEDataBaseView.java and .class files
  - Export as .jar file to file system where application is deployed
- Key points
  - Metadata deployed to multiple file locations
  - Metadata offline and not guaranteed to be current

# IMS Catalog for IMS Java Metadata

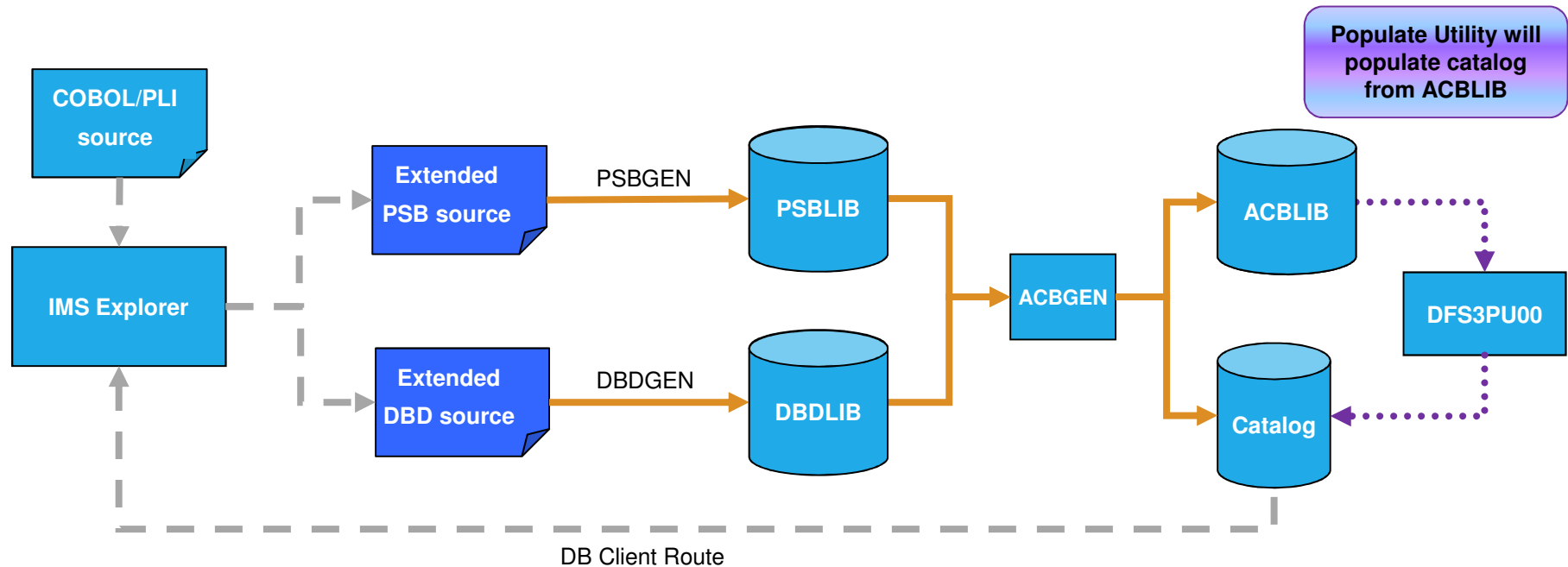


Contains IMS program & database resources, and relevant application metadata

Database Definitions	Application Program Specifications
<ul style="list-style-type: none"><li>▪ Segments</li><li>▪ Fields</li></ul>	<ul style="list-style-type: none"><li>▪ Arrays and Structures</li><li>▪ Field data types and data type conversion</li><li>▪ Field redefines</li><li>▪ Alternative Field maps for a segment</li></ul>



# IMS Catalog Lifecycle



- ACBGEN will populate ACBLIB and catalog in same UOW
  - Populates ACBLIB with standard ACB info and extended info
  - Populates the catalog with extended info
- Key points
  - Only way to update catalog is via the Populate Utility or ACBGEN process
  - Extended info is acquired via the IMS Explorer
  - Extended info stored in ACBLIB members for recoverability

# The IMS Catalog Database

- Contains metadata related to an IMS system's databases & programs
  - DBD and PSB and Application information
- IMS PHIDAM/OSAM HALDB database
  - Defined with 4 Data Set Groups (DSGs)
- One Secondary Index
- Unique feature → “Unregistered Catalog Database”
  - DBRC use is optional for the IMS Catalog database
    - Only HALDB that isn't required to be defined to DBRC
    - IMS can manage allocation/creation of catalog database
    - Done via parameters in the “CATALOG” section of DFSDFxxx PROCLIB member

# The IMS Catalog Database

- IMS provides the DBD and PSB source code and object code for the Catalog database
- PHIDAM DBD name is DFSCD000
- PSINDEX DBD name is DFSCX000
- Used to connect DBDs to PSBs that reference them
- PSBs provided to access the Catalog database
  - Initial load process - DFSCPL00
    - Used by the Catalog Populate Utility
  - Update access - DFSCP001
    - Used by the new ACBGEN Utility
  - Read access - DFSCP000 (COBOL/HLASM), DFSCP002 (PL/I), and DFSCP003 (PASCAL)
- Default catalog PCB is DFSCAT00
- ACBGEN required for all catalog PSBs

**Let's look at the IMS Catalog database physical structure...**

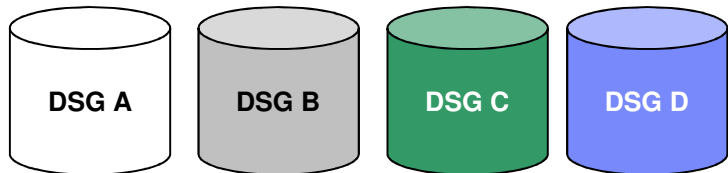
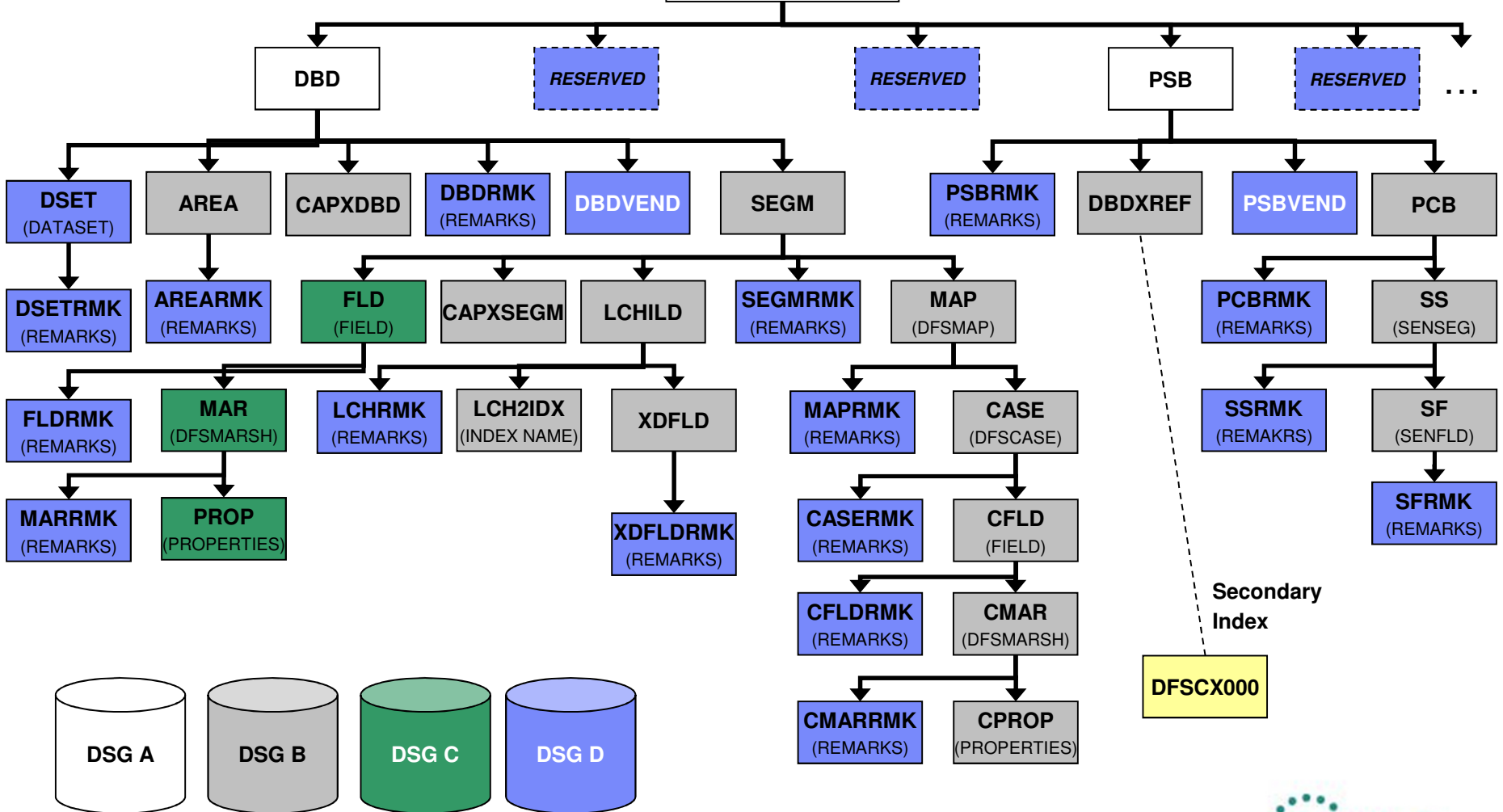
# Physical Catalog Record Structure



•Key value: **DBD**bbbbdbdname1



•Key value: **PSB**bbbbpsbname1



## Supported by Existing Database Utilities

- HALDB Index/ILDS Rebuild utility (DFSPREC0)
- HD Reorganization Unload utility (DFSURGU0)
- HD Reorganization Reload utility (DFSURGL0)
- Batch Backout utility (DFSBBO00)
- Database Recovery utility (DFSURDB0)
- Database Image Copy utility (DFSUDMP0 / DFSUDMT0)
  - Only batch image copies for an unregistered Catalog



# New Utilities for the IMS Catalog



- **IMS Catalog Populate utility (DFS3PU00)**
  - Loads or inserts records into the IMS catalog
  - Estimates the size of the IMS catalog data sets
- **ACB Generation and Catalog Populate utility (DFS3UACB)**
  - Generates the ACBLIB members and loads the IMS catalog metadata in one unit of work
- **IMS Catalog Alias Names utility (DFS3ALI0)**
  - Defines a complete list of catalog aliases to IMS
- **IMS Catalog Copy utility (DFS3CCE0, DFS3CCI0)**
  - Copies IMS catalog database definitions and metadata between IMS systems
    - Migrate an IMS catalog database from a test to production environment
    - Copy a production IMS catalog database to another installation for system cloning or DR purposes (etc...)
- **IMS Catalog Partition Definition Data Set utility (DFS3UCD0)**
  - When DBRC is not used to manage the catalog database: creates the IMS catalog partition definition data set and populates it with information about the IMS catalog HALDB partitions
- **IMS Catalog Record Purge utility (DFS3PU10)**
  - Removes unnecessary versions of IMS catalog records from the IMS catalog database based on criteria that you specify

# IMS Batch Processing with the Catalog

- Enabling the IMS catalog for IMS batch processing
  - Specify DFSDFxxx member on job EXEC parm
    - Requires JCL change to implement
  - Exit Routine (DFS3CDX0)
    - Optional Catalog Definition user exit routine
    - Alternative to specifying DFSDFxxx member through job JCL
    - Available if users cannot or choose not to modify job JCL

# IMS Catalog Enablement



- Add catalog DBDs and PSBs to your DBDLIB, PSBLIB & ACBLIB
  - Copy DBD and PSB object code from SDFSRESL to your DBDLIB and PSBLIB

```
//CPYCMEM EXEC PGM=IEBCOPY
//SDFSRESL DD DSN=SDFSRESL,DISP=SHR
//DBDLIB DD DSN=MYIMS.DBDLIB,DISP=OLD
//PSBLIB DD DSN=MYIMS.PSBLIB,DISP=OLD
//SYSIN DD *
COPY OUTDD=DBDLIB,INDD=((SDFSRESL,R)),LIST=YES
SELECT MEMBER=(DFSCD000,DFSCX000)
COPY OUTDD=PSBLIB,INDD=((SDFSRESL,R)),LIST=YES
SELECT MEMBER=(DFSCPL00,DFSCP000,DFSCP001,DFSCP002,DFSCP003)
```

- ACBGEN the catalog DBD and PSB resources into your ACBLIB

```
//CATABC EXEC PGM=DFSRR00,PARM='UPB'
//STEPLIB DD DSN=SDFSRESL,DISP=SHR
//DFSRESLB DD DSN=SDFSRESL,DISP=SHR
//IMS DD DSN=MYIMS.DBDLIB,DISP=SHR
// DD DSN=MYIMS.DBDLIB,DISP=SHR
//IMSACB DD DSN=IMS.ACBLIB,DISP=OLD
//SYSIN DD *
BUILD PSB=(DFSCPL00)
BUILD PSB=(DFSCP001)
BUILD PSB=(DFSCP000)
```

**N.B. The MODBLKS resources for the Catalog databases and programs do not need to be defined !**

# IMS Catalog Enablement

- Modify DFSDFxxx PROCLIB Member
  - New CATALOG section(s) for catalog related parameters
    - Single section format <SECTION=CATALOG>
    - Multiple section format <SECTION=CATALOG*imsid*>
      - Multiple IMS systems sharing one DFSDFxxx PROCLIB member
      - *imsid* suffix must be a four character IMS ID
  - CATALOG section parameters
    - CATALOG=N | Y
      - Catalog is disabled or enabled
      - If enabled, IMS automatically creates catalog DDIR & PDIRs at IMS startup
    - ALIAS=DFSC | xxxx (**no default value**)
      - Specifies any 1-4 alphanumeric value used as a Catalog database name prefix
      - Enables use of non-shared, Catalog databases within an IMSplex
        - Use in a data sharing environment where each IMS has its own Catalog database and all are registered in a single set of RECONS
        - At runtime, the alias Catalog database names are dynamically replaced with internal database names **DFSCD000** and **DFSCX000**
      - For standalone IMS system – use “**DFSC**” which is the standard Catalog database name prefix → **DFSCD000** and **DFSCX000**

# IMS Catalog Enablement

- DFSDFxxx PROCLIB Member
  - CATALOG section parameters (continued)
    - Information used by Catalog Populate Utility to automatically allocate the Catalog database data sets
      - DATACLAS
        - Optional data class for SMS managed data sets
      - MGMTCLAS
        - Optional management class for SMS managed data sets
      - STORCLAS
        - Required storage class for SMS managed data sets
      - IXVOLSER
        - Volume serial number for primary and secondary catalog indices
        - Required for non-SMS managed data sets
      - SPACEALLOC
        - Free space % (0 to 9999) added to the IMS-computed size of the primary & secondary data set allocations
      - SMSVOLCT
        - Number of volumes (1-20) created by the Catalog Populate utility for SMS-managed

# IMS Catalog Enablement

- DFSDFxxx PROCLIB Member
  - CATALOG section parameters (continued)
    - RETENTION=(MAX=2 | nnn) or RETENTION=(PERIOD=0 | nnn)
      - Specifies retention schedule for metadata in the IMS catalog
      - By default IMS keeps only two copies of the DBD or PSB in catalog
        - MAX=2 | nnn
        - Maximum number of versions of a DBD or PSB to be stored before they are replaced first-in first-out
    - PERIOD=0 | nnn
      - Maximum number of days a version of a DBD or PSB is to be stored before it can be replaced
      - Metadata versions older than the specified retention period are not automatically deleted, but available for removal when new version of metadata is added
      - Default value of “0” disables this feature

# IMS Catalog Enablement

- Definition of the HALDB structure
  - Partitioning of the catalog is the users responsibility
    - Minimum of 1 partition is required
    - Last partition must be able to contain the highest-key PSB record
    - Catalog HALDB uses the high-key selection method
      - No use of Partition Selection Exit allowed
  - Catalog Database Definition
    - For systems that use DBRC
      - Catalog database can be defined to the RECONs with the DBRC utility and commands
    - For systems that do not use DBRC
      - Catalog database must be defined to the Catalog Partition Definition data set using the Catalog Partition Definition Data Set utility, DFS3UCD0
    - If an ALIAS is used in the CATALOG sections of the DFSDfxxx member, each alias Catalog database must be defined

# IMS Catalog Enablement

- Using DBRC DSPURX00 utility and commands to define the Catalog database to the RECONS

```
//DEFCAT EXEC PGM=DSPURX00
//STEPLIB DD DSN=IMS.SDFSRESL,DISP=SHR
//SYSPRINT DD SYSOUT=*
//IMS DD DSN=IMS.DBDLIB,DISP=SHR
//SYSIN DD *
INIT.DB DBD(DFSCD000) TYPHALDB SHARELVL(3)
INIT.PART DBD(DFSCD000) PART(DFSCD01) -
  DSNPREFIX(dsnprefix.DFSCD000) -
  BLOCKSIZE(4096) -
  KEYSTRNG(X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF')
INIT.DB DBD(DFSCX000) TYPHALDB SHARELVL(3)
INIT.PART DBD(DFSCX000) PART(DFSCX01) -
  DSNPREFIX(dsnprefix.DFSCX000) -
  KEYSTRNG(X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF') /*
```

- If using a catalog alias prefix, replace **DFSC** in the database and partition names for the catalog and the catalog secondary index with the four character ALIAS name prefix
- You might need to define multiple alias name databases to the RECONS



# IMS Catalog Enablement



- Using the Catalog Partition Definition Data Set utility, DFS3UCD0, to define the Catalog database (for systems that do not use DBRC)

```
//S1 EXEC PGM=DFS3UCD0,REGION=0M
//STEPLIB DD DSN=IMS.SDFSRESL,DISP=SHR
//DFSRESLB DD DSN=IMS.SDFSRESL,DISP=SHR
//DFSHDBSC DD DSN=...,DISP=
//SYSPRINT DD SYSOUT=*
//IMS DD DSN=IMS.DBDLIB,DISP=SHR
//SYSIN DD *
  HALDB=(NAME=DFSCD000)
  PART=(NAME=DFSCD000,PART=partitionname,
        DSNPREFIX=dsnprefix,
        KEYSTRNG=keystring)
  HALDB=(NAME=DFSCX000)
  PART=(NAME=DFSCX000,PART=partitionname,
        DSNPREFIX=dsnprefix,
        KEYSTHEX=FFFFFFFFFFFFFFFF) /*
```

Unregistered  
Catalog database

- Catalog Partition Definition data set is populated with the information specified in the HALDB and PART control cards
  - RECON-like information for catalog database partition definition and structure
- The name DFSCD000 in the HALDB and PART statements contains the default catalog prefix **DFSC**. If your catalog uses an alias name prefix, substitute it in the JCL.

# IMS Catalog Enablement



- After Catalog database is defined in Catalog Partition Definition Data Set
  - Identify unregistered Catalog database names
    - UNREGCATLG parameter in the DATABASE section of the DFSDFxxx member

```
/* **** */
/* Database Section */
/* **** */
<SECTION=DATABASE>
UNREGCATLG=(DFSCD000,DFSCX000) /* Unregistered IMS catalog DB */
/* **** */
/* **** */
/* **** */
```

- If using an alias name prefix, replace **DFSC** in the UNREGCATLG database names with the four character alias name prefix
- Limitations of using an unregistered Catalog database
  - NO IMS Data Sharing support
  - NO OLR support
  - NO partition definition change support
    - User must rebuild catalog partitions
  - Manual recovery required for unregistered Catalog databases

# IMS Catalog Enablement

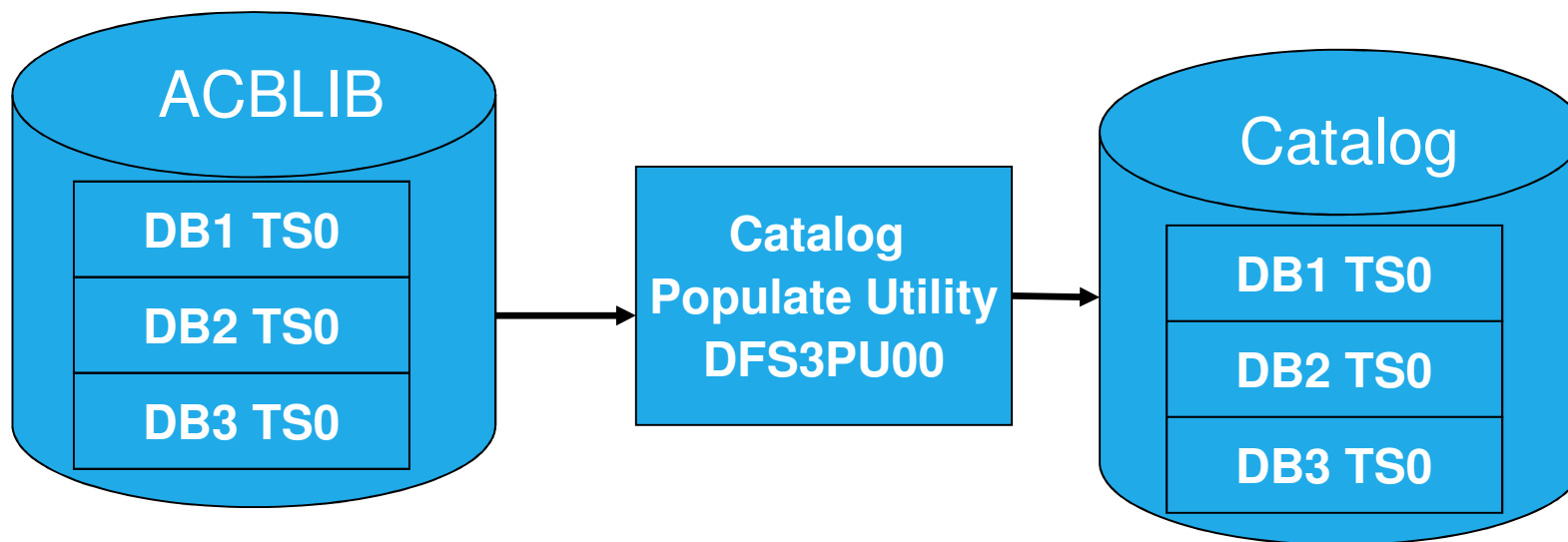


- After Catalog database is defined in Catalog Partition Definition Data Set
  - Create a new DFSMDA dynamic allocation member for the Catalog Partition Definition data set

```
//DYNALOC JOB
//*
//STEP EXEC IMSDALOC
//SYSIN DD *
    DFSMDA TYPE=INITIAL
    DFSMDA TYPE=CATDBDEF, DSNAME=dsn
    DFSMDA TYPE=FINAL
END
/*
```

- **dsn** is the name of the Catalog Partition Definition data set
  - Catalog Partition Definition data set was allocated in the DFS3UCD0 utility on the DFSHDBSC DD
- Dynamically allocate Catalog Partition Definition data set in any IMS job step

# IMS Catalog Members After Populate Utility



- Start with 3 members in an ACBLIB
- Run the Catalog Populate Utility, **DFS3PU00**
- Created catalog members will contain timestamp TS0
- This is the same timestamp from the ACB member

# Catalog Populate Utility Report



CATALOG DFSCD000  
PARTITION DFSCD01  
NUMBER OF SEGMENTS INSERTED INTO THE CATALOG  
INSERTED AVERAGE

SC	SEGMENT	SEGMENTS	DSG	PARENT	SEGS/PARENT
1	HEADER	4228	A		
2	DBD	2530	A	HEADER	0.6
3	CAPXDBD	7	D	DBD	0.0
5	DSET	2599	D	DBD	1.0
7	AREA	139	D	DBD	0.1
9	SEGM	16337	B	DBD	6.5
10	CAPXSEGM	1	D	SEGM	0.0
12	FLD	16426	C	SEGM	1.0
14	MAR	16426	C	FLD	1.0
17	LCHILD	2687	B	SEGM	0.2
20	XDFLD	134	B	LCHILD	0.0
33	PSB	1840	A	HEADER	0.4
35	PCB	9190	B	PSB	5.0
37	SS	75274	B	PCB	8.2
39	SF	1105	B	SS	0.0
41	DBDXREF	8886	D	PSB	4.8

SEGMENT within existing header duplicates not inserted

DBD	71	0
PSB	72	0

ESTIMATED SPACE REQUIREMENT TO HOLD INSERTED SEGMENTS

DSG	BLKSIZE	BLOCKS
A	4096	596
B	4096	9343
C	4096	8214
D	4096	236

DSG	RECORDS
L	8886
X	4230

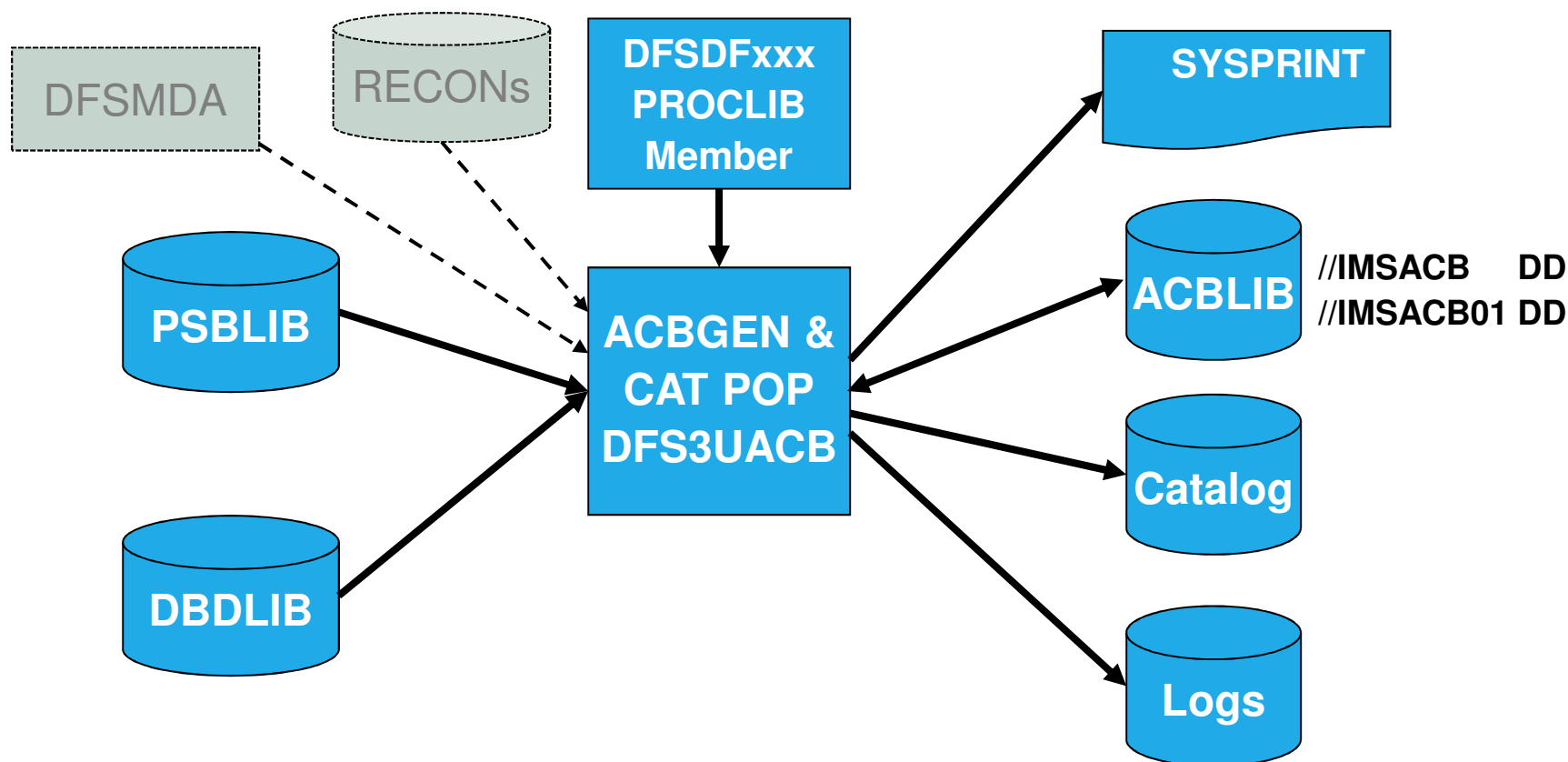
SECONDARY INDEX	RECORDS
DFSCX000	8886

# Adding IMS Catalog Metadata



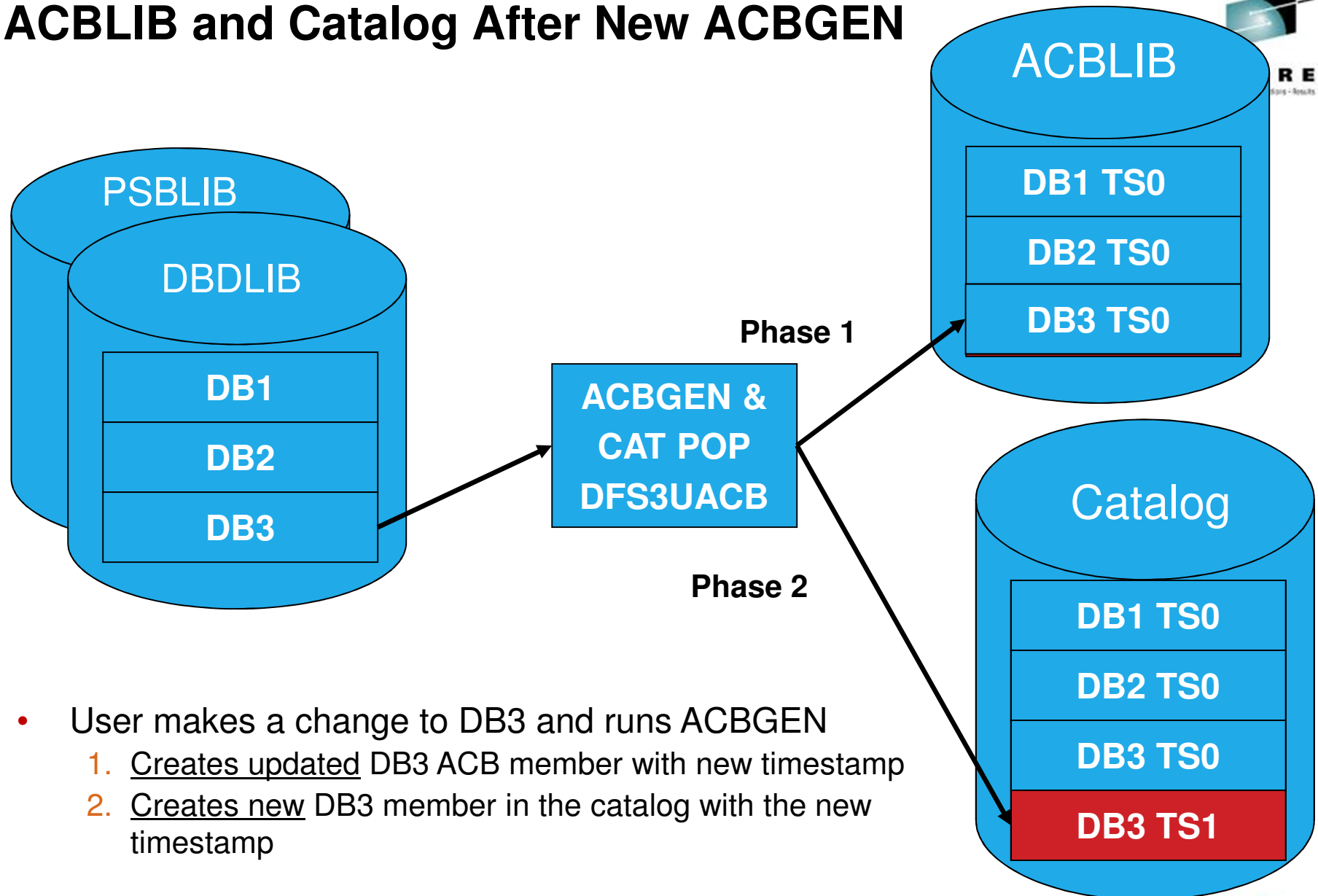
- New ACB Generation - **DFS3UACB**
  - Replaces existing ACBGEN Utility, DFSUACB0 (if IMS catalog enabled)
  - Generate ACBLIB member and populate/create catalog metadata in a **single job step**
    - Phase 1 - ACBGEN
      - DBDLIB and PSBLIB members used as input
      - Validation is unchanged
      - ACB member is written to ACBLIB with new ACBGEN timestamp
    - Phase 2 – IMS catalog update
      - Generated ACB is decoded, converted to catalog segments , loaded into the catalog
        - DBD and PSB metadata created and inserted
        - Corresponding ACB member timestamp saved as timestamp in catalog DBD and PSB segments
          - ensures validity and consistency of ACBLIB and catalog
- New ACBGEN, DFS3UACB, and new Catalog Populate, DFS3PU00, utilities are the **only** updaters of the IMS catalog
  - IMS online and IMS batch regions will never update catalog data
  - IMS online and IMS batch regions will only retrieve data from the catalog

# IMS Catalog Additions: New ACBGEN



- New integrated ACBGEN process includes update to the IMS catalog
- DFSDFxxx PROCLIB member has the catalog information
- DFSMDA member used to dynamically allocate the catalog datasets

# ACBLIB and Catalog After New ACBGEN

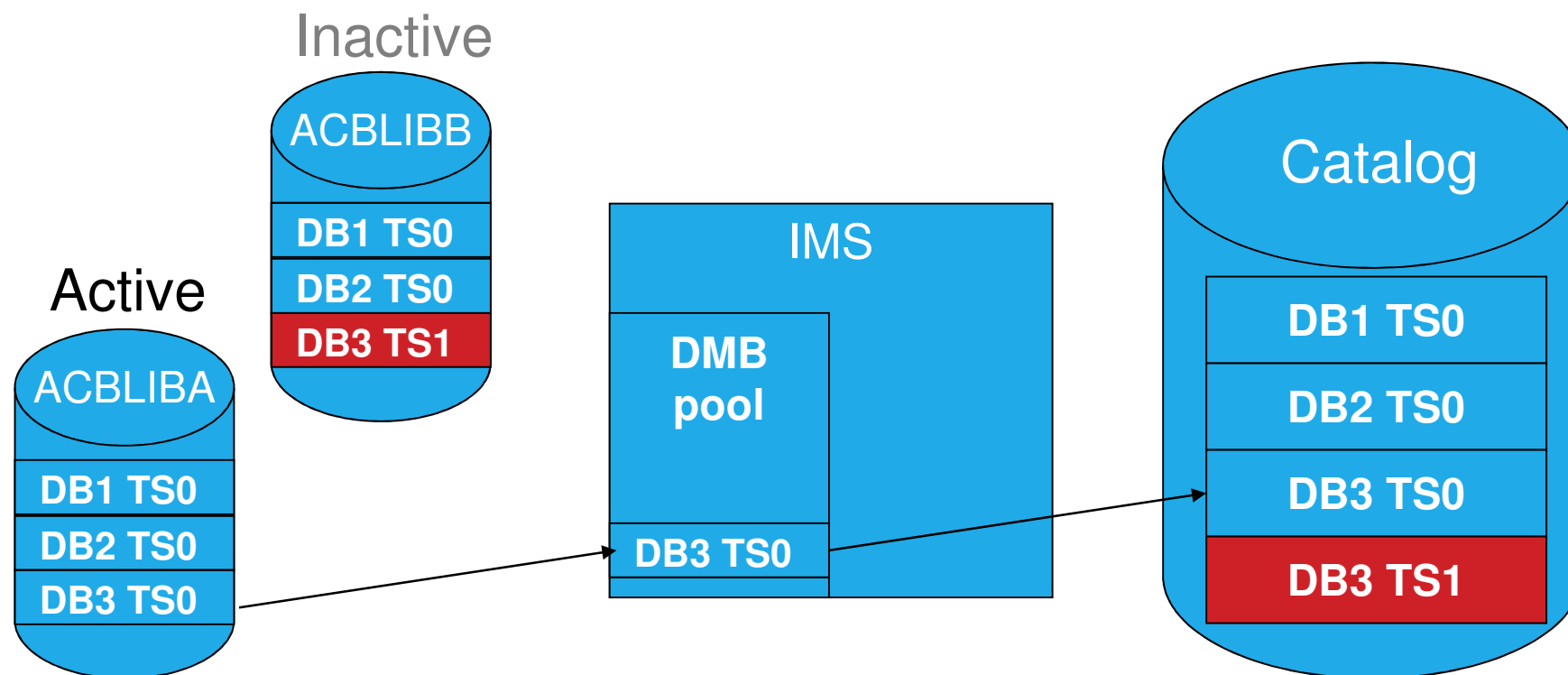


- User makes a change to DB3 and runs ACBGEN
  1. Creates updated DB3 ACB member with new timestamp
  2. Creates new DB3 member in the catalog with the new timestamp



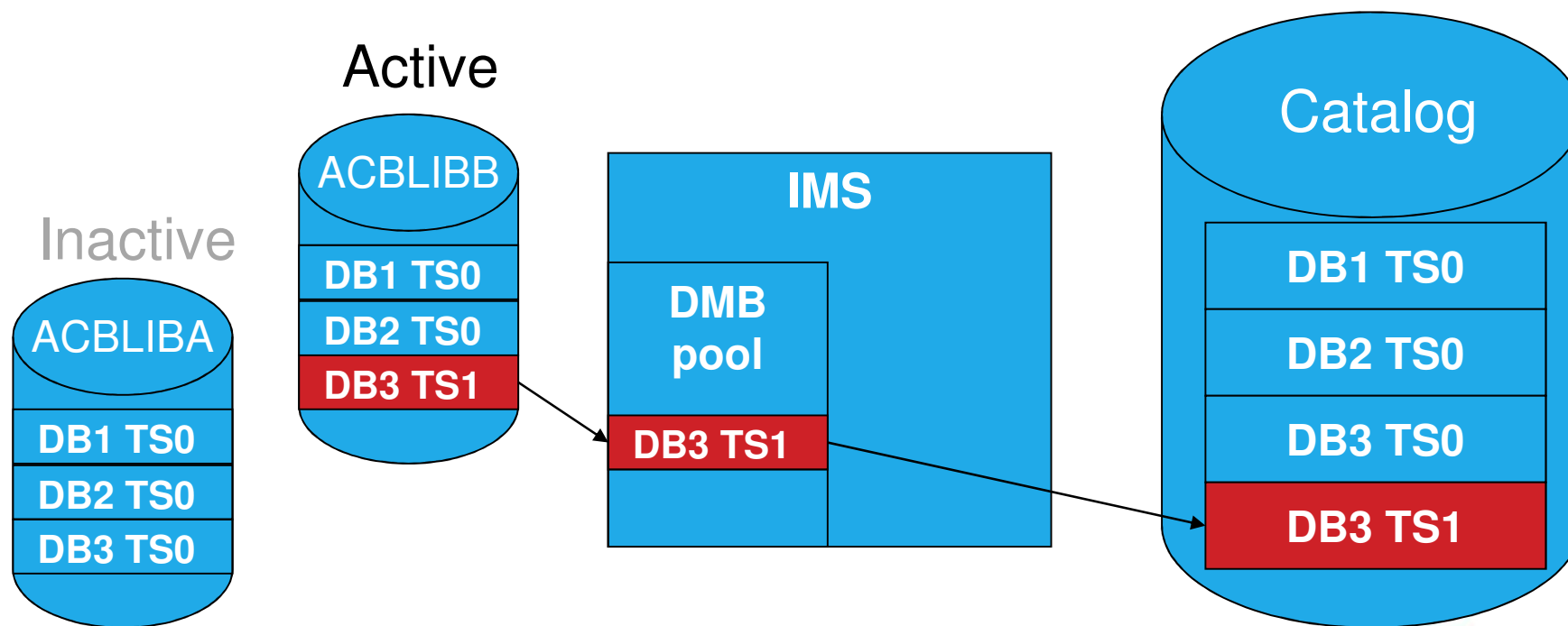
# Catalog Member Timestamps

- Application request is made to read DB3
  1. IMS determines active DB3 member has timestamp TS0
  2. Internal DL/I call issued to retrieve member DB3 from IMS catalog
  3. IMS retrieves metadata from catalog member DB3 with timestamp TS0



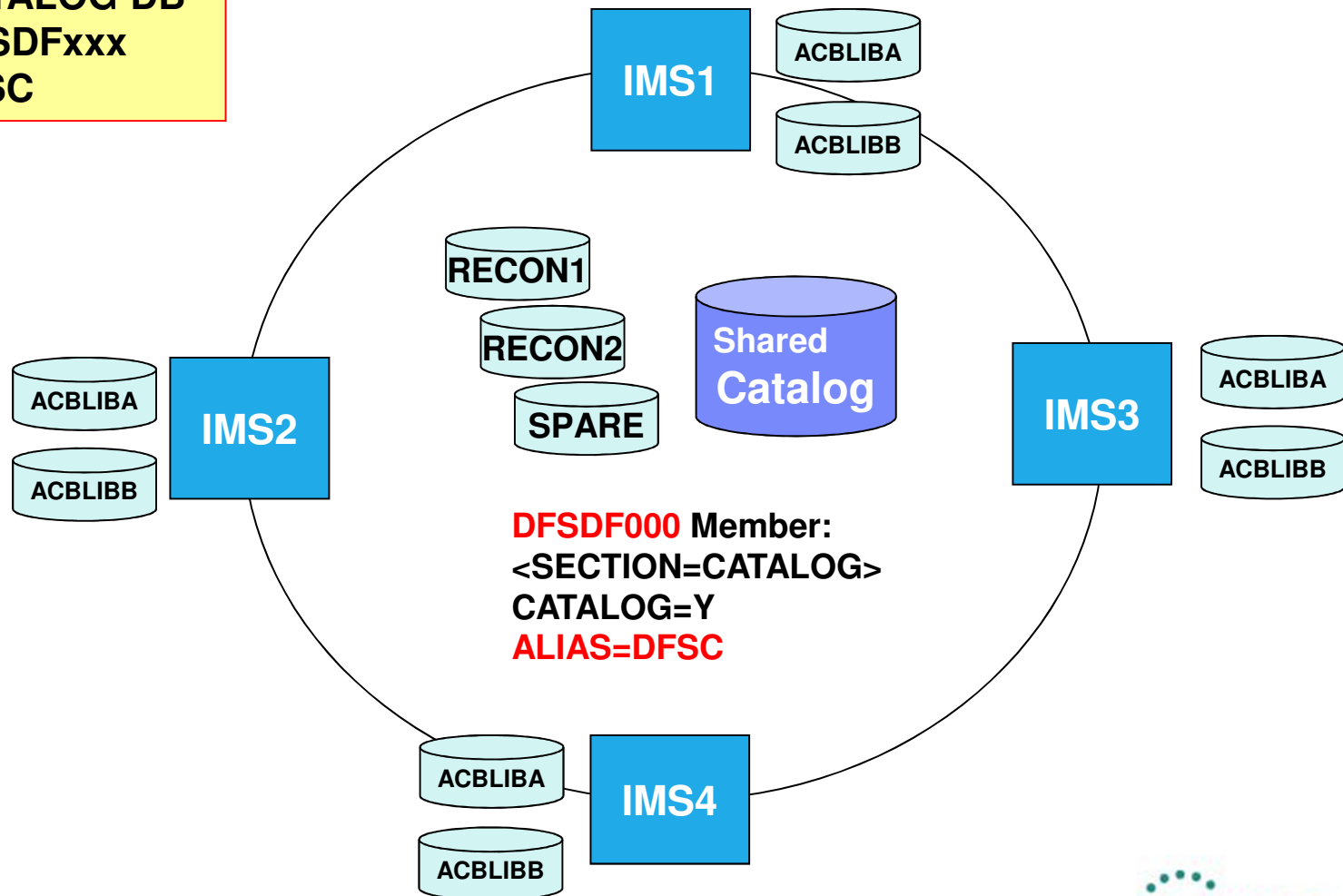
# Catalog Member Timestamps

- Initiate OLC to switch from ACBLIBA to ACBLIBB
  - Activates DB3 ACB with timestamp TS1
- Application request is made to read DB3
  1. Internal DL/I call issued to retrieve member DB3 from IMS catalog
  2. IMS determines active DB3 member has timestamp TS1
  3. IMS retrieves metadata catalog member DB3 with timestamp TS1



# Multiple IMSes, Cloned ACBLIBs, Shared Catalog

Shared CATALOG DB  
Shared DFSDFxxx  
ALIAS=DFSC



# Multiple IMSes, Shared ACBLIBs, each IMS has it's own Catalog



Non-Shared CATALOG DBs  
Shared DFSDFxxx  
Separate <SECTION=CATALOGimsid>  
ALIAS=xxxx

**DFSDF000** Member:

<SECTION=CATALOGIMS1>

CATALOG=Y

ALIAS=CAT1

<SECTION=CATALOGIMS2>

CATALOG=Y

ALIAS=CAT2

<SECTION=CATALOGIMS3>

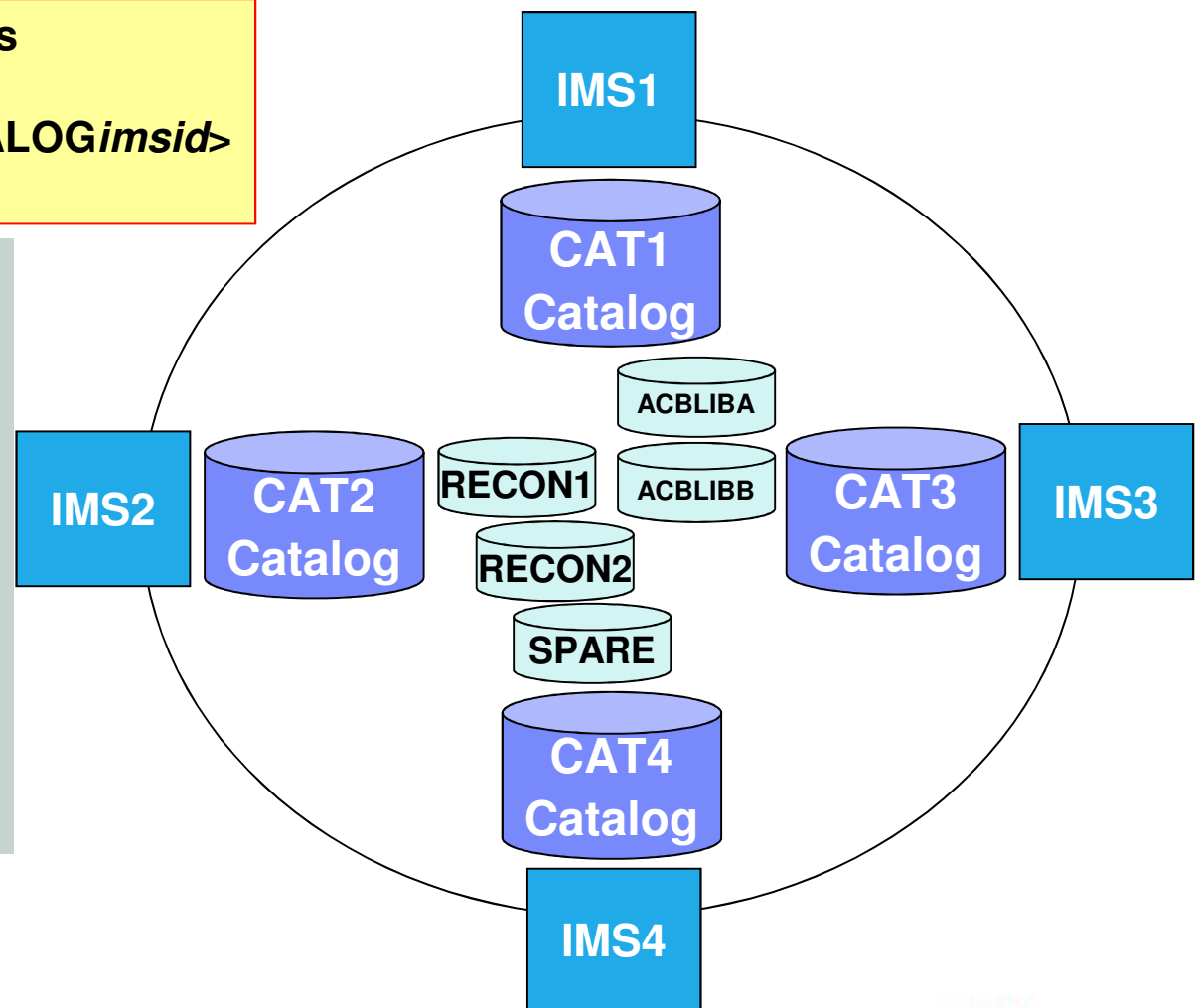
CATALOG=Y

ALIAS=CAT3

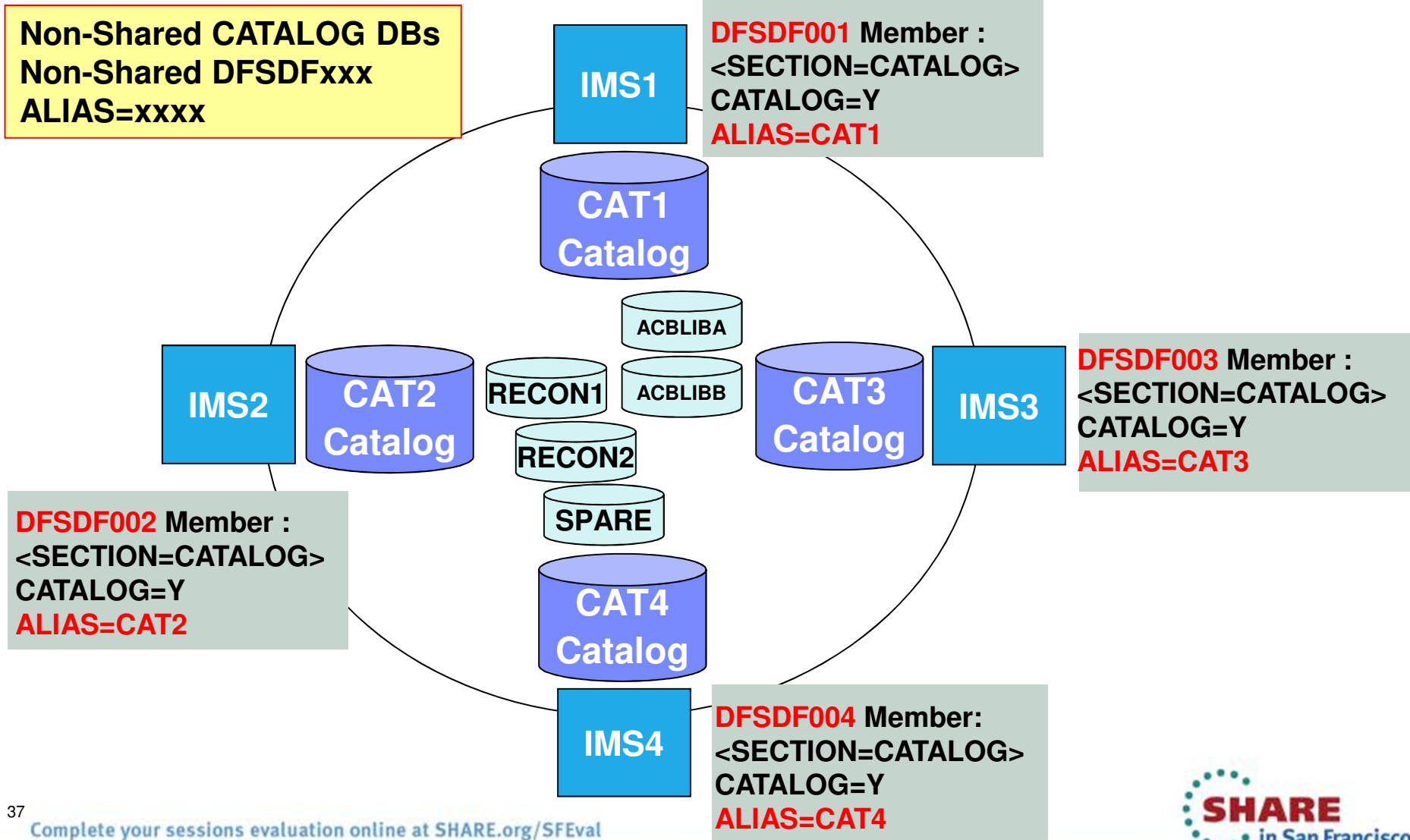
<SECTION=CATALOGIMS4>

CATALOG=Y

ALIAS=CAT4



# Multiple IMSes, Shared ACBLIBs, each IMS has it's own Catalog



# Application Programming with IMS Catalog



- IMS catalog PSBs resident for application programs
  - DFSCP000 - High-level assembler and COBOL applications
  - DFSCP002 - PL/I applications
  - DFSCP003 - PASCAL applications
- PCBs included to support different catalog processing models:
  - DFSCAT00 - Primary PCB to access all data in the catalog database
  - DFSCAT SX – Used access the catalog database via the catalog 2<sup>nd</sup> index
  - DFSCAT X0 – Used to access the catalog 2<sup>nd</sup> index as a database
- All catalog processing is performed with PROCOPT=G
- New “GUR” DL/I call to access Catalog DB records
  - Application programs can use the GUR call

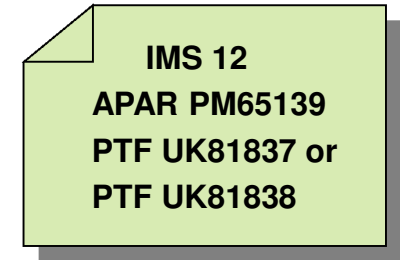
# NEW “GUR” DL/I Call

- Get Unique Record
  - Retrieves an XML formatted Catalog database “record”
  - Restricted to use with the IMS Catalog database
- Functions like a GU followed by a series of GNP calls
  - Less overhead than issuing GU & GNP to retrieve all the metadata for a catalog member
- Returns the entire database DBD or PSB record in one call
  - Using an AIB token, the call can be continued if the I/O area is too small for the entire catalog database record
- Data returned in XML format
  - The XML schemas are included in the IMS.ADFSSMPL data set:
    - DFS3XDBD.xsd (for DBD records)
    - DFS3XPSB.xsd (for PSB records)
- Support added for DFSDDLTO and IMS REXX

# SSA Command Code “O”: Qualify by Position



- New SSA command code “O”
  - Non-key field definitions not required in the DBD
    - Allows fields defined in database metadata to be used
  - Search by position and length vs. field name
    - 4 byte position, hex value
    - 4 byte length, hex value UK81837 UK81838
  - Valid for HDAM, HIDAM, PHDAM, PHIDAM and DEBD databases
  - Valid for GU, GHU, GN, GNP, GHNP, ISRT calls
  - Plays well with other command codes
  - “GE” status code returned if field not found
  - Support for DFSDDLTO and IMS REXX
  - Performance will be the same as non-key field search





# SSA with command code, position and length

- SSA with "O" command code, position and length

## DBD

Field	Offset	Len
LASTNAME	1	10

## Database Segments

0	1	2	3
<u>1234567890</u>	<u>1234567890</u>	<u>1235678901</u>	<u>234567</u>
LAST1	FIRST1	555-1111	1999999
LAST2	FIRST2	555-2222	2999999
LAST3	FIRST3	555-3333	3999999

## COBOL Copybook

Field	Offset	Len
LASTNAME	1	10
FIRSTNME	11	10
EXTENSIN	21	10
ZIPCODE	31	7

'bb' Status Code: segments returned successfully

```

GU TELEBOOK*--(LASTNAME=LAST2      )
GU TELEBOOK*O-(000000010000000A=LAST3      )
GU TELEBOOK*O-(0000000B0000000A=FIRST1      )

```

Offset
Length

(Offset is relative to 1 vs. zero)

# SSA Command Code “O”: Qualify by Position



IMS12  
APAR PM69378  
PTF UK81917

- Support for IMS Universal Drivers
  - Allows users to issue queries qualified on non-searchable fields and have a field’s position and length generated automatically in the qualified SSA
  - SQL
    - Universal Drivers will detect a non-searchable field in the where clause based on database metadata and will internally convert the SSAList qualification
  - DLI
    - Universal Drivers will detect a non-searchable field in the SSAList based on database metadata and will internally convert the SSAList qualification

# IMS Universal Driver Additional Enhancements



- Variable length segment support
  - VL segments contain a two byte length (LL) field that identify size of the segment instance
  - Universal Drivers are now sensitive to the LL field of a VL segment and will manage the IO area of the segment instance on all CRUD calls

FIELD=PERSONAL_INFO (VLOB min length=82 max length=112)			
INNER FIELD=LENGTH (2 bytes)	INNER FIELD=NAME (30 bytes)	INNER FIELD=ADDRESS (50 bytes)	INNER FIELD=EMAIL (optional field 30 bytes)
112	RICHARD	555 Bailey Ave	tran@abc123.com
82	KEVIN	555 Bailey Ave	<does not exist physically on disk>

# Mapping Support

- A Map is metadata that describes how a field, or set of fields, are mapped for a particular segment instance
- Various mapping cases are captured in the metadata
  - defines the set of fields to be used for each case
- Maps can be defined in the IMS catalog
- Example:
  - Insurance segment mapped multiple ways depending on value of a 'Policy Type' field

Policy Type	Property Type	Rooms	Value	Address	Make	Model	Year	Value	Color
M	-	-	-	-	Ford	Escort	1989	2K	Red
H	Single Family	5	500K	555 Disk Drive Way, 95141	-	-	-	-	-

# IMS Catalog Benefits

- Trusted, online source for IMS metadata
- Direct access to IMS metadata in the catalog
- Leveraged by the Universal Database Drivers
- No need for “local” Java metadata classes

# Summary

- **IMS Catalog**
  - Contains information about IMS program resources, database resources, and relevant application metadata
  - New ACBGEN
    - Used to auto-populate the catalog
  - The IMS Catalog: The Next Step in Simplification and Enterprise Integration  
<http://www-01.ibm.com/software/sw-events/teleconference/D108305C25358T22.html>
- **IMS Enterprise Suite Explorer for Development**
  - Generates DBD/PSB source used to populate the catalog
  - Enables IMS metadata discovery
  - IMS Enterprise Suite Explorer: The new face of IMS  
<http://www-01.ibm.com/software/sw-events/teleconference/T929253D59548D24.html>

# Two New IMS White Papers!!



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## IBM Cognos Proven Practices: Best Practices for Using IMS Data in IBM Cognos BI Reports

Product(s): IMS, IBM Cognos BI Server; Area of Interest: Business Intelligence

**Richard Tran**, Software Engineer, IBM  
**Kevin Hite** ([khite@us.ibm.com](mailto:khite@us.ibm.com)), IMS Solution Test, IBM  
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