# Purging those "pesky" older (inactive) instances of DBDs & PSBs in the IMS Catalog

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# Thank You

- Clients:

  - Robert Recknagel of FI-TS

  - TSYS friends

- Colleagues:

  - Joe Reynolds, Greg Vance, Suraj Natarajan & Harman Gill

# Agenda

- What are **instances** of DBDs & PSBs in the IMS Catalog

  - In a Catalog only environment &

  - In an IMS Managed ACB environment

- Understanding the **Timestamps** in the IMS Catalog

- Understanding the **Retention parameter**

- Running the  **IMS Catalog Record Purge utility (DFS3PU10)**

- Best Practices

# **Instances** of DBDs & PSBs in the IMS Catalog

# Introduction

- Title of this presentation: "Purging those "pesky" older (inactive) instances of DBDs & PSBs **in the IMS Catalog**."

- IMS Catalog can be implemented:

  - Stand alone (i.e. Catalog only environment) or

  - As part of IMS Managed ACB environment

# IMS Catalog only environment
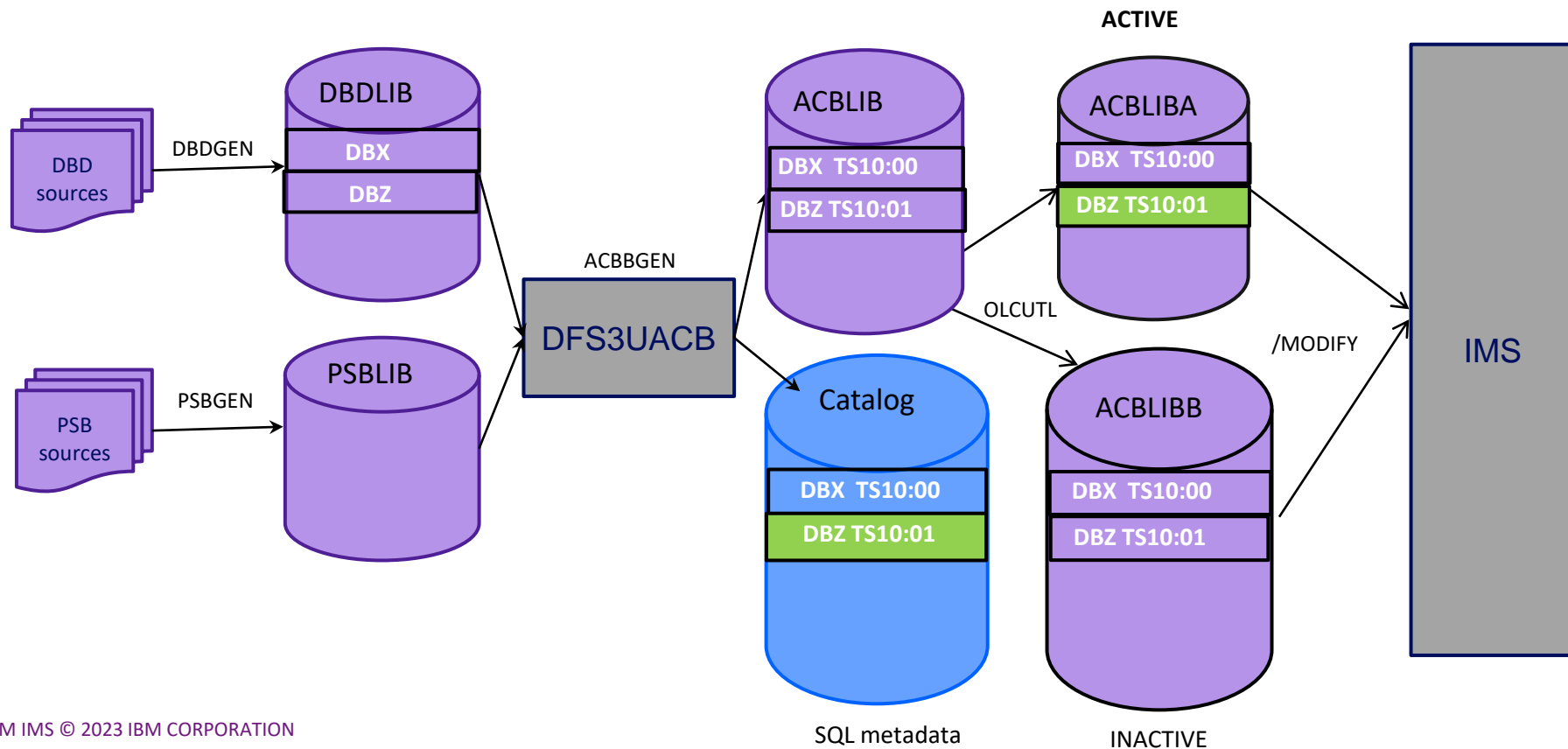# (non-IMS Managed ACB environment)

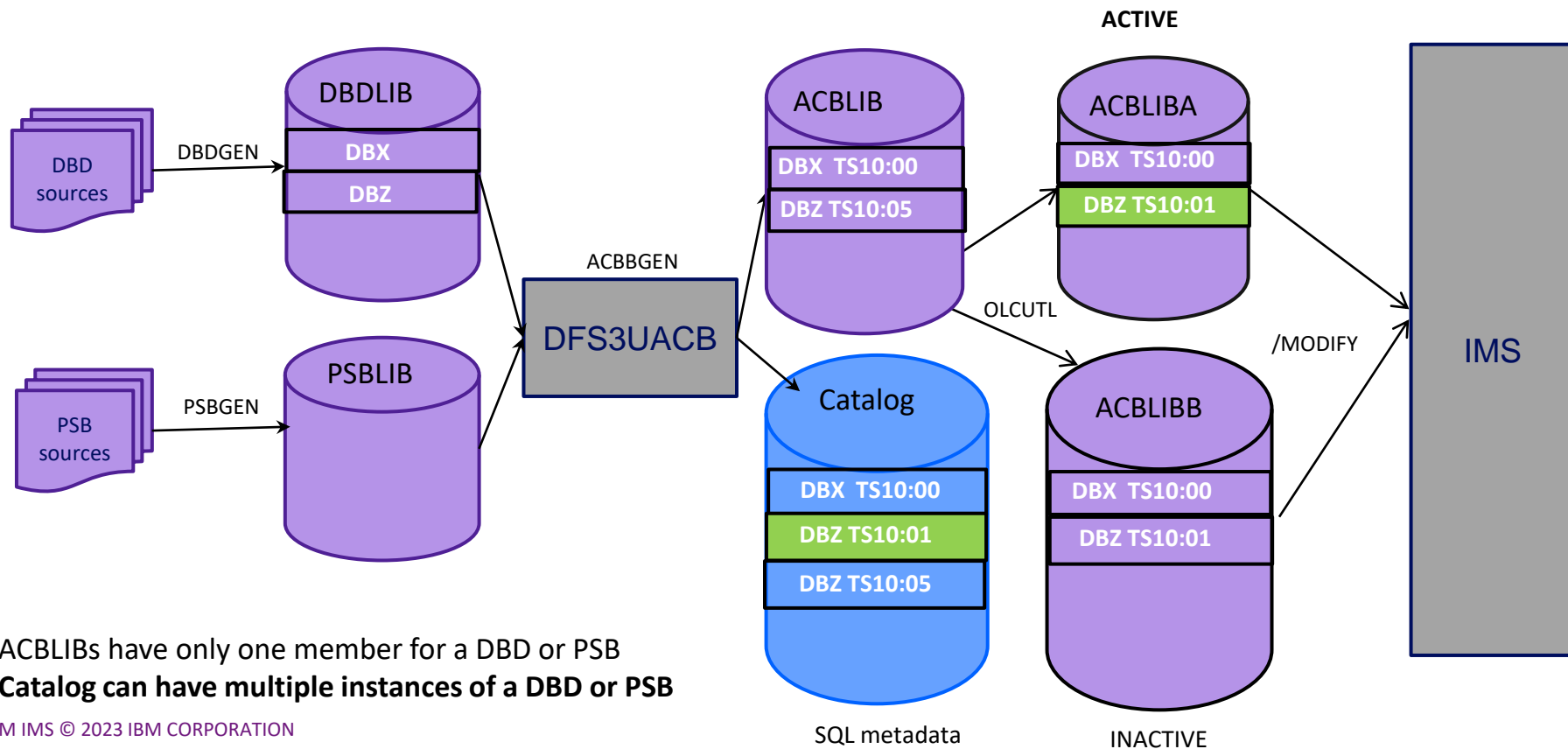# Genning a DBD or PSB - Catalog only environment
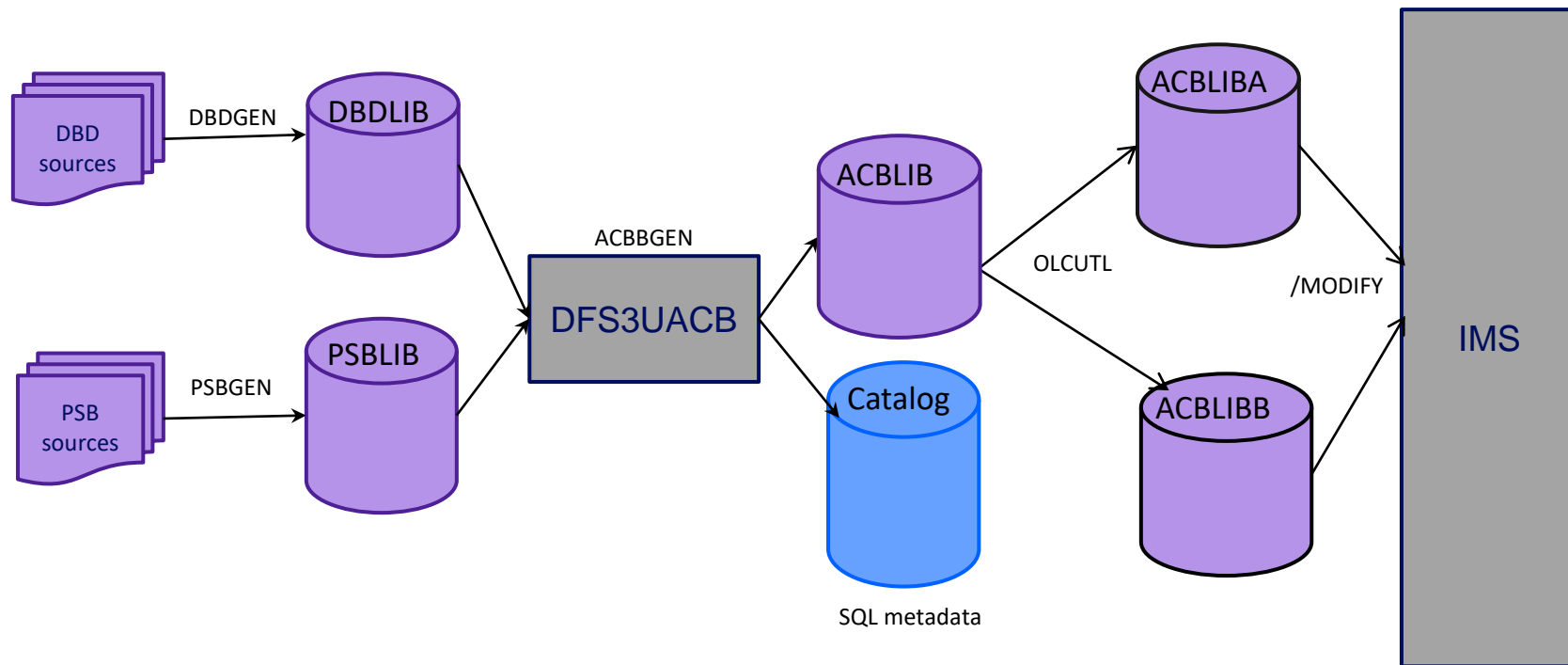
Examples of ACBGENs in IMS <u>Catalog only</u> environment
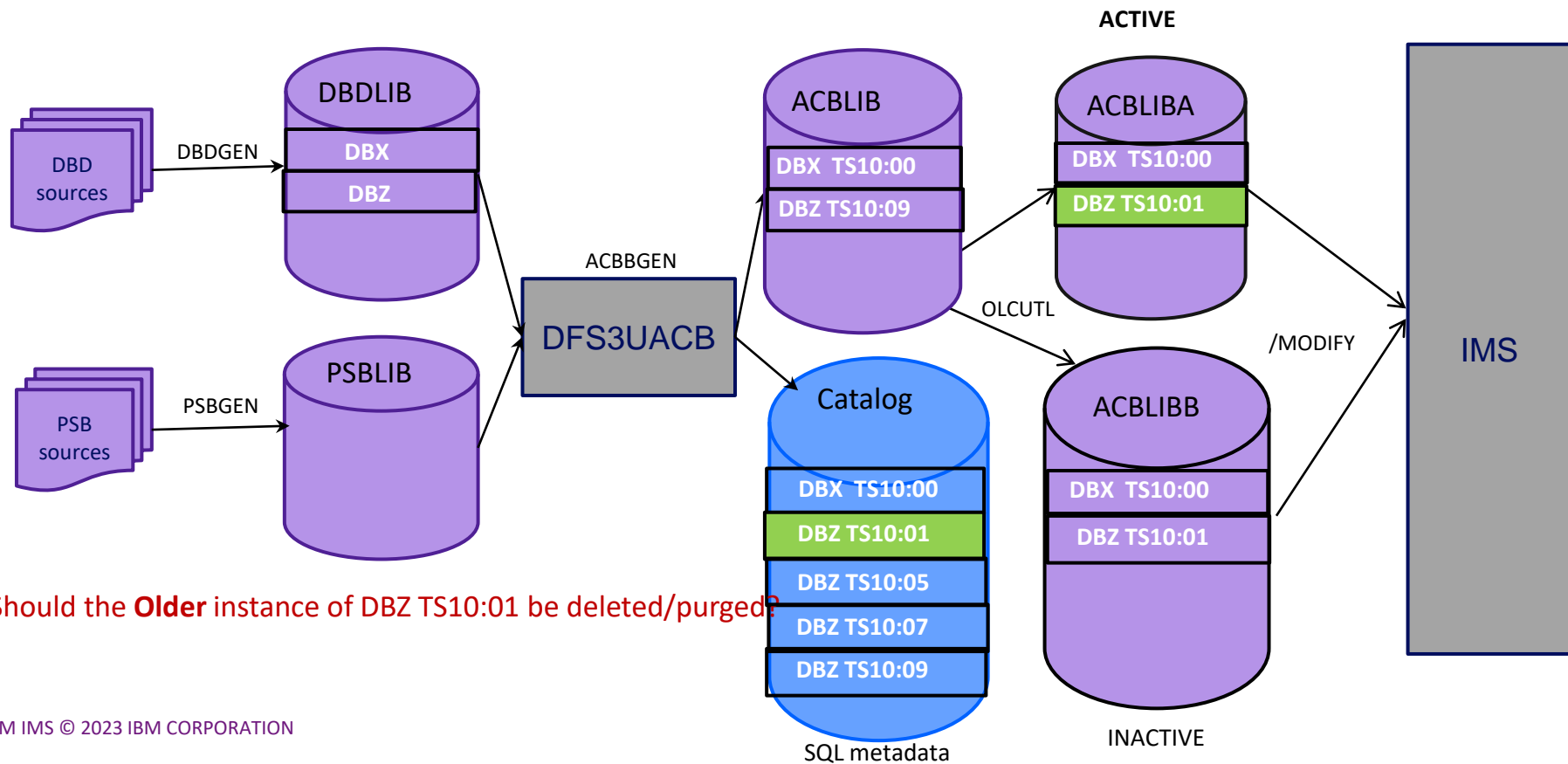
# DBX & DBZ genned into the system
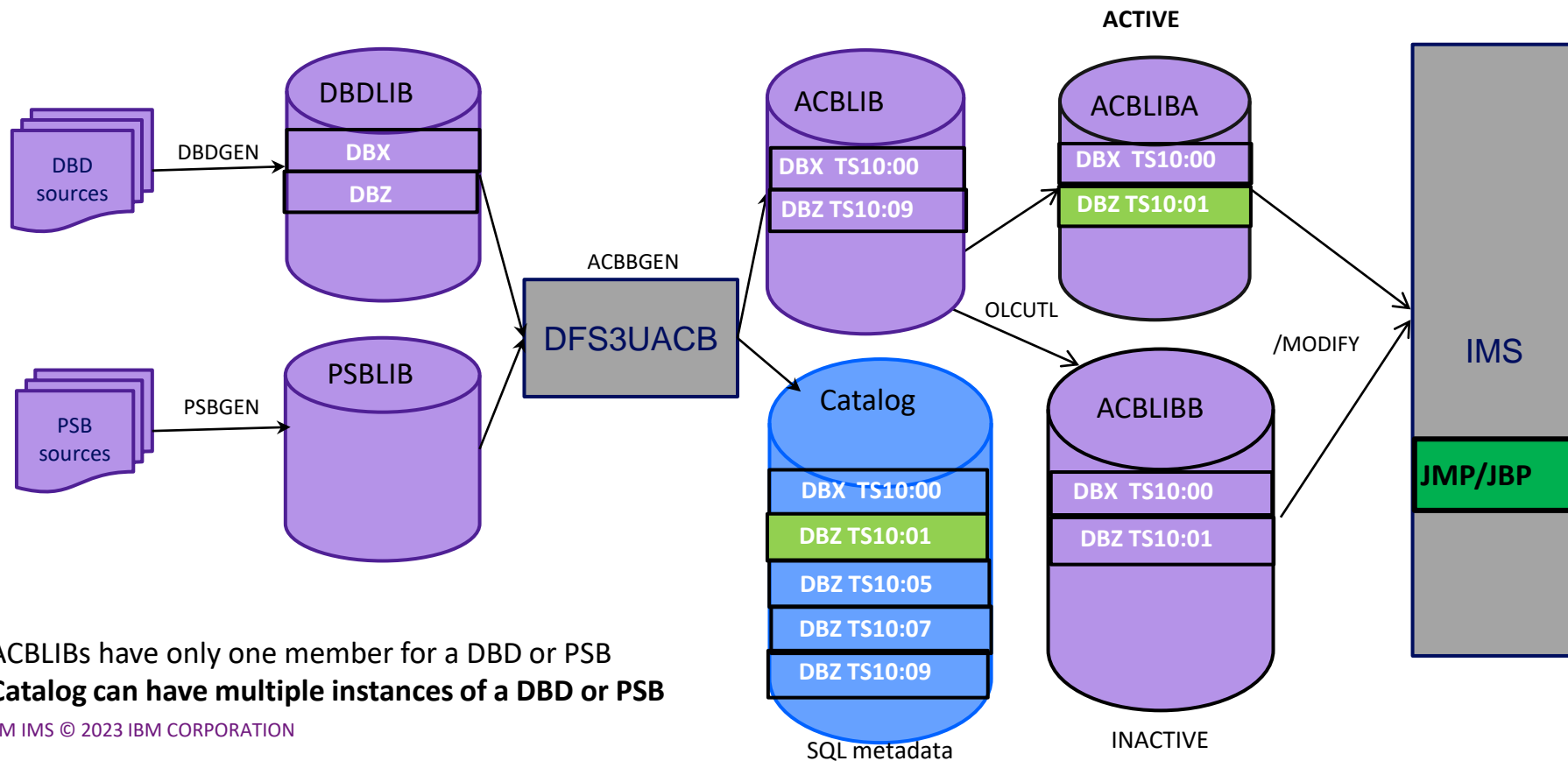
# DBZ re-ACB genned into the system @ 10:05 (no OLC)



- ACBLIBs have only one member for a DBD or PSB
- **Catalog can have multiple instances of a DBD or PSB**

# DBZ re-ACB genned a couple more times (no OLC)



DBD sources → DBDGEN → DBDLIB [DBX, DBZ]

PSB sources → PSBGEN → PSBLIB

DBDLIB, PSBLIB → ACBBGEN / DFS3UACB → ACBLIB [DBX TS10:00, DBZ TS10:09]

**ACTIVE**
ACBLIBA [DBX TS10:00, DBZ TS10:01]

OLCUTL → Catalog [DBX TS10:00, DBZ TS10:01, DBZ TS10:05, DBZ TS10:07, DBZ TS10:09]
SQL metadata

ACBLIBB [DBX TS10:00, DBZ TS10:01]
**INACTIVE**

/MODIFY → IMS

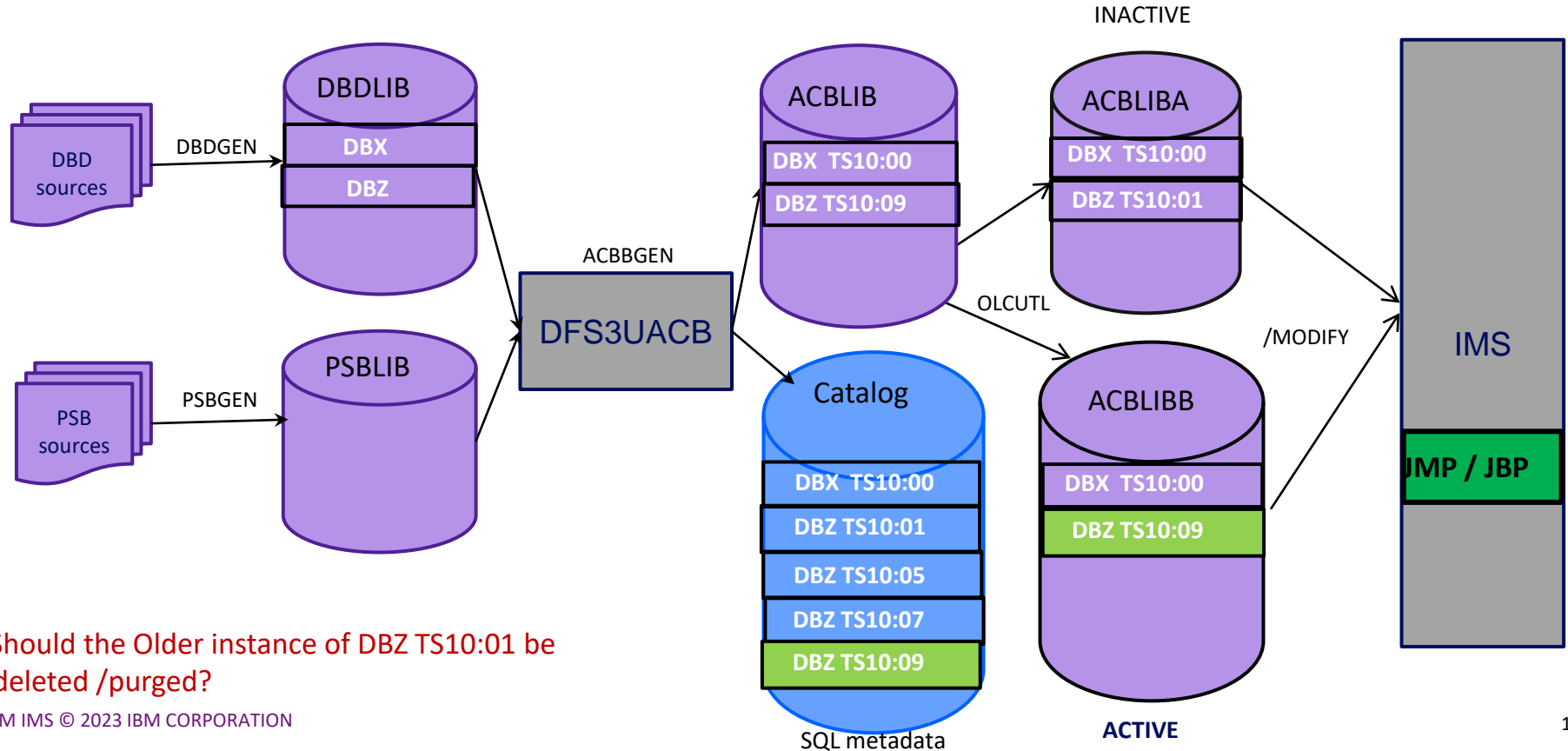- Should the **Older** instance of DBZ TS10:01 be deleted/purged?

# JBP Program starts up (no OLC) …



- ACBLIBs have only one member for a DBD or PSB
- **Catalog can have multiple instances of a DBD or PSB**
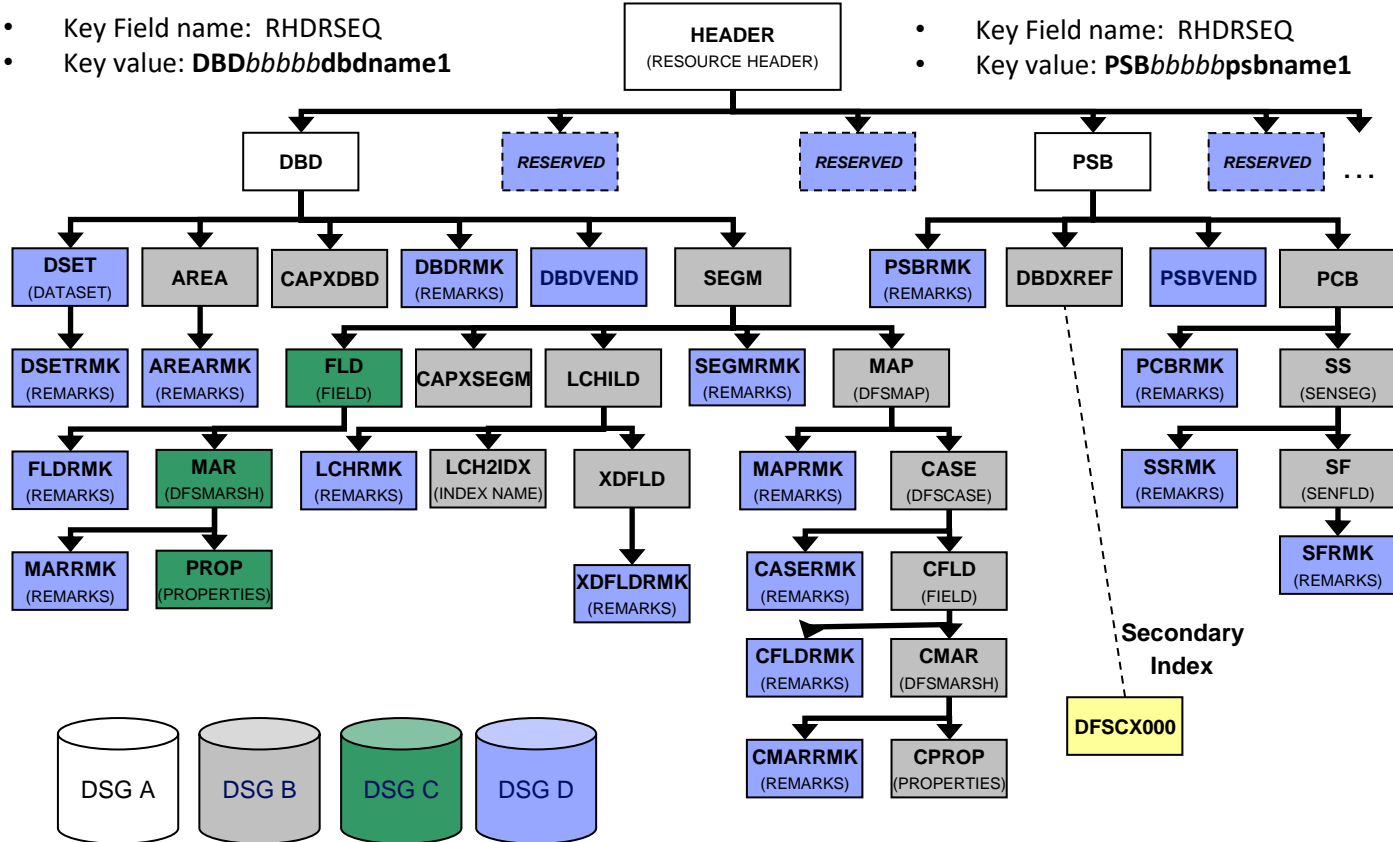
# JBP Program starts up (after OLC) …



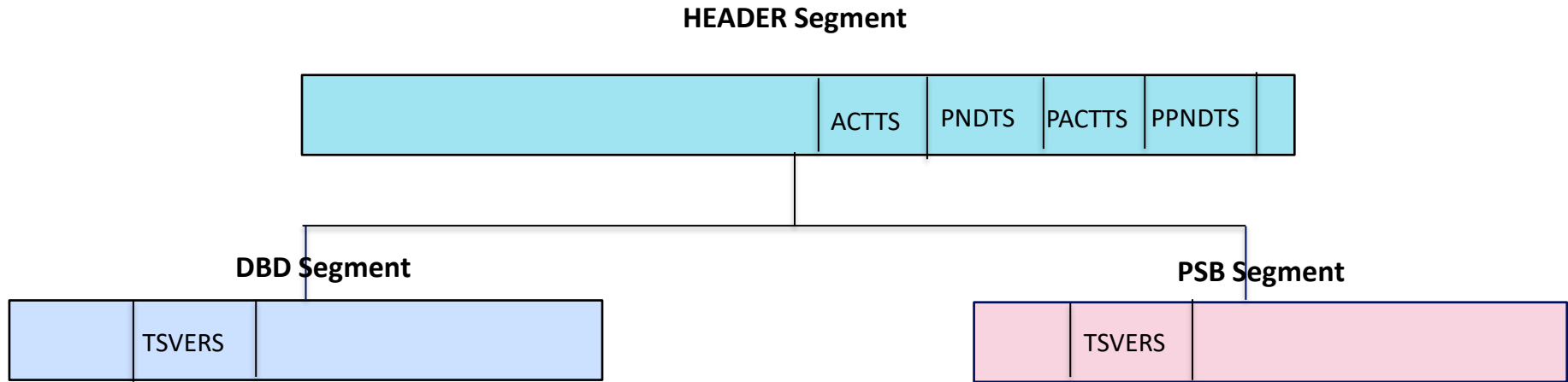- Should the Older instance of DBZ TS10:01 be deleted /purged?

# Understanding Timestamps in the IMS Catalog
## (for a Catalog Only environment)

# IMS Catalog Hierarchy

# Where are the timestamps in the IMS Catalog?

**HEADER Segment**

| | ACTTS | PNDTS | PACTTS | PPNDTS | |
|---|---|---|---|---|---|

**DBD Segment**

| | TSVERS | |
|---|---|---|

**PSB Segment**

| | TSVERS | |
|---|---|---|

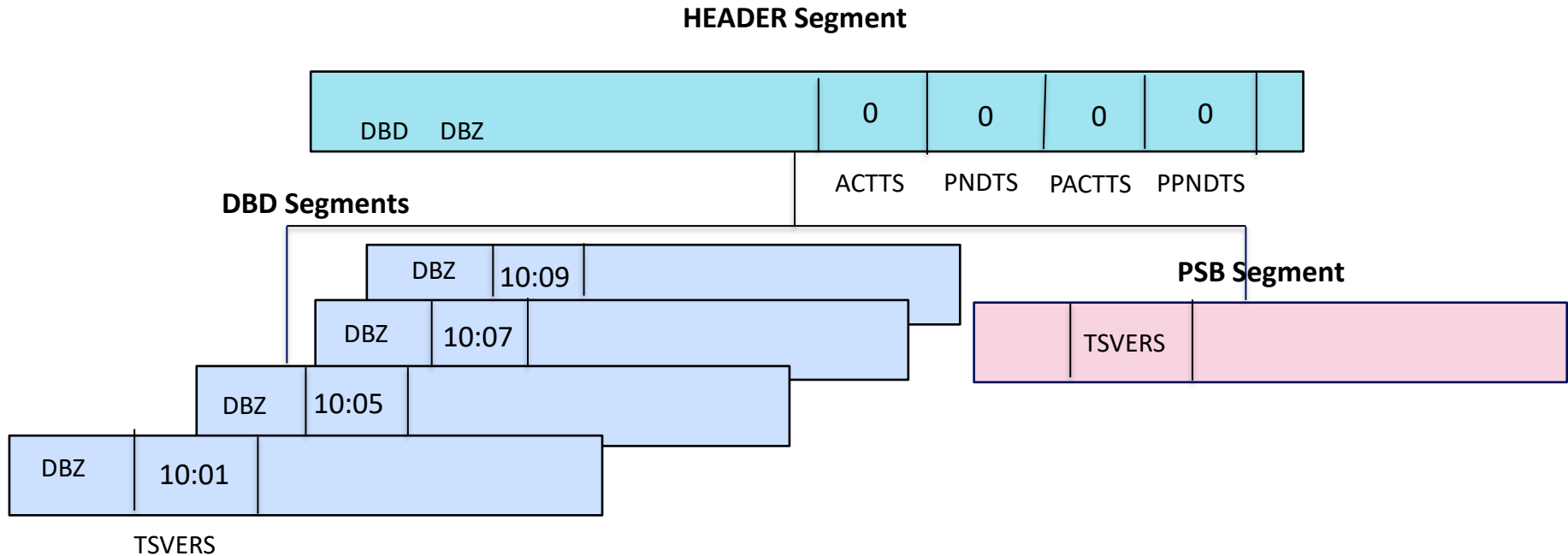- ACTTS – Active Timestamp – will be 0 in a Catalog only environment
- PNDTS – Pending Timestamp – will be 0 in a Catalog only environment
- PACTTS – Printable active timestamps – will be 0 in a catalog only environment
- PPNDTS – Printable pending timestamp – will be 0 in a catalog only environment

- TSVERS – Timestamp matching ACBGEN for the DBD or PSB

# Remember this scenario: where OLC was not done
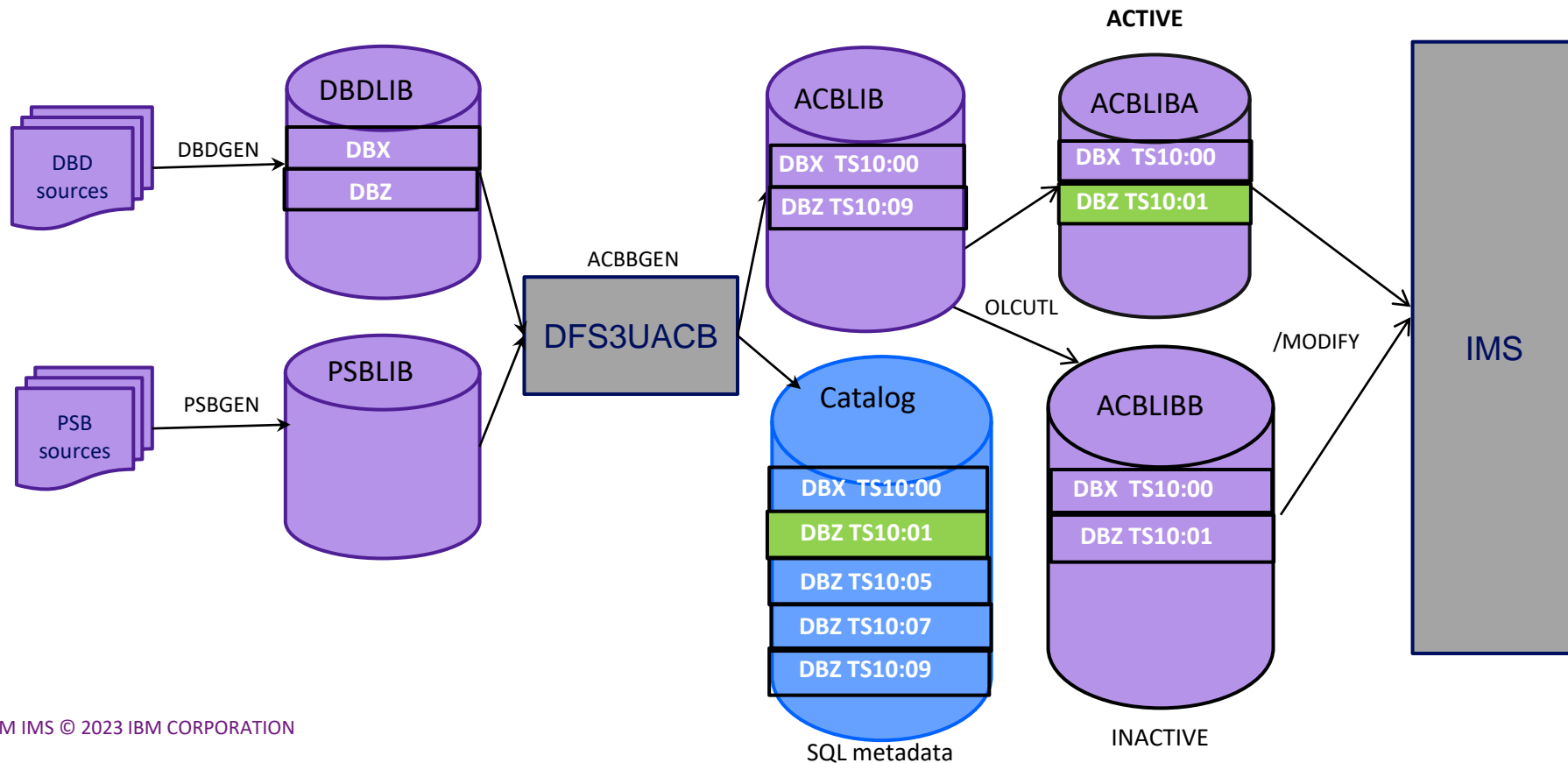
# Catalog instances from previous scenario
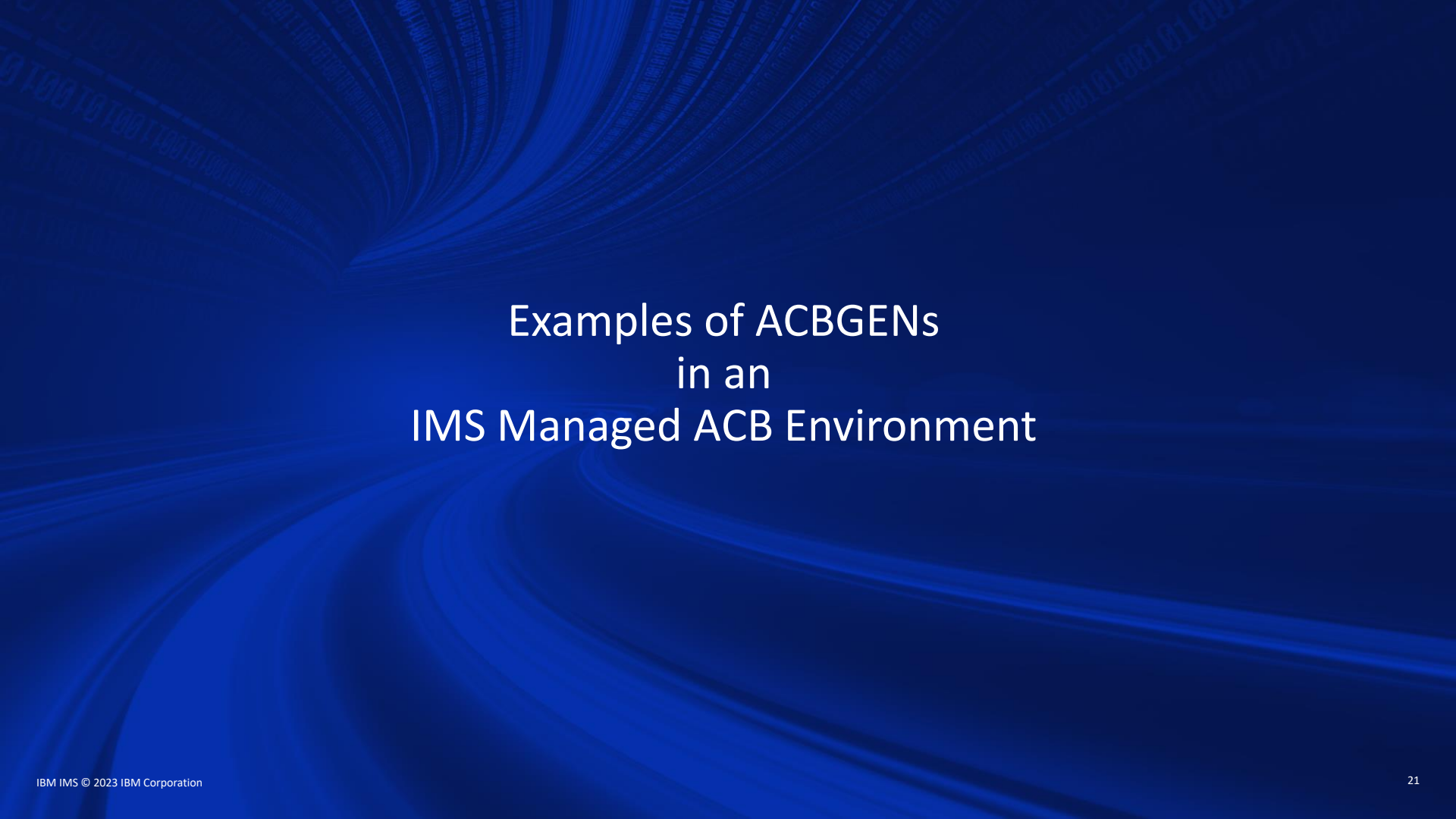
**HEADER Segment**

| | | | 0 | 0 | 0 | 0 | |
|---|---|---|---|---|---|---|---|
| DBD | DBZ | | | | | | |

ACTTS    PNDTS    PACTTS    PPNDTS

**DBD Segments**

**PSB Segment**

DBZ    10:09

DBZ    10:07

| | TSVERS | |
|---|---|---|

DBZ    10:05

DBZ    10:01

TSVERS

IMS Catalog
in an
IMS Managed ACB environment

# Genning a DBD or PSB – IMS Managed ACB environment
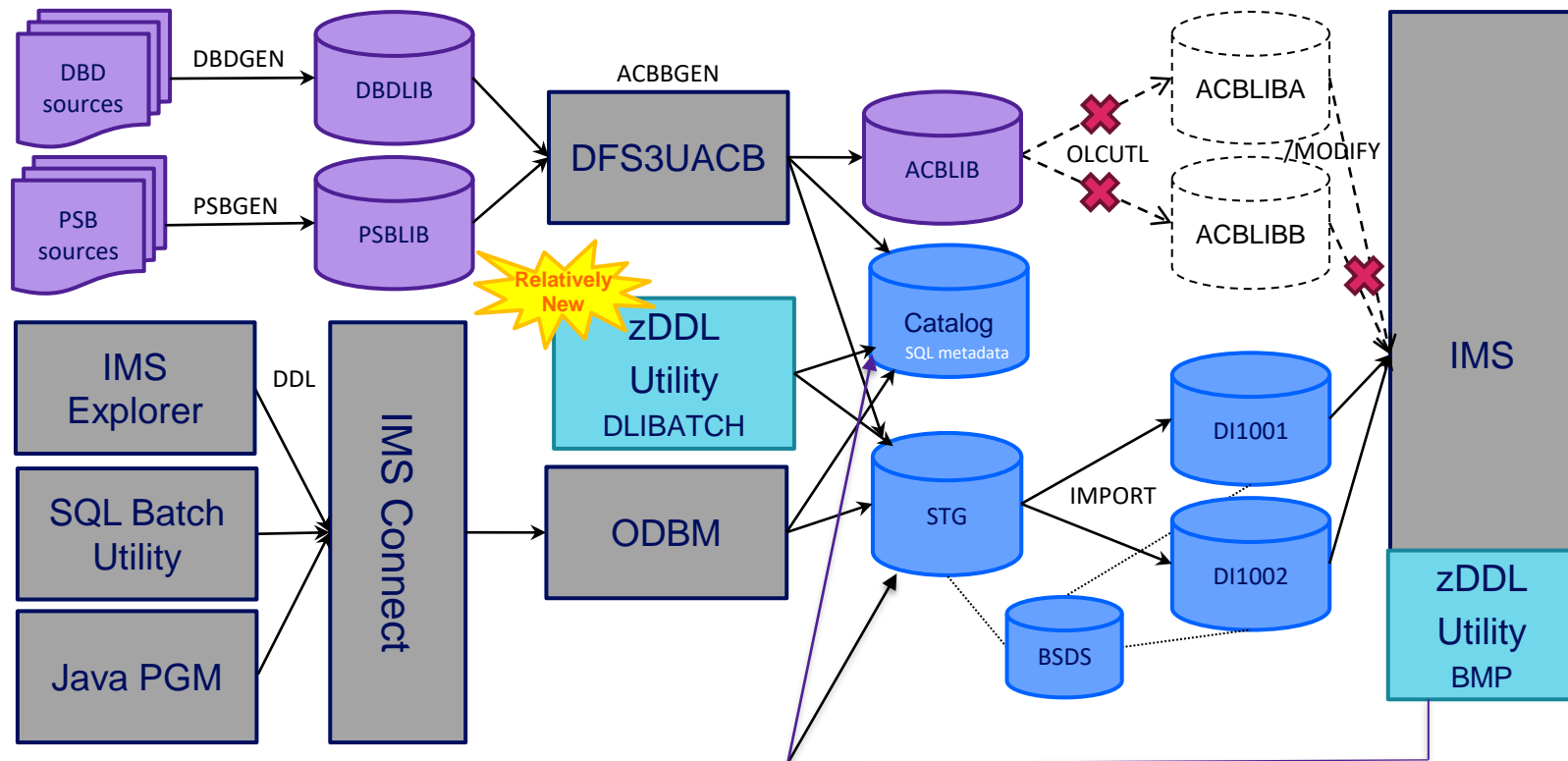
# Examples of ACBGENs
# in an
# IMS Managed ACB Environment

# DBX & DBZ genned into the system
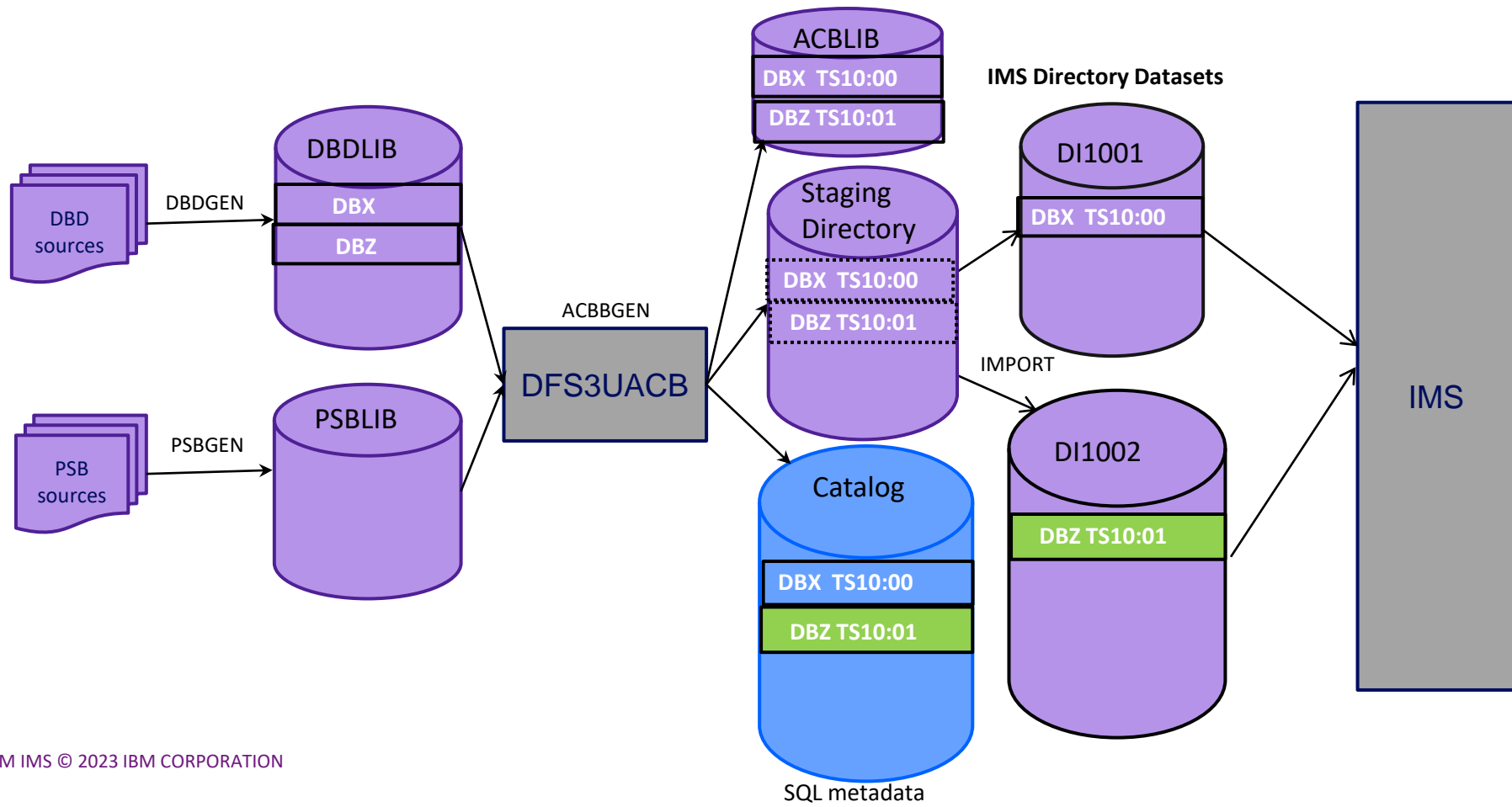
# DBZ genned into the system a couple more times (without IMPORT)



DBD sources → DBDGEN → DBDLIB (DBX, DBZ)

PSB sources → PSBGEN → PSBLIB

ACBBGEN → DFS3UACB

ACBLIB
- DBX TS10:00
- DBZ TS10:09

**IMS Directory Datasets**

Staging Directory
- DBZ TS10:09

DI1001
- DBX TS10:00

IMPORT

DI1002
- DBZ TS10:01

Catalog
- DBX TS10:00
- DBZ TS10:01
- DBZ TS10:05
- DBZ TS10:09

SQL metadata

IMS

- Should the Older instance of DBZ TS10:01 be deleted /purged?
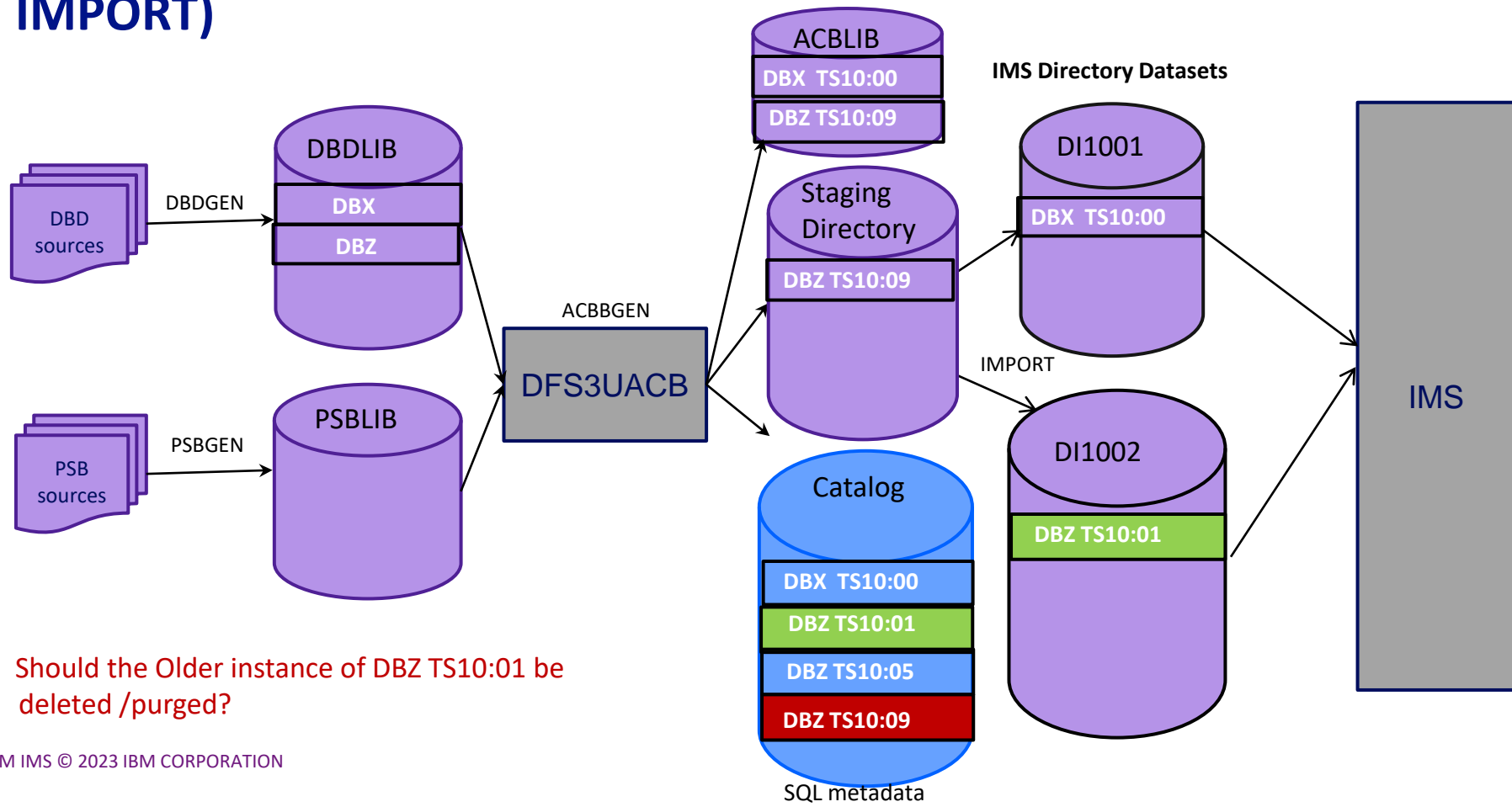
# DBZ genned into the system a couple more times, JBP started, (without IMPORT)
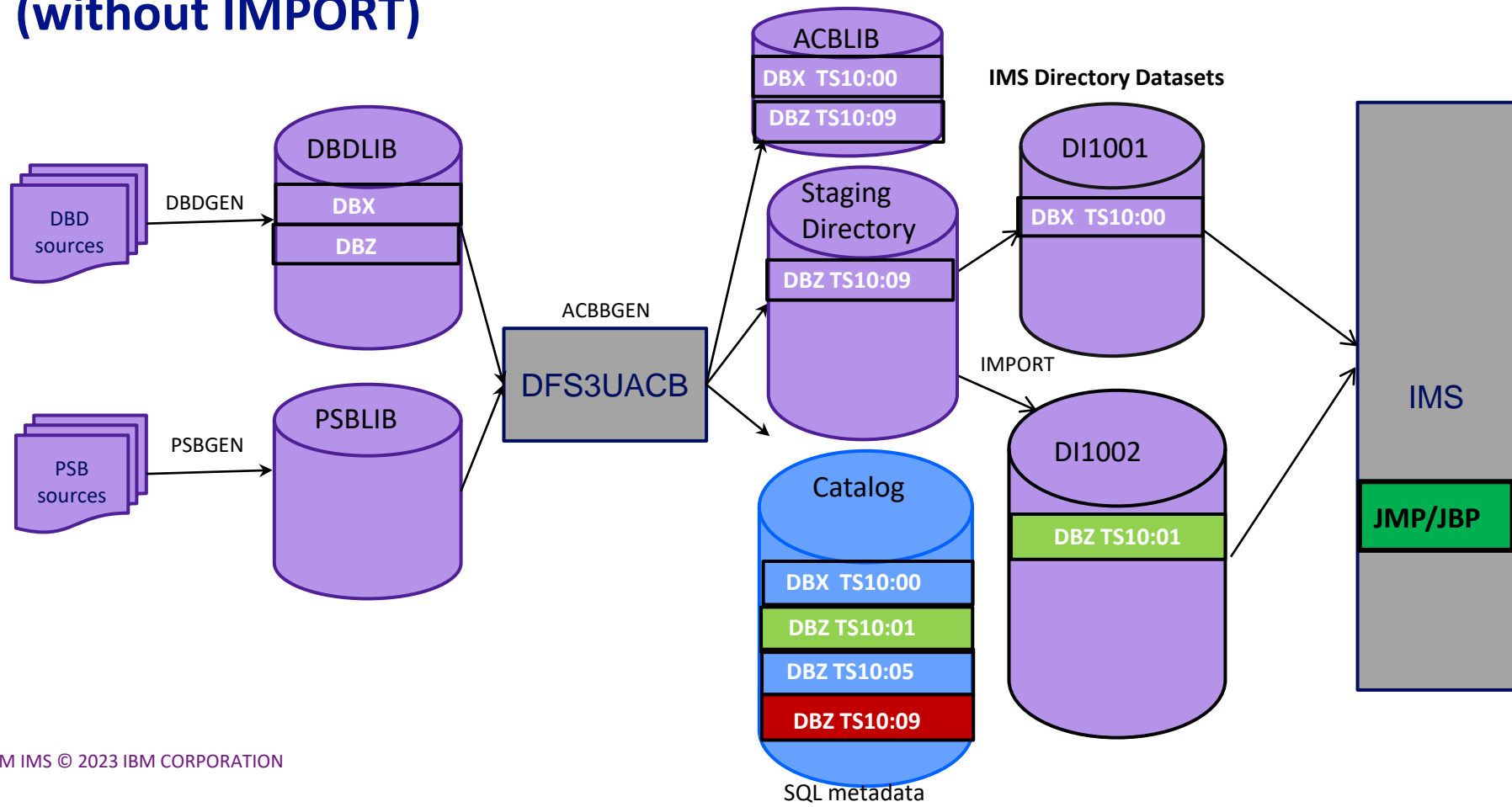
# DBZ genned into the system a couple more times, JBP started, (IMPORT done first)



ACBLIB
- DBX TS10:00
- DBZ TS10:09

IMS Directory Datasets

DBDLIB
- DBX
- DBZ

DBD sources → DBDGEN

PSB sources → PSBGEN → PSBLIB

ACBBGEN → DFS3UACB

Staging Directory

Catalog
- DBX TS10:00
- DBZ TS10:01
- DBZ TS10:05
- DBZ TS10:09

SQL metadata

DI1001
- DBX TS10:00

IMPORT

DI1002
- DBZ TS10:09

IMS
- JMP/JBP
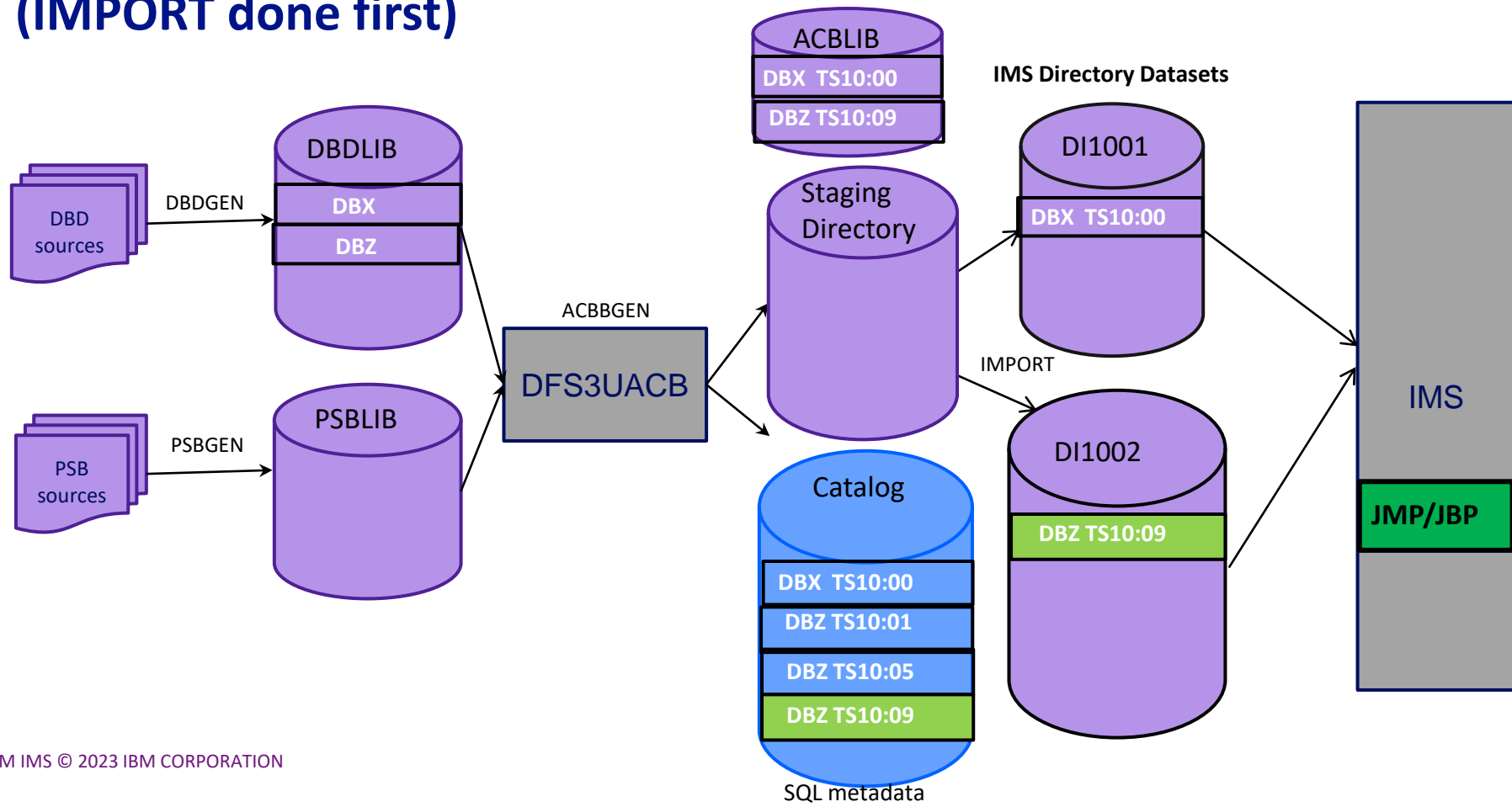
# Understanding Timestamps in the IMS Catalog
## (for an IMS Managed ACB environment)

# Where are the timestamps in the IMS Catalog?

**HEADER Segment**

| | ACTTS | PNDTS | PACTTS | PPNDTS | |
|---|---|---|---|---|---|

**DBD Segment**

| | TSVERS | |
|---|---|---|

**PSB Segment**

| | TSVERS | |
|---|---|---|
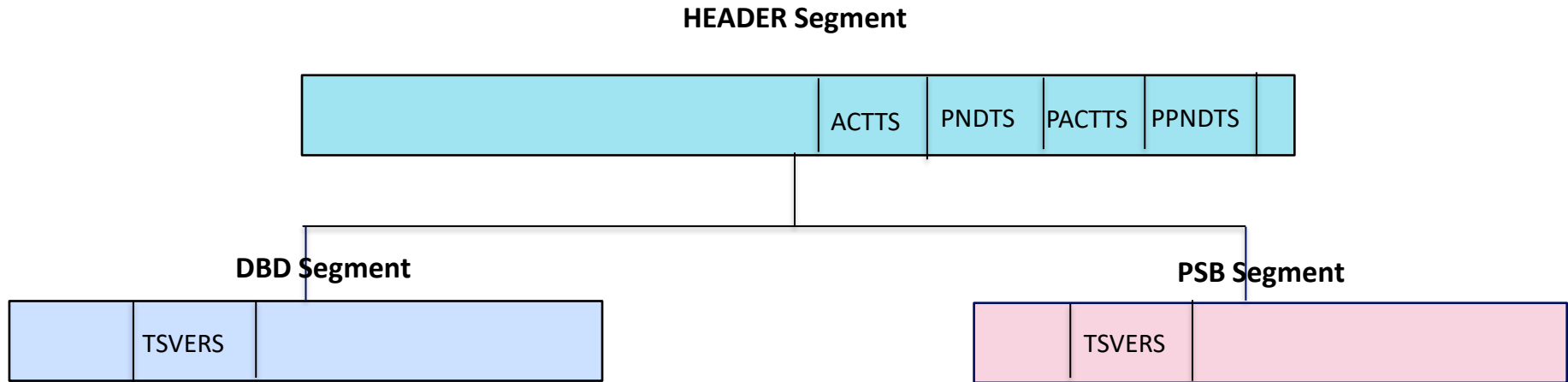
- ACTTS – Active Timestamp –              is used in an IMS Managed ACB environment
- PNDTS – Pending Timestamp –             is used in an IMS Managed ACB environment
- PACTTS – Printable active timestamps –   is used in an IMS ACB environment
- PPNDTS – Printable pending timestamp – is used in an IMS Managed ACB environment

- TSVERS – Timestamp matching ACBGEN for the DBD or PSB
- GSAM TSVERS may be the DBDGEN timestamp since it is not ACBGENed
- timestamps are still not maintained for logical DBDs
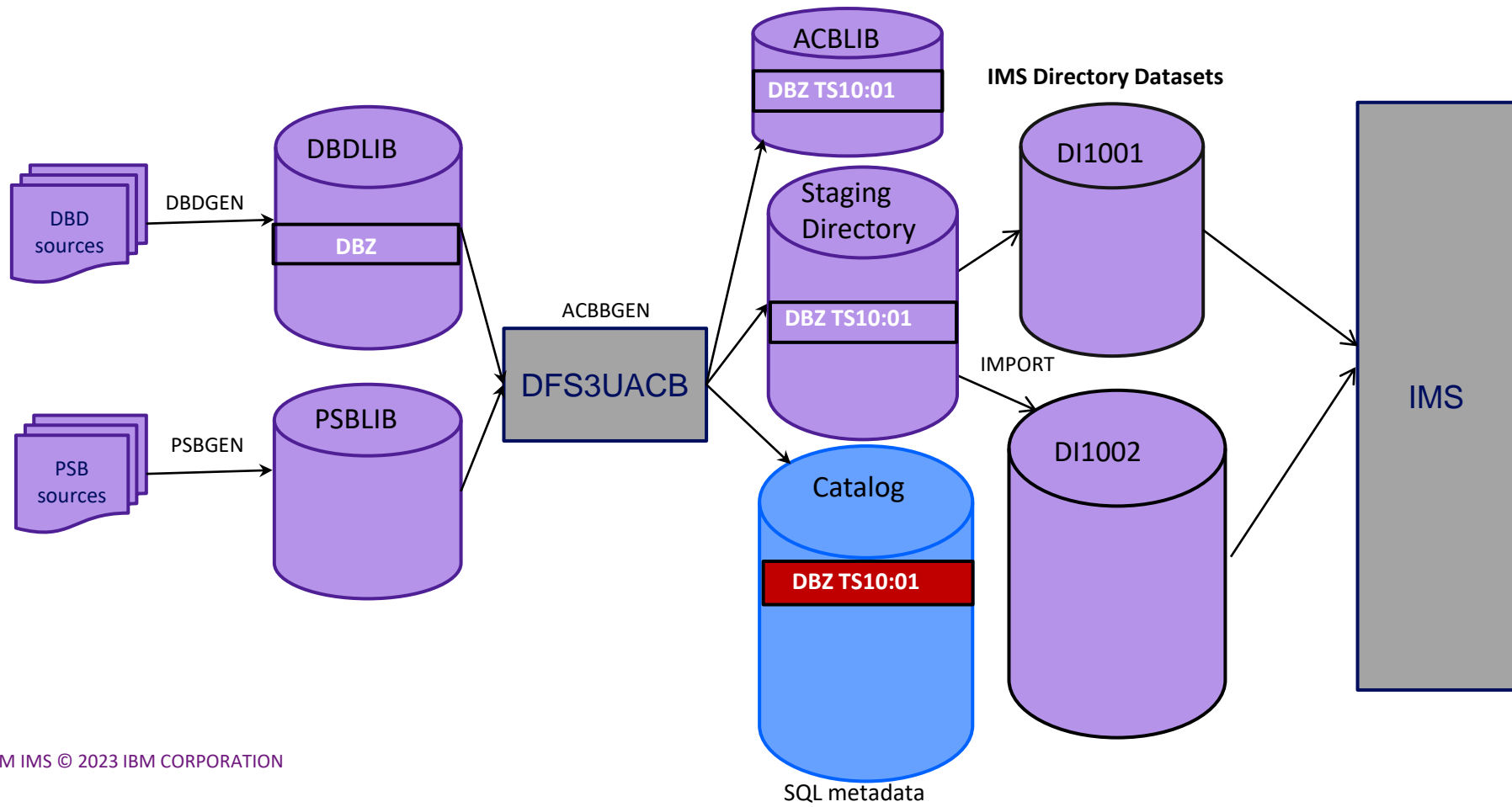
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# DBZ ACB genned into the staging directory

# Where are the timestamps in the IMS Catalog?

**HEADER Segment**

| | | | | | |
|---|---|---|---|---|---|
| DBD    DBZ | 0 | 10:01 | 0 | 10:01 | |

ACTTS    PNDTS    PACTTS    PPNDTS

**DBD Segment**

| | | |
|---|---|---|
| DBZ | 10:01 | |

TSVERS

**PSB Segment**

| | | |
|---|---|---|
| | TSVERS | |

# DBZ ACB genned into the staging directory



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# Where are the timestamps in the IMS Catalog?

**HEADER Segment**

| DBD     DBZ | 10:01 | 0 | 10:01 | 0 | |
|---|---|---|---|---|---|
| | ACTTS | PNDTS | PACTTS | PPNDTS | |

**DBD Segment**

| DBZ | 10:01 | |
|---|---|---|
| | TSVERS | |

**PSB Segment**

| | TSVERS | |
|---|---|---|
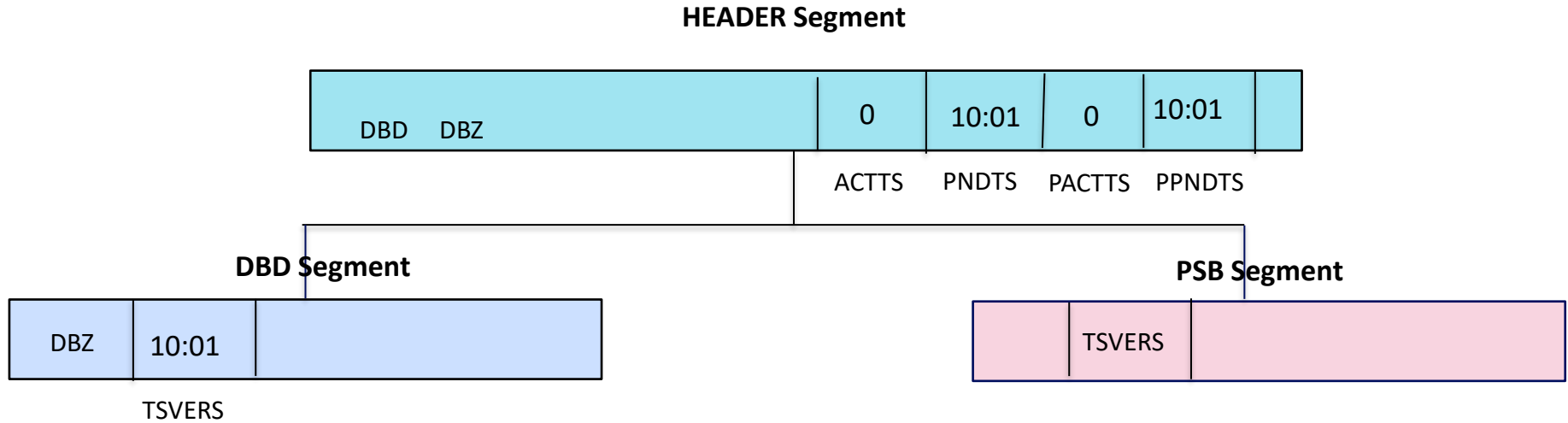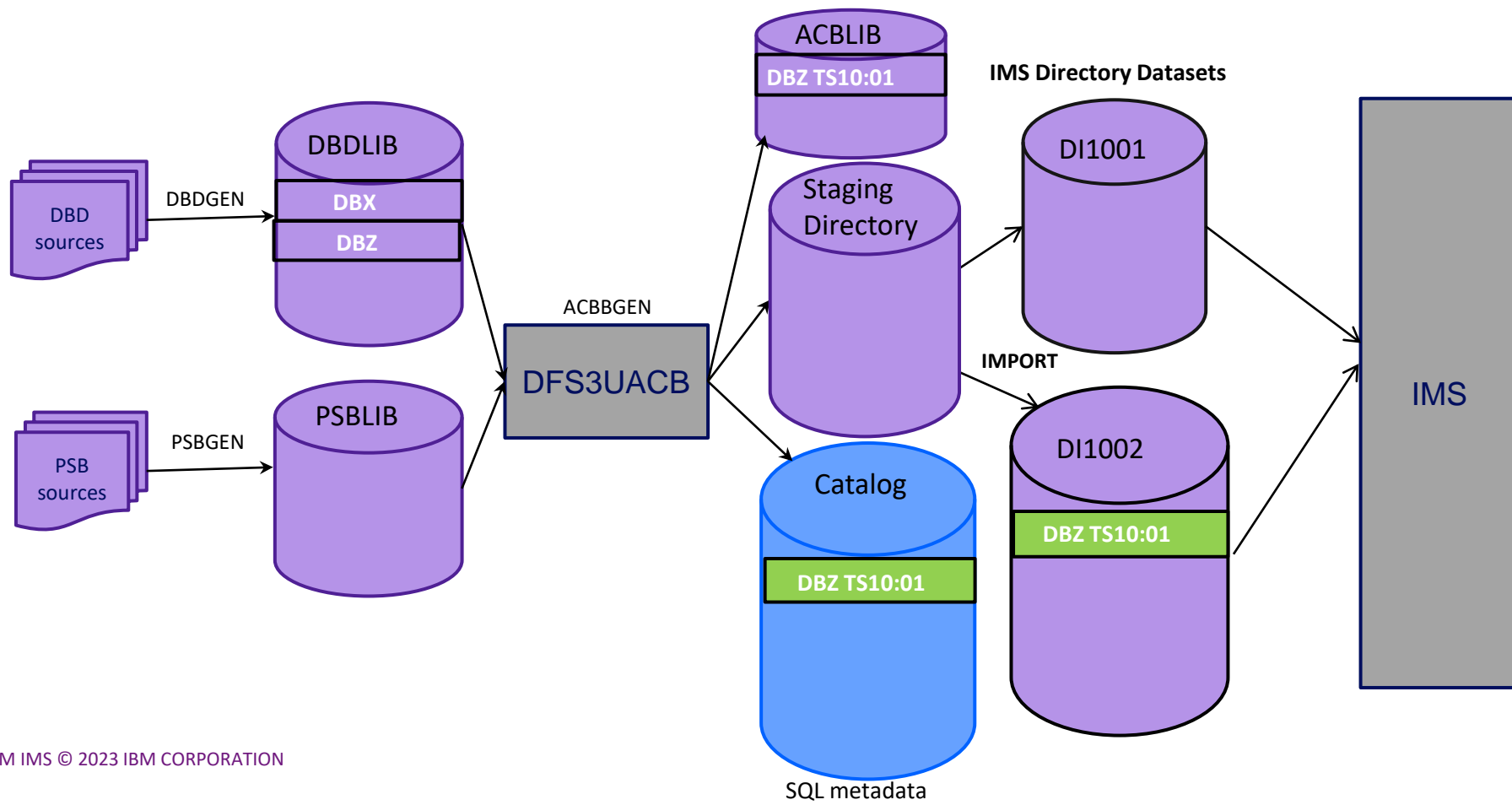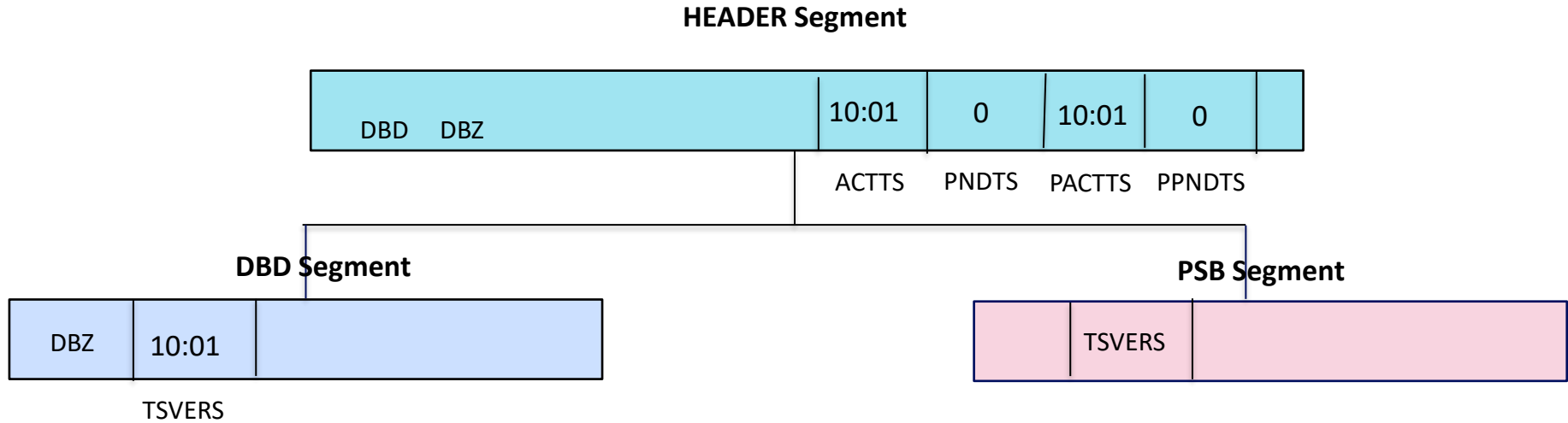
# DBZ re-ACB genned into the staging directory @ 10:05

# Where are the timestamps in the IMS Catalog?



**HEADER Segment**

| DBD    DBZ | 10:01 | 10:05 | 10:01 | 10:05 | |

ACTTS    PNDTS    PACTTS    PPNDTS

**DBD Segments**

DBZ    10:05

DBZ    10:01

TSVERS

**PSB Segment**

TSVERS
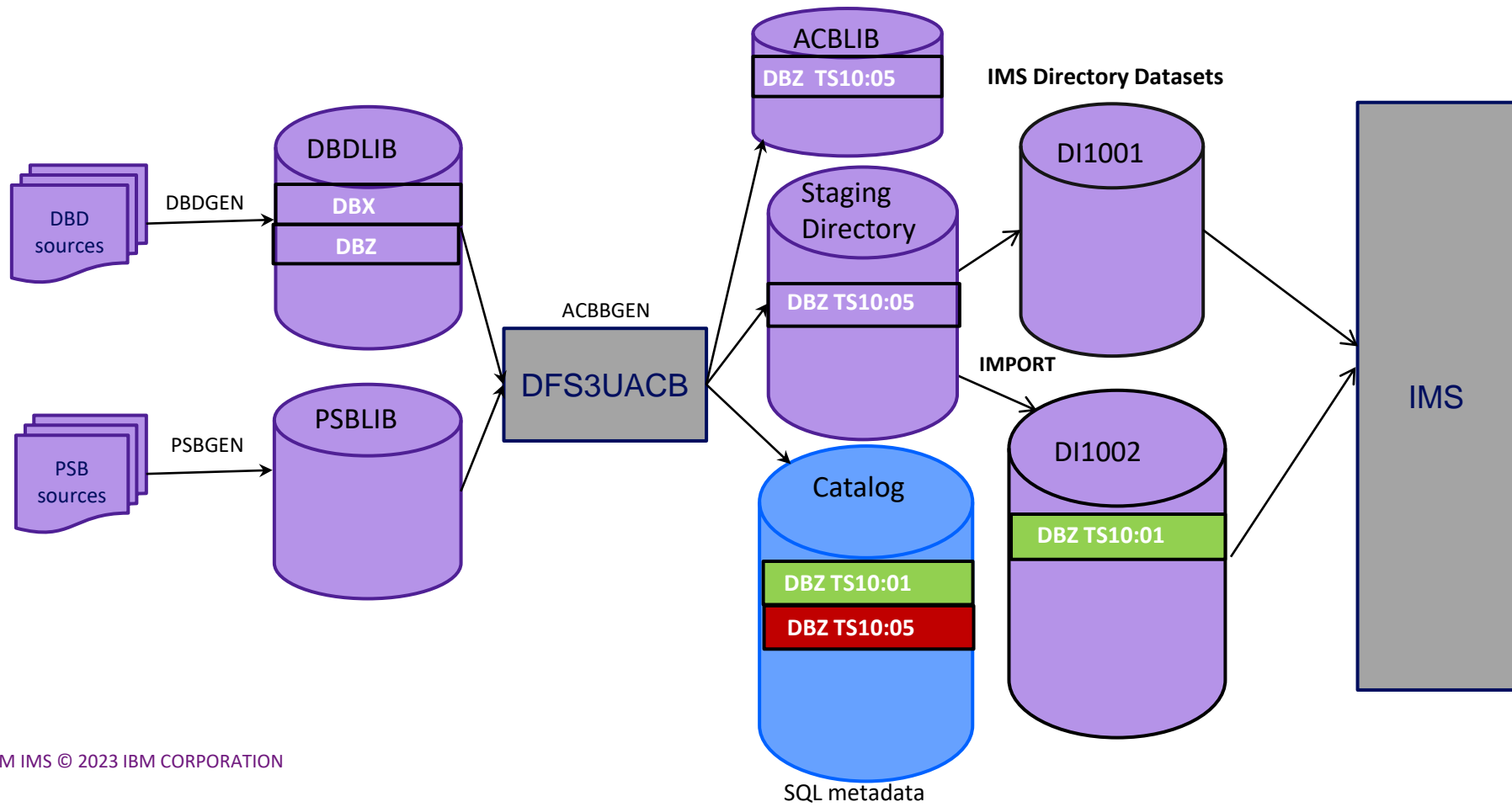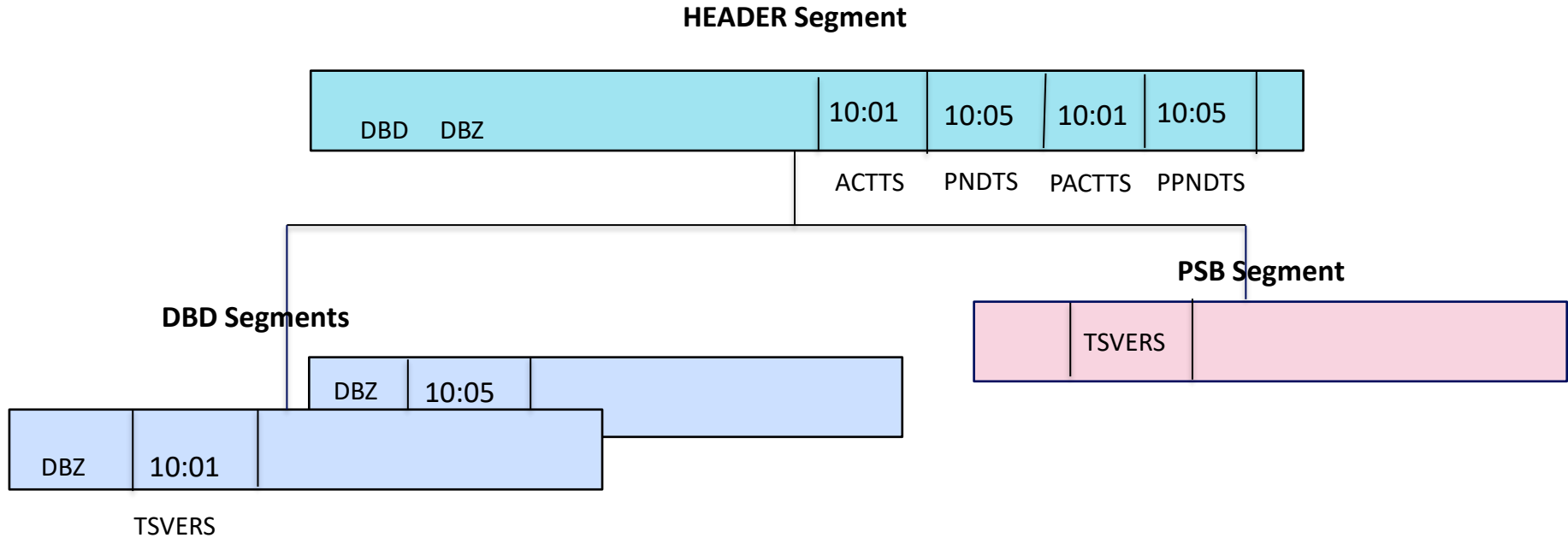
# DBZ IMPORTed from staging directory

# Where are the timestamps in the IMS Catalog?



**HEADER Segment**

| DBD    DBZ | 10:05 | 0 | 10:05 | 0 | |
|---|---|---|---|---|---|
| | ACTTS | PNDTS | PACTTS | PPNDTS | |

**DBD Segments**

| DBZ | 10:05 | |

| DBZ | 10:01 | |

TSVERS

**PSB Segment**

| | TSVERS | |
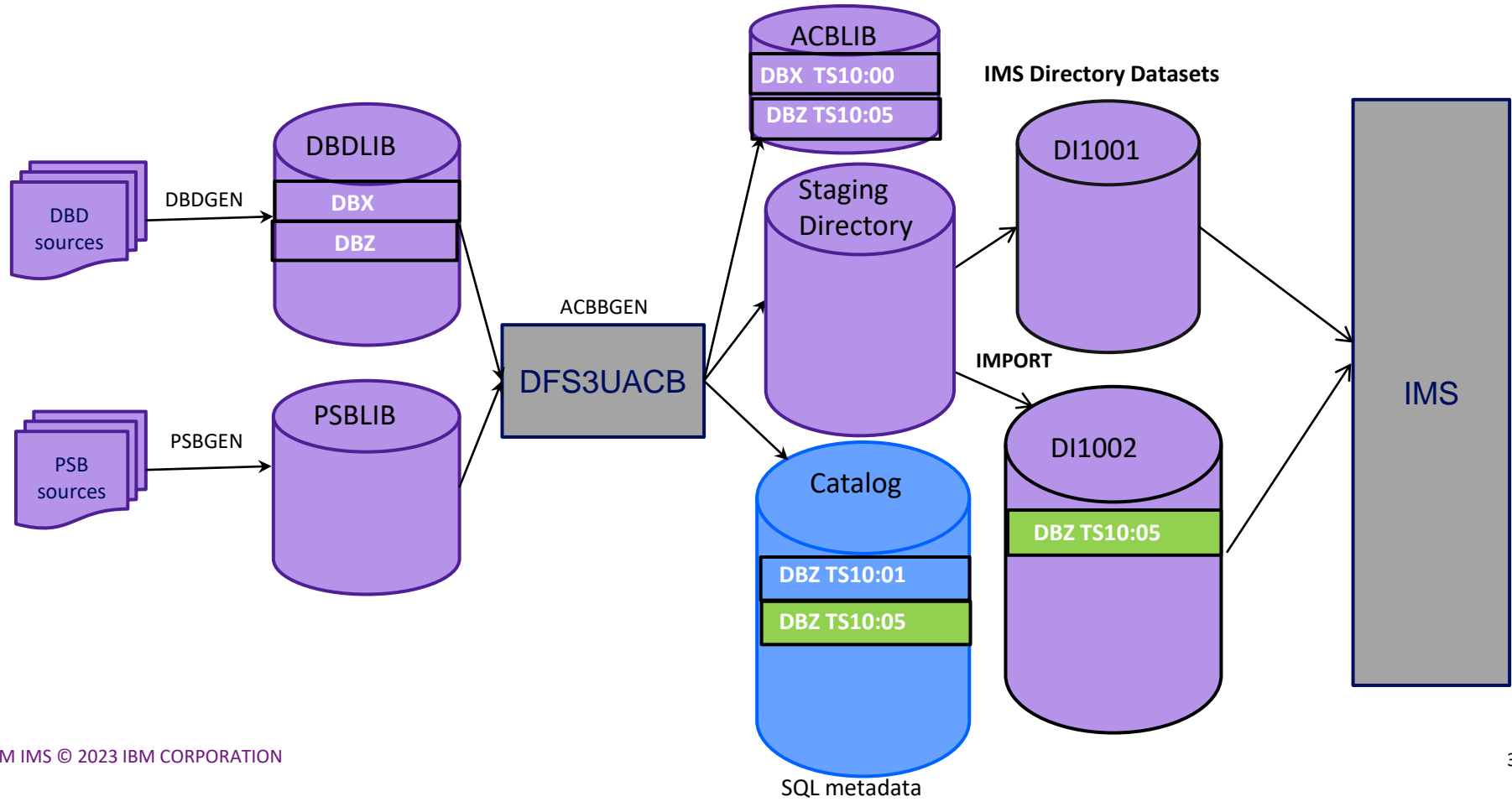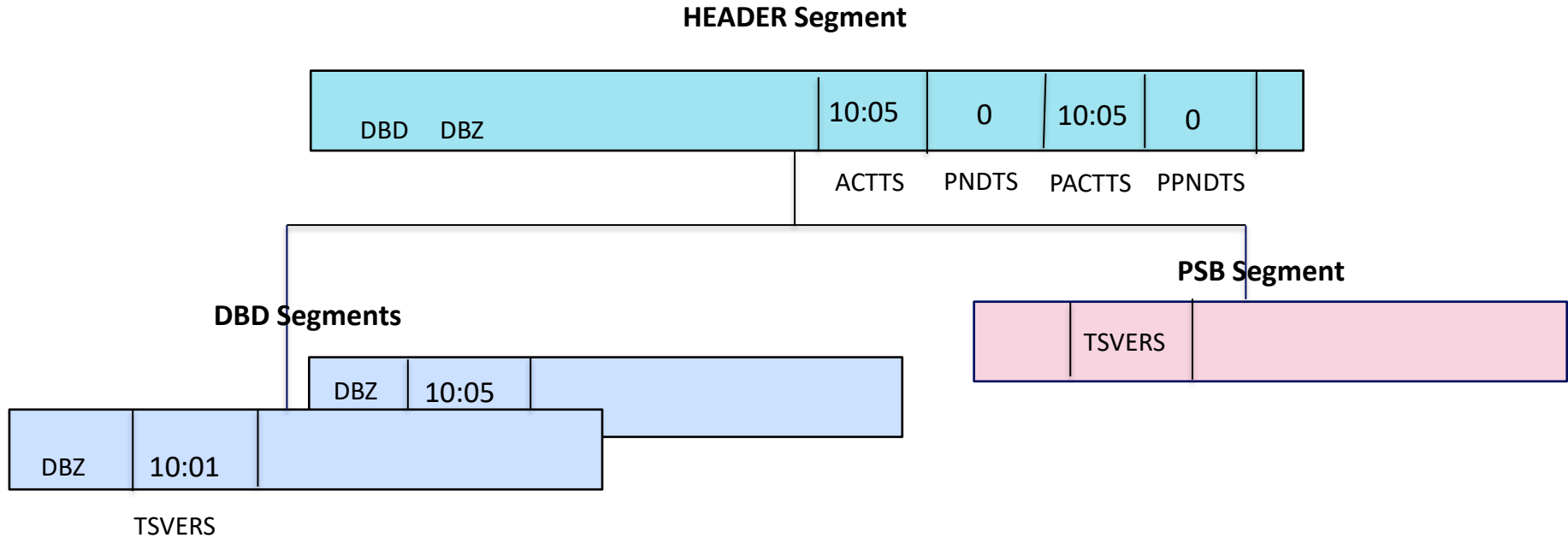
# The RETENTION parameter

# DFSDFxxx Proclib member

- Has many **sections**

- In the **Catalog section** there is a RETENTION parameter

- This optional statement specifies the **default retention criteria** for the DBD and PSB records in the IMS catalog. These values are used by the IMS Catalog Record Purge utility (DFS3PU10) to remove older DBD and PSB segment instances and records from the catalog database.

- You can specify the **INSTANCES** parameter, the **DAYS** parameters, or both:

  RETENTION=(INSTANCES=nnnnn)

  RETENTION=(DAYS=nnnnn)

  RETENTION=(INSTANCES=nnnnn,DAYS=nnnnn)

# INSTANCES parameter

- INSTANCES parameter:

Specifies the number of DBD and PSB **instances that must be retained** in DBD and PSB records in the IMS catalog before any instances can be deleted. For DBD instances, if database versioning is used, this value is the number of instances of the DBD that must be retained for each version of the DBD.

When the number of instances exceeds this value, the IMS Catalog Record Purge utility (DFS3PU10) can delete the excess instances. **The instances with the oldest ACB generation time stamps are selected for deletion**. This value is a decimal value 1 - 65535.

The default is 2.

- If the number of instances in the record or the DBD version exceeds this value, the oldest instances are **eligible for deletion**, but only **if they are older than the *days* value, if it is set**.

# DAYS parameters

- DAYS parameter

Specifies the number of days that the DBD and PSB instances in the IMS catalog must be **retained before they can be deleted.** When the age of a DBD or PSB instance in a DBD or PSB record **exceeds this value**, the instance is eligible for deletion by the IMS Catalog Record Purge utility (DFS3PU10). The keyword accepts a decimal value 0 - 65535.

**When 0 is specified**, the **age of a DBD or PSB instance is ignored** when the DFS3PU10 utility determines the eligibility of an instance for deletion.

The default is 0.    Good default ☺

# Examples of RETENTION specification in DFSDF proclib member

- RETENTION=(INSTANCES=3) <span style="color:red">(Days will default to 0, so age will not matter</span>)

- RETENTION=(DAYS=90)          <span style="color:red">(Instances will default to 2</span>)

- RETENTION=(INSTANCES=5, DAYS=5)

# The Catalog Record Purge Utility (DFS3PU10)

# Catalog Record Purge Utility – running as a DLIBATCH job

- Can be run as a **DLIBATCH** job:

```
//BATCH EXEC PGM=DFSRRC00,
//    PARM=(DLI,DFS3PU10,DFSCP001,,,,,,,,,,,,Y,N,,,,,,,,,,,,'DFSDF=xxx')
```

- To run as a DLIBATCH job while online IMS is also up & running **requires Block level data sharing.** So IRLM needs to specified in the parm.

```
PARM=(DLI,DFS3PU10,DFSCP001,,,,,,,,,,,,Y,Y,irlmid,,,,,,,,,,,'DFSDF=xxx')
```

# Catalog Record Purge Utility – running with DFS3CDX0

- For DLIBATCH programs, an alternative to specifying DFSDF=xxx parm in the JCL, IMS Catalog Definition exit routine (**DFS3CDX0**) can be used to provide the settings and attributes of the IMS catalog:

```
//BATCH EXEC PGM=DFSRRC00,
//    PARM=(DLI,DFS3PU10,DFSCP001,,,,,,,,,,,Y,N,,,,,,,,,,,,'DFSDF=xxx')
```

- In this exit(**DFS3CDX0**):
  - **DXPL_RETNUM parm is used to specify the INSTANCES= retention value**
  - **DXPL_RETPD parm is used to specify the DAYS= retention value**

- If you have both the DFS3CDX0 exit & the DFSDF=xxx parm in the JCL, then the exit retention parameters take precedence.

# Catalog Record Purge Utility – can also be run as a BMP

- Can be run as a **BMP**:

   PARM=(BMP,DFS3PU10,DFSCP001,,,,,,,,,,,*imsid*,,,,,,)

# Catalog Record Purge Utility functions

• Default Retention criteria is specified in the Catalog section of the DFSDFxxx Proclib member

• **UPDATE** statement

- Can be used to set the RETENTION criteria for individual DBDs & PSBs

- Example: UPDATE DBD  JK*  5   0

- This information is stored in the HEADER segment of the relevant catalog record.

- Can have multiple UPDATE statements

- Updates are processed in **alphanumeric** order. Later updates override earlier ones.

- Example:

  UPDATE DBD DB* 1 365
  UPDATE DBD * 1 20
  UPDATE DBD DBOHIDK5 10 813

- These retention values are stored in RETNINST and RETNDAYS fields in the HEADER segment

• **\*not a big fan\* - less transparent than coding retention in DFSDFxxx or DFS3CDX0 exit**

# Catalog Record Purge Utility functions

- **MODE ANALYSIS**
  - Can be used to determine which DBD & PSB instances are eligible to be deleted
  - Determines what needs to be deleted based on:
    - The individual retention criteria that was set via the UPDATE command or
    - the default retention criteria specified in the CATALOG section of the DFSDFxxx member of the IMS.PROCLIB data set.
  - Writes DELETE statements into SYSUT1 dataset (for DBD & PSB instances that can be deleted
  - When MODE ANALYSIS is specified, you can review and edit the contents of the SYSUT1 data set before anything is deleted.

# Catalog Record Purge Utility functions

- **MODE PURGE**
    - Can be used **purge (delete)** DBD & PSB instances from the Catalog
    - Reads DELETE statements from SYSUT1 input dataset and purges the instances
    - UPDATE statements are not allowed with this mode.
    - During the purge mode, the utility **does not check the retention criteria**. If you manually code or edit the DELETE statements, you can remove DBD and PSB instances that would not otherwise be eligible for deletion.

- There is also **MODE BOTH**
    - Performs Analysis & Purge in one run
    - You probably don't want to do this (esp. when running in DLIBATCH mode)

# Catalog Record Purge Utility functions – Delete statements

- **Delete statement are in SYSUT1 data set.**

- **You can write your own / edit  Delete statements**

- **Format:**
  - **DELETE  DBD member-name timestamp**
  - **DELETE  PSB member-name timestamp**

- **Examples:**
  - DELETE DBD JKDBA600 1306514025679
  - DELETE DBD JKDBA725 *
  - DELETE DBD  *      1300112161055

# Catalog Record Purge Utility checkpoints

- The DFS3PU10 utility issues a CHKP (checkpoint) call to commit updates to the IMS catalog after every 200 updates, and message DFS4518I is issued in the utility output.

- To change checkpoint frequency use: **RESOURCE_CHKP_FREQ n**
- n can be a 1- to 8-digit numeric value ranging from 1 to 99999999

# Catalog Record Purge Utility – MANAGEDACBS statements

- **MANAGEDACBS UPDATE**

- Deletes from the IMS directory the DBD and PSB instances that are deleted from the IMS catalog. The MANAGEDACBS UPDATE statement is automatically generated if the IMS directory is active

# To run the utility as a BMP job

```
//BMP3ID00 JOB 'IMS SYSTEM',CLASS=K,MSGLEVEL=(1,1),REGION=0M
//BMP   EXEC PGM=DFSRRC00,
//      PARM=(BMP,DFS3PU10,DFSCP001,,,,,,,,,,,IMSID,,,,,,)
//STEPLIB    DD …
//DFSRESLIB  DD …
//PROCLIB    DD …
//IMS        DD …
//           DD …
//SYSUT1     DD …                    Delete statements
//SYSIN      DD …
MODE ANALYSIS
```
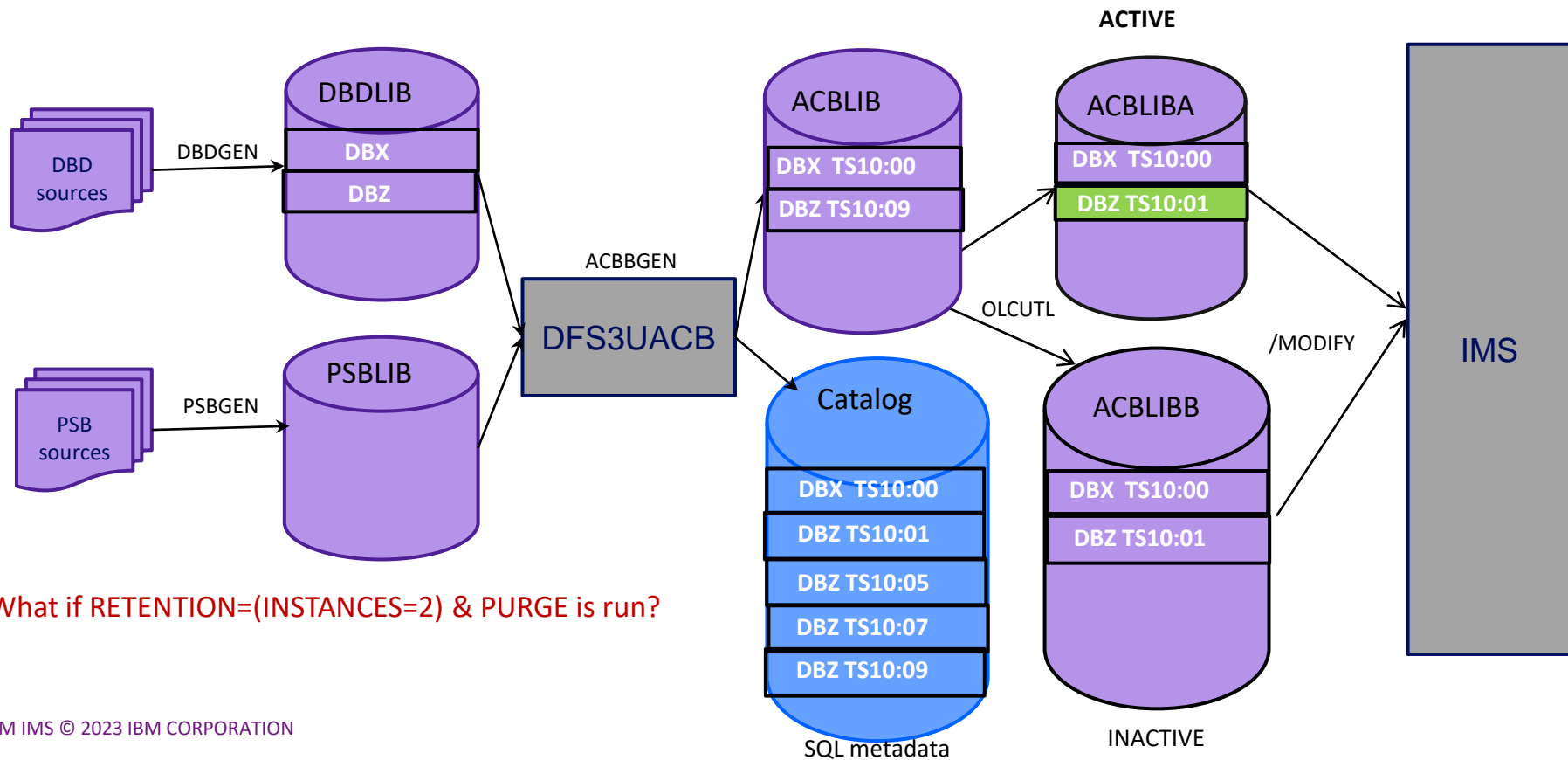
The Catalog Record Purge Utility Cautions

# Catalog Record Purge Utility Cautions

- In a **Catalog only environment** (non-IMS Managed ACB environment)

  - The purge utility **can delete active instances** from the catalog.
    - No checks in place that stop the utility from deleting active instances

  - Don't code DAYS= parameter in your retention criteria, let it default to 0
    - You may have Databases that have not been genned in a while e.g. GSAM

  - Even with INSTANCES= parameter, you have to be careful.
    - You could end up accidentally Deleting the active instance
    - Example on next page

# DBZ re-ACB genned a few times (but no OLC)



- What if RETENTION=(INSTANCES=2) & PURGE is run?

# Catalog Record Purge Utility Cautions

- In an **IMS Managed ACB environment:**

  - The purge utility will **NOT delete active instance or pending instance**. If utility is run as a BMP.
  - I.E. MODE PURGE will not delete active / pending instance if utility is run as a BMP.

  - If the utility is run as a DLIBATCH (with IRLM specified) & IMS is up then the utility **can** delete active / pending instances.

# DBZ re-ACB genned a few times into staging directory without IMPORT



- How can the active instance of DBZ be deleted?
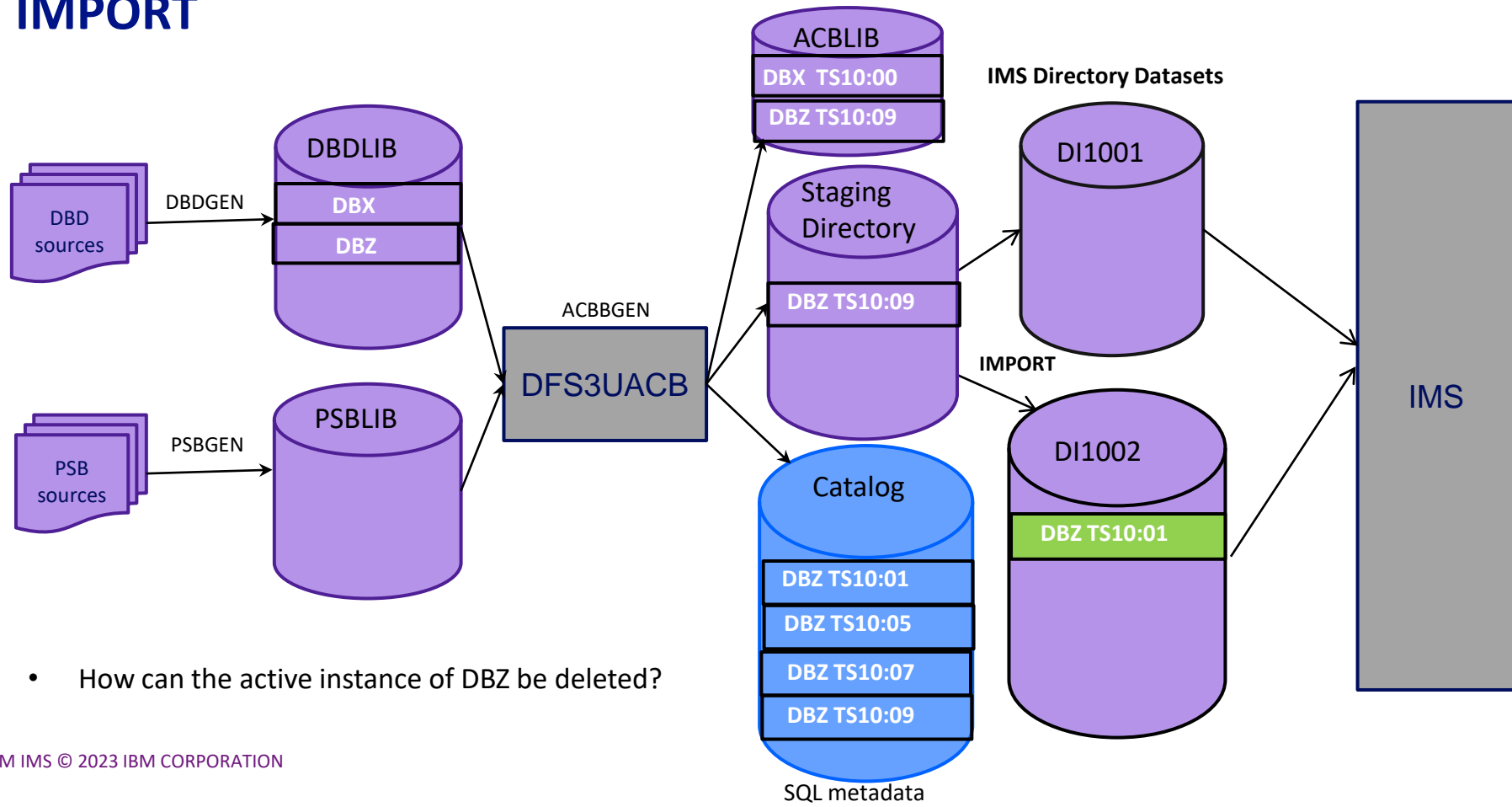
# Best practices for running the Purge utility

- Don't use DAYS= parameter for your retention criteria
- Have Instances=3 (at least)
- Be absolutely certain you need individual DBD & PSB retention criteria (set via the UPDATE statement).

- In a **Catalog only** environment:
- Running the Purge utility should be done with MODE ANALYSIS, study the results and the catalog to make sure the DELETE statements are correct and then run with MODE PURGE.

- In an **IMS Managed ACB** environment:
- Run the Purge utility as a BMP job so that active/purge instances are not deleted

- PH53152 has been created to make sure  "do not purge active instance" as the standard default behavior.

Thank You