The ABCs of IMS Managed ACBs

GSE BeNeLux IMS User Group

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With acknowledgements to Deepak Kohli

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Statement of Direction

- IBM IMS has evolved into a more dynamic system, based on continuous redesign that will ultimately eliminate the need for system generation. This redesign currently includes dynamic definition for resources such as application programs, databases, routing codes, transactions, OSAM buffer pools, VSAM share pools, MSC physical links, logical links, logical link paths, and remote logical terminals.
- IMS 14 delivered optional support allowing IMS to dynamically manage application control blocks (ACBs). IMS-managed ACBs allows for the use of DDL to replace DBD and PSB generation processes. Databases and program views can be dynamically defined using SQL DDL statements instead of generation utilities, such as ACBGEN.
- **IBM intends to require IMS management of ACBs in the future**. IMS and the IMS catalog must be set up to support ACB management. IMS provides a utility for this.
- **At a later date, after the requirement for IMS-managed ACBs is in place, IBM also intends to remove the generation processes for PSBLIB, DBDLIB and ACBLIB. At that time, the IMS catalog, SQL, and DDL become the interface to IMS database management.**
- These planned changes to IBM IMS will enhance availability, free up DBA resources, improve productivity, simplify operations, testing, and debugging, and accelerate time-to-value for new business solutions.
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TOPICS

- IMS Catalog Review
- IMS Managed ACBs
- Enablement and Transition to IMS Managed ACBs
- Utilities

So why and what is the IMS Catalog?

Why have a Catalog?

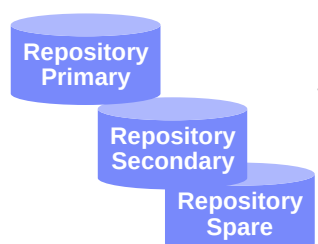
- Enables scalable and flexible IMS Open Database solution
- Allow direct access to IMS databases from Java
- Introduced the Single Source of Truth Concept with IMS v12
- Natural next step for IMS Users with long-term IMS plans
- Provides a trusted online source for two types of metadata
  - IMS Database
  - IMS Application

IMS Catalog is not the same as IMS Repository

- **DB**
  - PSB/DBD resources
    - Database structure definitions
    - Physical database definitions
    - Segment definitions
    - Field definitions
  - Application
    - Data types
    - Application defined fields
    - Encodings
    - Redefines
    - User defined types
    - Structures

IMS PHIDAM/OSAM HALDB

- **TM**
  - MODBLKS resources
    - Program definitions
    - Transaction definitions
    - Database definitions
  - MSC resources



VSAM Data Sets

What is the IMS Catalog?

- Introduced back in IMS V12 – optional
- IMS Catalog is a HALDB database
  - Contains IMS metadata (data about the data)
  - Used by IMS Universal drivers for JDBC & DL/I access to IMS Databases
  - Useful for integration with tools that provide JDBC access (e.g. Datastage)
  - Data Modeling
  - Etc.
- IMS Catalog is **required** if you will implement IMS Managed ACBs

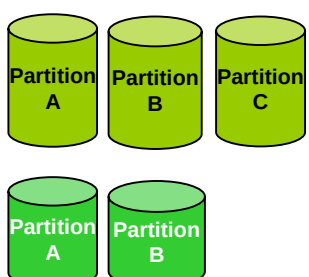
IMS Catalog Review/Background

- Foundation for additional existing and future IMS features:
  - IMS 13 Database Versioning
  - IMS 13 IMS Native SQL support for COBOL 5.1
  - IMS 13 .NET access to IMS data
  - **IMS 14 Dynamic Database Definition**
  - **IMS 14 IMS Managed ACBs**
- Some IBM products which can utilize the IMS Catalog:
  - IMS Explorer for Development
  - IBM Data Studio
  - Rational Asset Analyzer
  - COGNOS
  - QMF
  - InfoSphere Data Architect, DataStage, and Metadata Asset Manager
  - IBM WAS Liberty Profile, IBM MobileFirst, and IMS Mobile Feature Pack

IMS Catalog datasets

- IMS HALDB Database
  - PHIDAM / OSAM HALDB database with 4 Data Set Groups
  - Secondary Index is partitioned
  - Catalog DBDs and PSBs are shipped with IMS

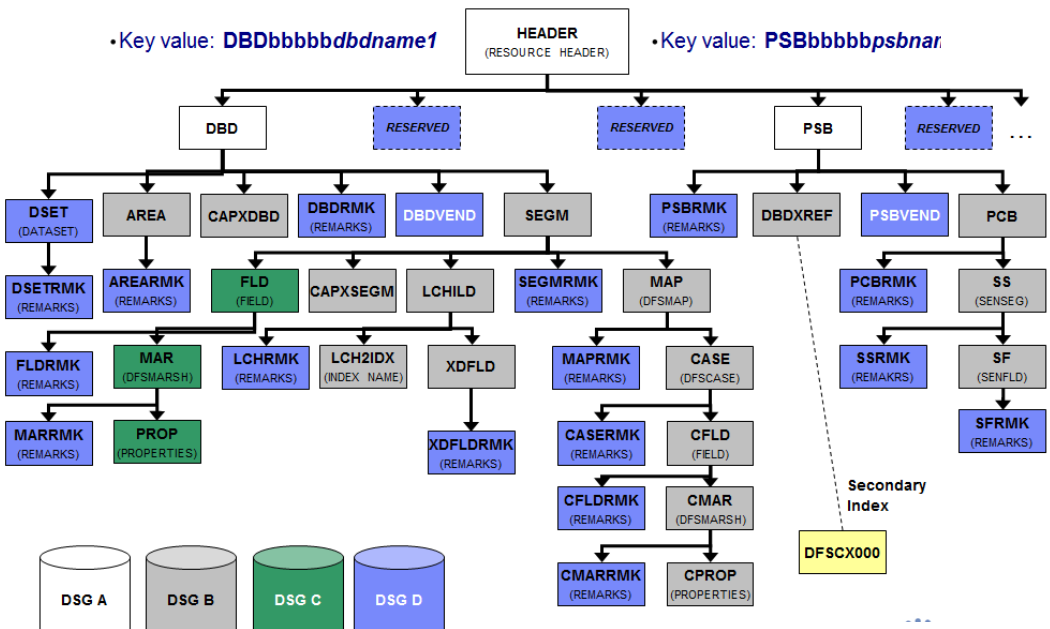
IMS Catalog data sets house IMS database metadata



Catalog Database

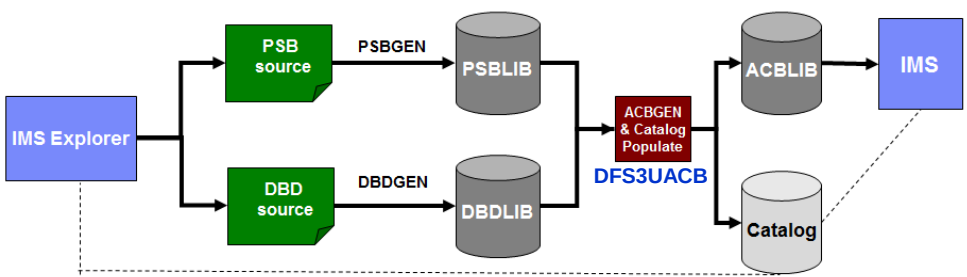
Catalog Secondary Index

Catalog Hierarchical Structure



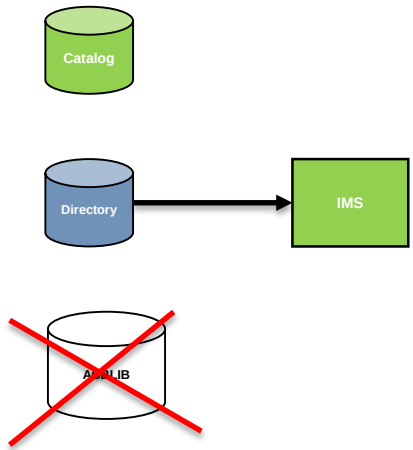
ACBLIB and Catalog

- Using the IMS Catalog and ACBLIB
  - IMS database and program resource definitions start with DBD and PSB macro coding, followed by DBDGEN and PSBGEN
  - Followed by “ACBGEN & Catalog Populate Utility” processing
  - Catalog and active ACB member are kept in sync via the ACBGEN process
  - IMS runtime database and program control blocks obtained from ACBLIB
  - IMS database and program metadata is available from the catalog



What is IMS Managed ACBs?

IMS Managed ACBs



IMS Loads ACB blocks from the directory & not ACBLIB

WHAT IS THE IMS DIRECTORY?

What is the IMS Directory?

- It's a PDSE (ACBLIB is a PDS)
- IMS directory houses ACBs (just like an ACBLIB)
- Directory records have a format much like the ACBs in an ACBLIB
- The directory has functionality similar to an ACBLIB
  - IMS will reference the directory to get the runtime ACBs

Why not just use ACBLIB?
Any differences between ACBLIB & Directory?

- Today, GSAM database control blocks stored in DBDLIB and PSBLIB, **not in ACBLIB**

- With IMS management of ACBs, GSAM databases will be stored in the Directory
  - IMS will use the directory to load the GSAM runtime control blocks at each dependent region schedule

- Today, logical database control blocks are stored in the DBDLIB, **not in ACBLIB**

- With IMS Management of ACBs, logical DBDs will be stored in the IMS Catalog

Why do they call it IMS Managed ACBs?

- IMS will self-manage the IMS directory PDSE data sets
  - An additional data set is allocated when a directory data set becomes full

- Data set names will be an extension of the HALDB catalog data set name
  - <HALDB data set prefix>.DI<suffix>
    - Example
      - IMSTEST.DFSCD000.DI1**001**
      - IMSTEST.DFSCD000.DI1**002**

- IMS will use DFSDIRxx DD for directory data set allocation

- IMS maintains a boot strap data set (BSDS) with information about the directory data sets

Staging Directory Dataset

- Application control blocks (ACBs) generated can be stored in a staging directory

- From the IMS staging directory dataset they can be added to the IMS directory (while IMS is up) using an IMPORT command

IMPORT DEFN SOURCE(CATALOG)

IMPORT DEFN Command

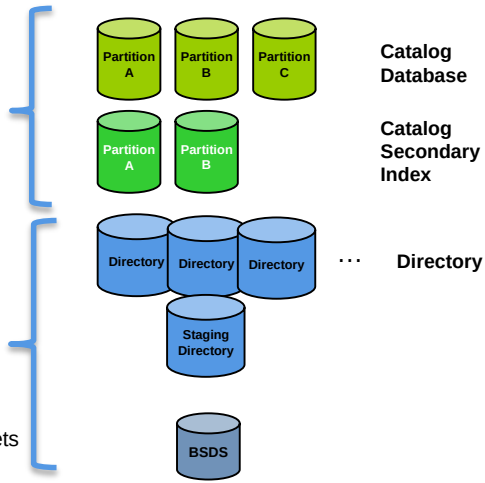
- Type 2 command
  - Requires SCI & OM and a SPOC
- IMPORT DEFN SOURCE(CATALOG)
  - Moves members from STG directory to active directories
  - Moves ALL members in STG
  - Single process
    - Messages for problems are displayed in the output
  - Command can be submitted again after corrective action taken for resources
  - **Imported resources are logged in 7002 log records that have the names of the resources that are changed or added**

IMS Managed ACBs – Components / Data Sets

IMS Catalog data sets house IMS database metadata

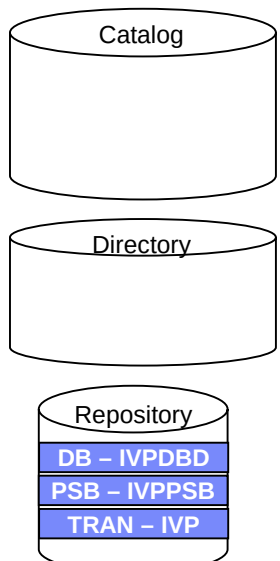
IMS directory has the runtime blocks of the IMS Catalog

The Boost Strap Data Set (BSDS) keeps track of the directory datasets

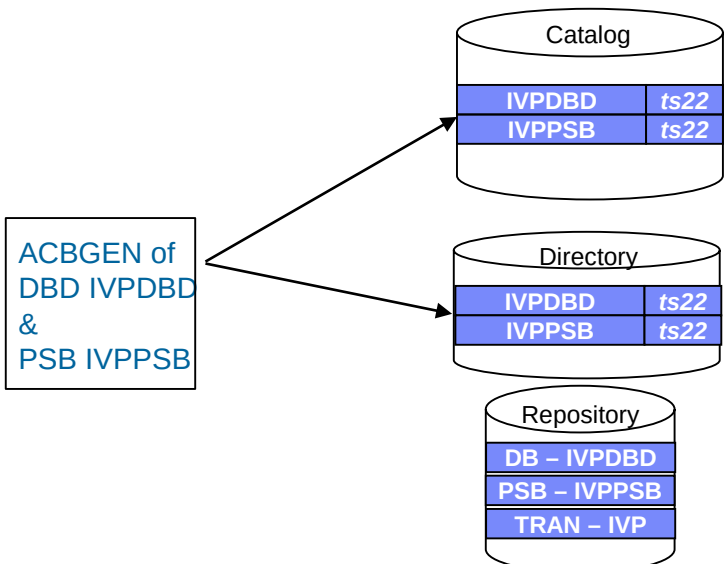


WHAT IS THE RELATIONSHIP BETWEEN THE IMS CATALOG & IMS DIRECTORY?

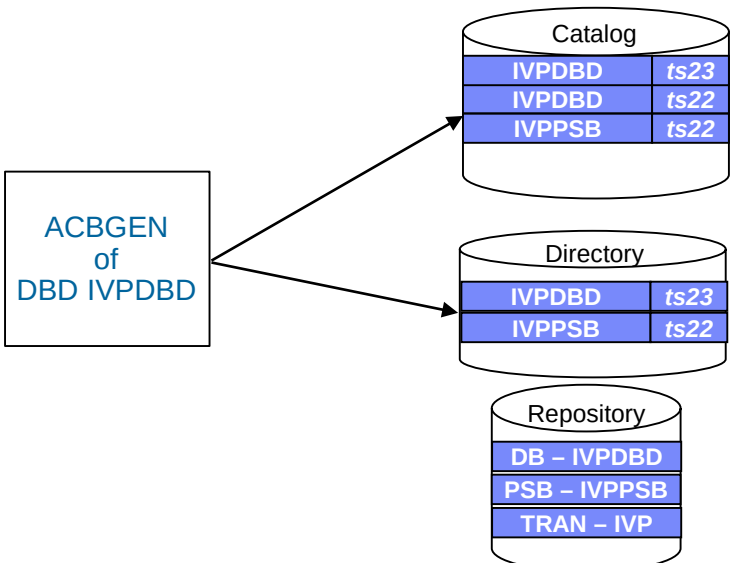
Running with IMS Catalog and Directory 1/3



Running with IMS Catalog and Directory 2/3

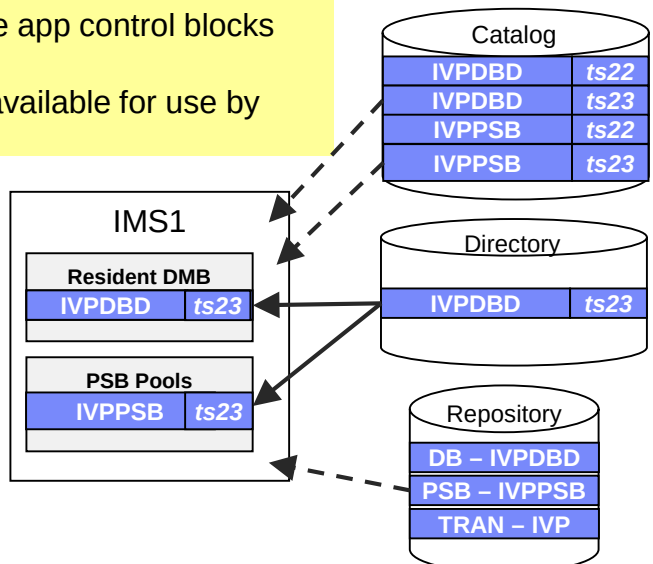


Running with IMS Catalog and Directory 3/3



How is the Catalog and Directory used

- Application SQL call to IVPDBD database
- IMS obtains runtime app control blocks from ACBLIB
- Catalog metadata available for use by programs



Difference between IMS Catalog & IMS Directory

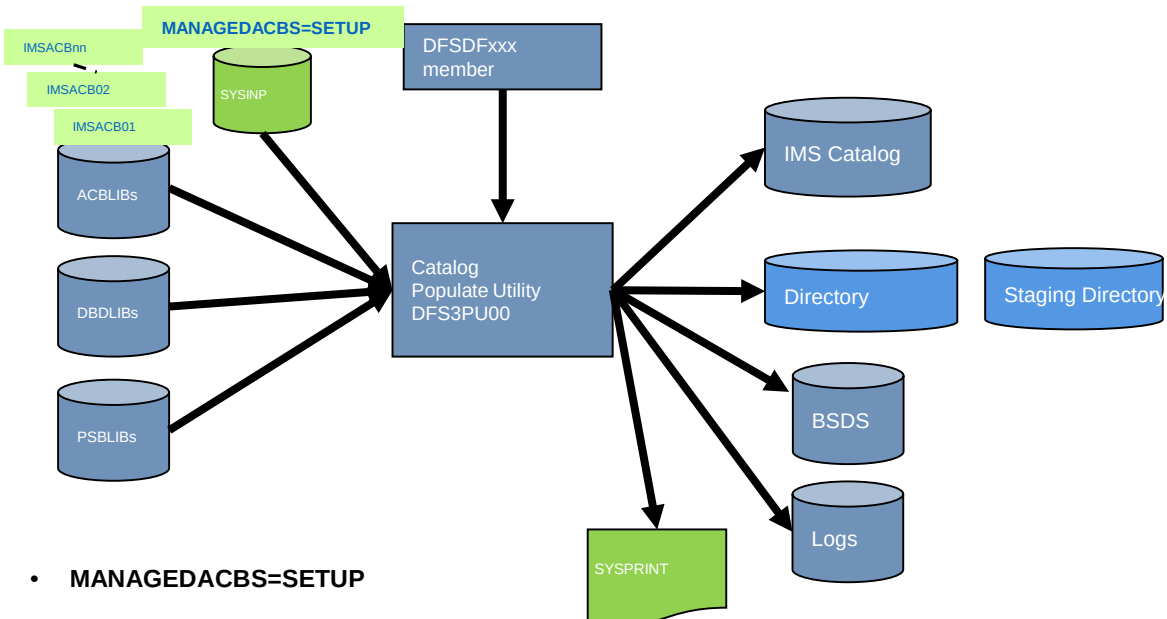
- IMS Catalog contains metadata for your DBDs & PSBs
- IMS Directory contains the ACBs of your DBDs & PSBs

- IMS Catalog contains various instances of your DBDs & PSBs
- IMS Directory only contains the latest ACB of your DBD or PSB
- The directory is kept in sync with the catalog
  - Both are updated

- 1:1 relationship between ACBs in the directory and the catalog
  - If the catalog is shared then Directory PDSE(s) are shared
  - If the catalog is non-shared then Directory PDSE(s) are non-shared

SETTING UP IMS MANAGED ACBS

Initially Creating & Populating the IMS Catalog / Directory



- **MANAGEDACBS=SETUP**
- **LOAD PSB DFSCPL00**

Initially Creating & Populating the IMS Catalog / Directory

- With V15 APAR PI83500 (& V14 APAR PI91613)
- pre-allocate the datasets or allocate the datasets in the IMS Catalog Populate (DFS3PU00) utility jobstep.

- DD names:
- IMSDBSDS for Boot strap dataset
- IMSDSTAG for Staging Directory dataset
- IMSD0001, IMSD0002, IMSD0003, etc. for Directory datasets

- For Catalog:
- An optimal blocksize is 6K or 8K
- You will need to decide on the number of partitions

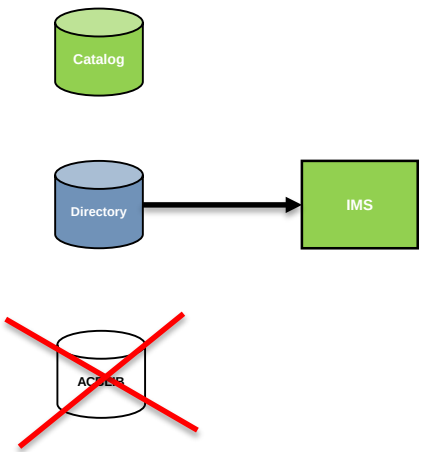
(this depends on the number of DBDs & PSBS you have)

Enabling IMS Managed ACBs

- In DFSDFxxx Proclib member

```
<SECTION=CATALOG>
CATALOG=Y,
ALIAS=DFSC,
DATACLAS=,
MGMTCLAS=,
RETENTION=(VERSIONS=010),
STORCLAS=MEDIUM,
ACBMGMT=CATALOG,
```

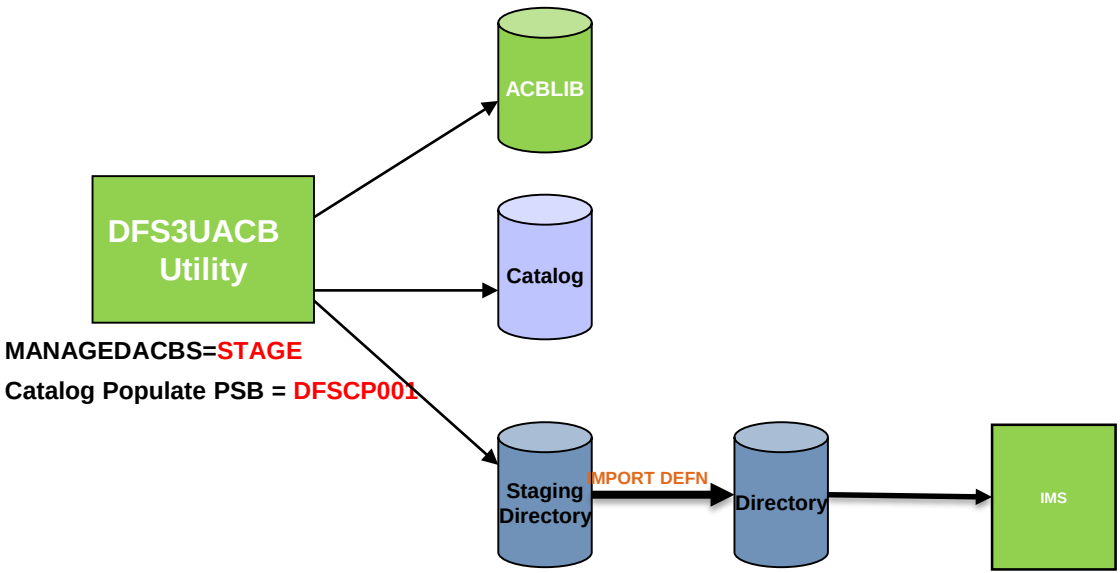
How is the directory updated?



IMS Loads ACB blocks from the directory & not ACBLIB

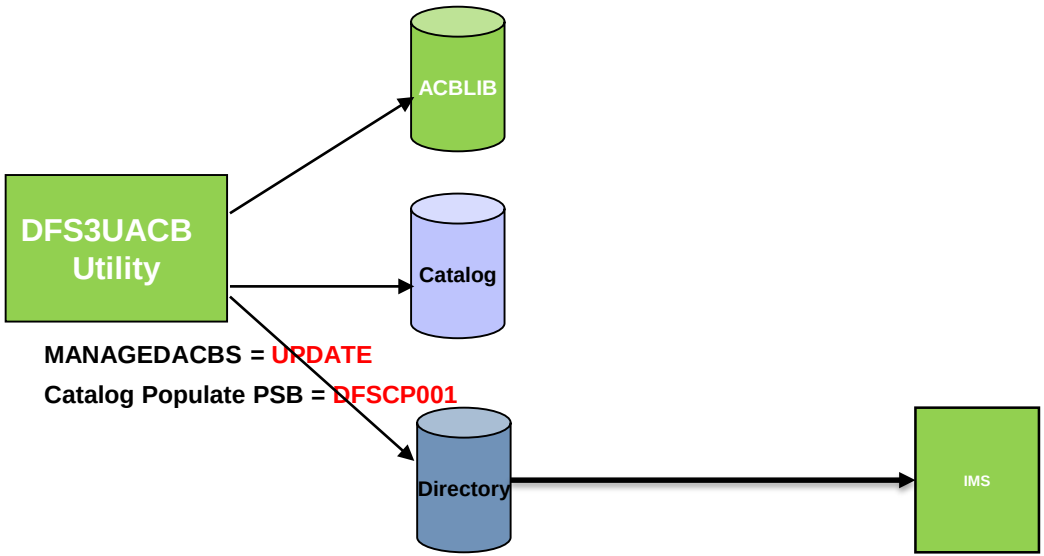
Updating the directory while IMS is up

Option 1a: Continue doing ACBGENs & use DFS3UACB with MANAGEDACBS=STAGE option to also update the Staging Directory



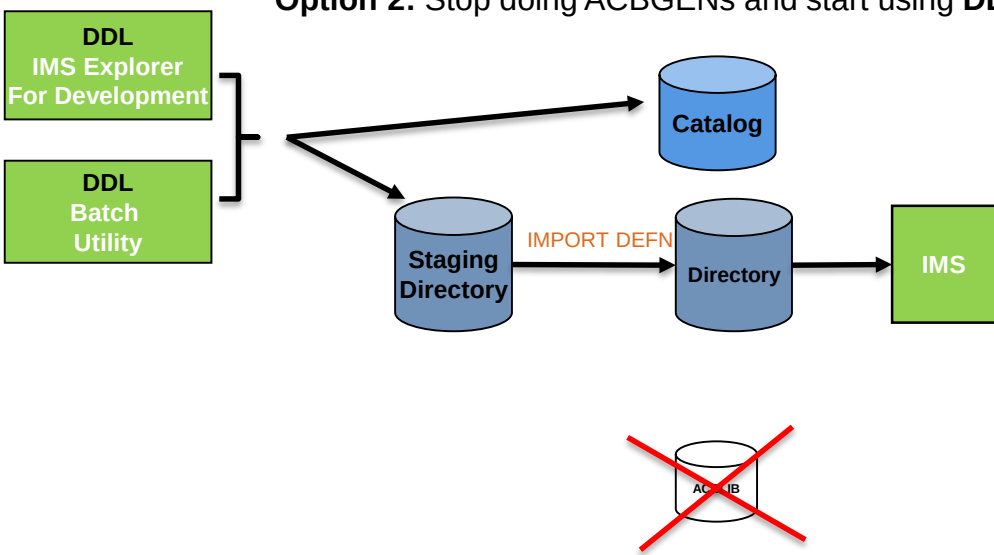
Updating the directory while IMS is down

Option 1b: Continue doing ACBGENs & update DFS3UACB with MANAGEDACBS=UPDATE to update Directory dataset directly



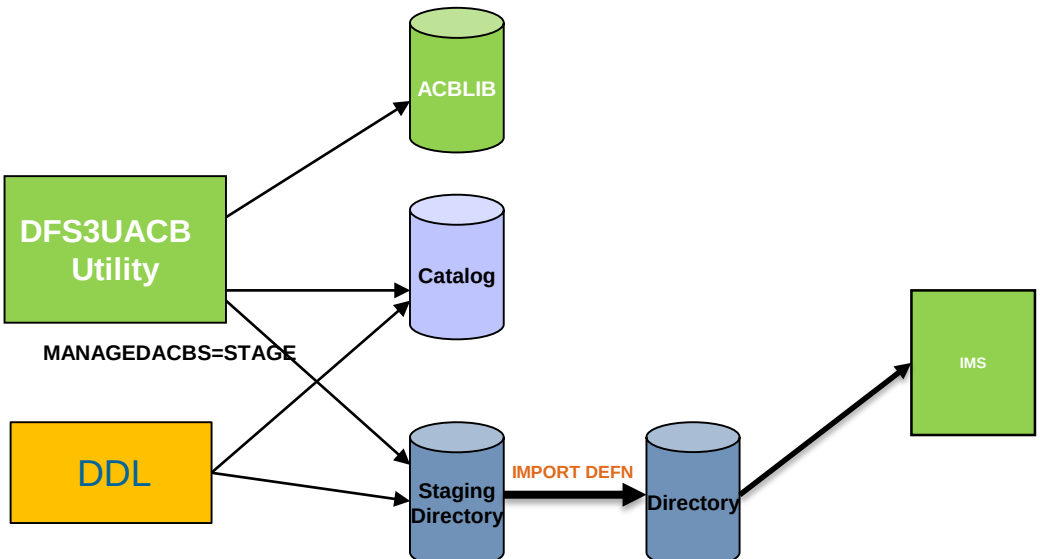
Updating the directory – Option 2 – use only DDL

Option 2: Stop doing ACBGENs and start using **DDL**



Updating the directory – option 3 – continue with ACBGENs

Option 3: Use ACBGENs & DDL – Phased cut over to DDL



Lets be clear

- Implementing IMS Managed ACBs
- Requires implementing the IMS Catalog & Directory
- Implementing DDL
- Requires implementing IMS Managed ACBs

Implementing IMS Managed ACBs is NOT …

- Change to the DBD/PSB source
- Change to DBDGEN or PSBGEN procedures
- Change to ACBGEN procedure to create what was/is the Staging ACBLIB
- - Use DFS3UACB for ACBGENs
- Requirement to enhance the DBD source with Copybook information
- Change to any DBRC procedures
- Accessing IMS databases via JDBC or DL/I Universal drivers

Implementing IMS Managed ACBs is NOT …

- Change to any running DLIBATCH or BMP JCL
- Change IMS STC procedures
  - Optionally can remove the ACBLIBA/B DD
  - Optionally can delete the ACBLIBA/B data sets
- Change to any existing Common Service Layer address space (CSL)
- Requirement to implement IMS Connect
- Requirement to implement ODBM address space

Implementing IMS Managed ACBs is NOT …

- Requirement to use the IMSPLEX or CATALOG DBRC options in the RECON
  - IMSPLEX if in use is unchanged
  - CATALOG is optional and is not used unless you chose to remove //IMS DD from DBRC command JCL

- Requirement to use DRD instead of MODBLKS gen

What about Batch jobs?

Batch Implications

- Application batch jobs **do not have to be modified** for IMS Managed ACBs. They can continue to run with DBDLIBs & PSBLIBs

- However, to enable batch jobs for IMS Managed ACBs

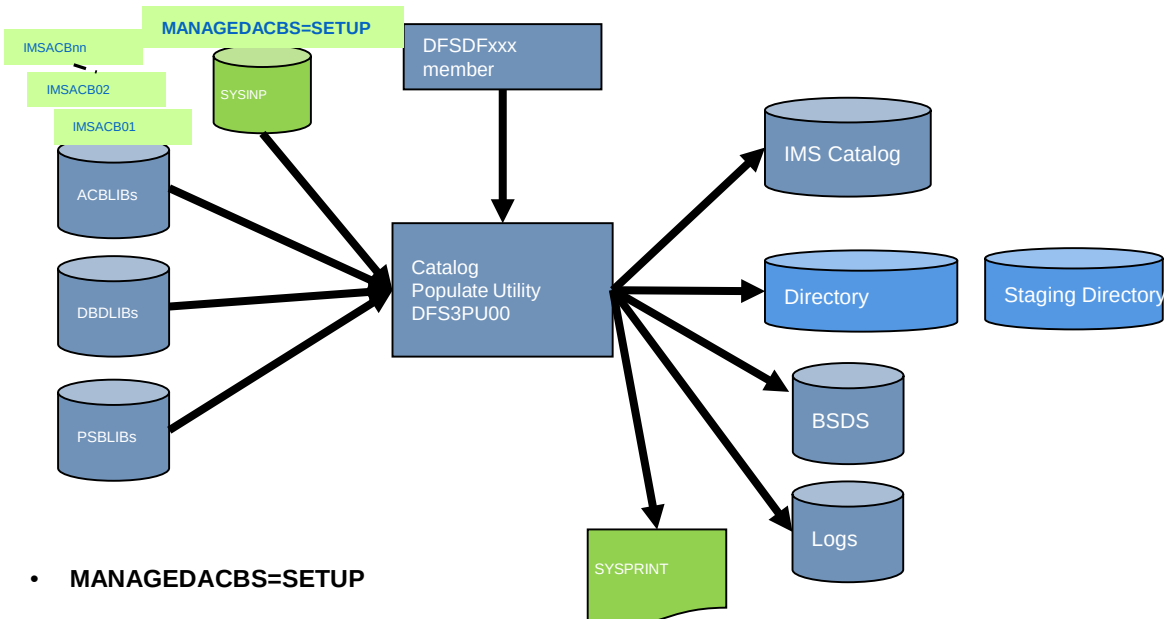
  - Specify use of the IMS catalog and ACB management
    - Add JCL PARM to specifiy DFSDFxxx PROCLIB member or
    - Use DFS3CDX0 exit as an alternative to modifying the JCL

  - IMS will load application control blocks from the catalog

  - If present, IMS ignores DBDLIB and PSBLIB, or ACBLIB
    - Overrides the DLI or DBB processing option specified in the JCL

UTILITIES

Initially Creating & Populating the IMS Catalog / Directory

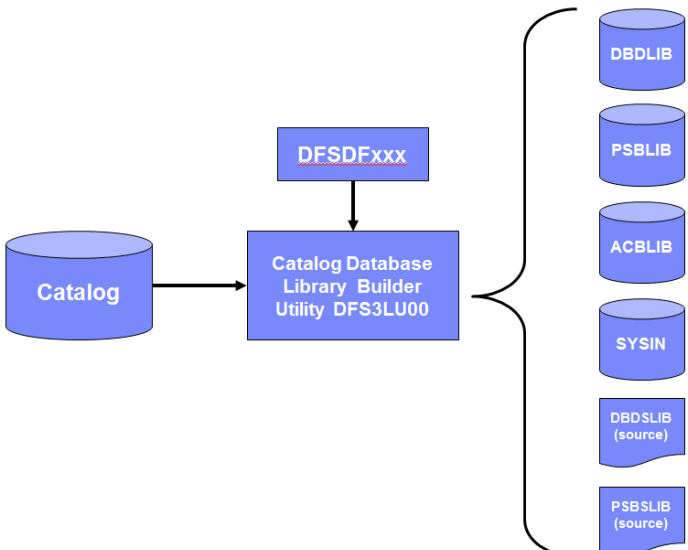


- **MANAGEDACBS=SETUP**
- **LOAD PSB DFSCPL00**

IMS Catalog Database Library Builder Utility – DFS3LU00

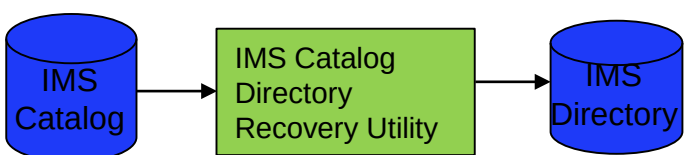
- Used **to build DBD and PSB source** from the IMS catalog
  - Utility will read catalog metadata and transform members into source macros
    - Similar to the IMS Enterprise Suite Explorer for Development function
  - **Source can be used to generate DBDLIB, PSBLIB and ACBLIB members**
- DFS3LU00 utility can be used until tools are updated to use the IMS catalog instead of DBDLIB, PSBLIB and ACBLIB

IMS Catalog Database Library Builder Utility - DFS3LU00



IMS Catalog Directory Recovery Utility - DFS3RU00

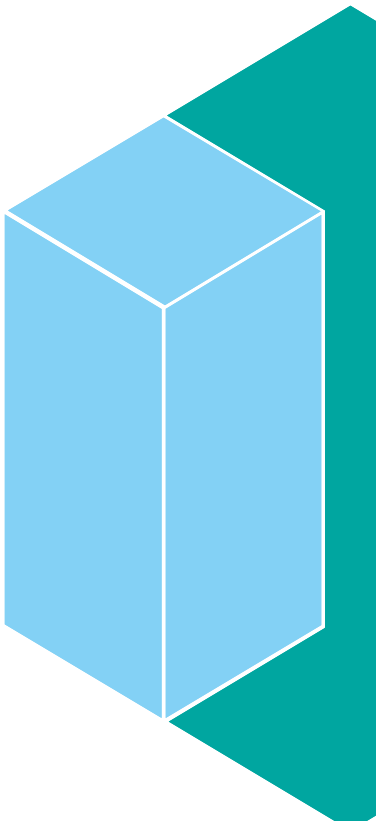
- IMS Catalog Directory Recovery Utility recovers (or rebuilds) the Directory from the IMS Catalog



IMS Catalog Record Purge Utility - DFS3PU10

- IMS Catalog Record Purge utility can be used to remove older instances of metadata from the IMS Catalog
- DFSDFxxx PROCLIB member provides defaults for the utility
- Currently the utility does not run online – development is aware of this & will be rectifying this.

Thank You!



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