

Virtual IMS user group meeting

IMS Virtualization with Compuware COPE™

COPE provides IMS Virtualization for Rapid Deployment and System Simplification

Thomas Esser
EMEA IMS Specialist
Compuware Software Solutions

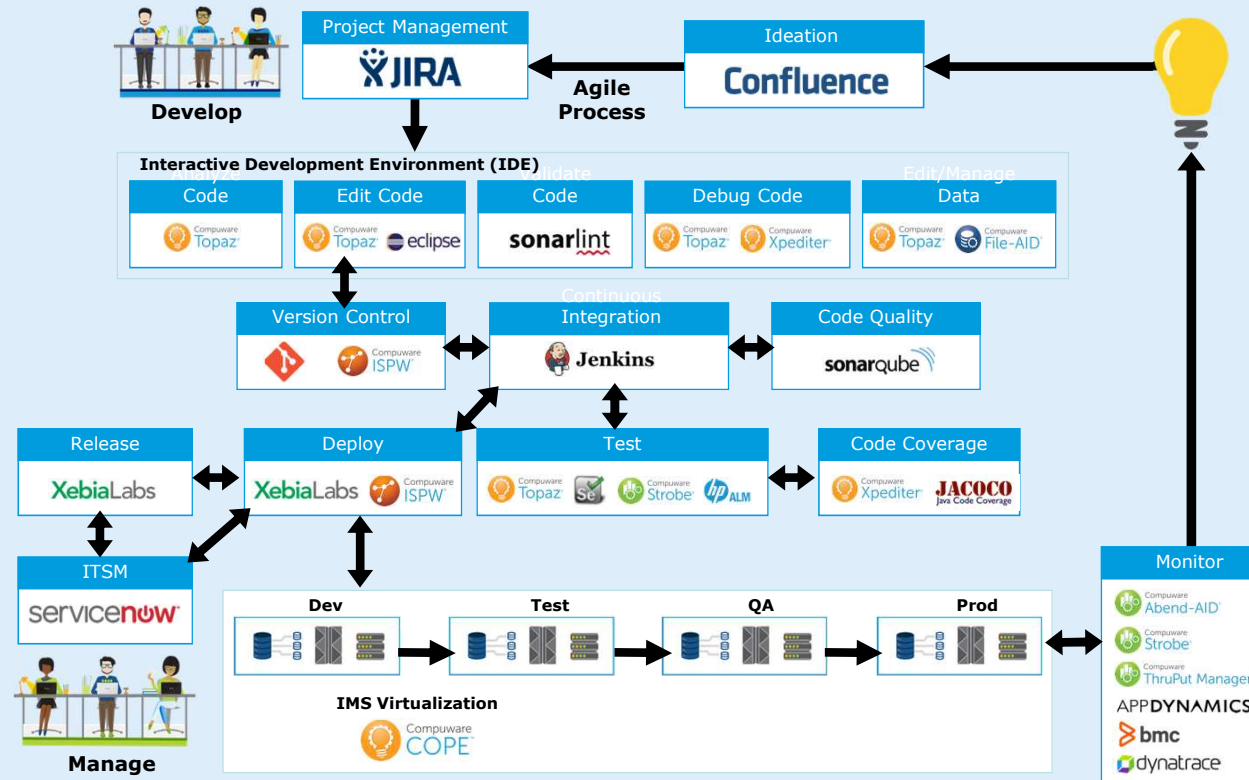
10.04.2018



Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?

DevOps Toolchain



Application Modernization

Today You Need to Master These with intelligent tools

Mobility | Analytics | Social | Cloud



Agenda

- The Compuware DevOps story
- **What is Virtualization in common?**
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?

What is Virtualization in common?

- In computing, **virtualization** refers to the act of creating a virtual (rather than actual) version of something, including virtual [computer hardware](#) platforms, [storage devices](#), and [computer network](#) resources.
- Virtualization began in the 1960s, as a method of logically dividing the system resources provided by [mainframe computers](#) between different applications.

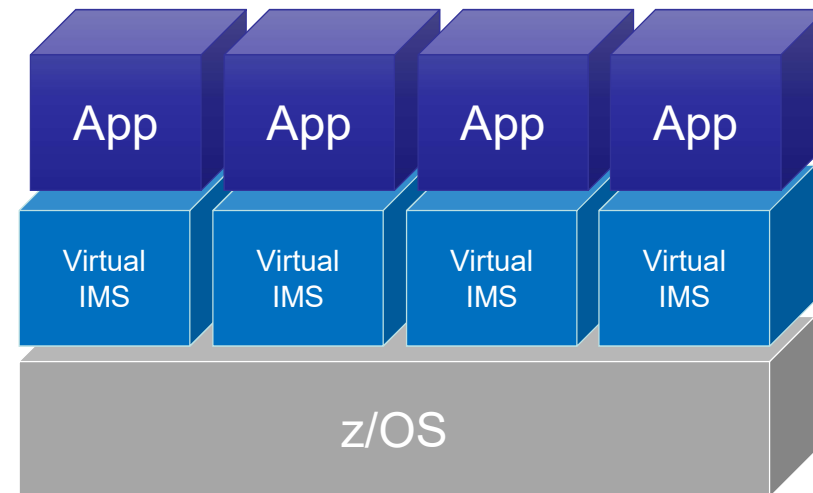
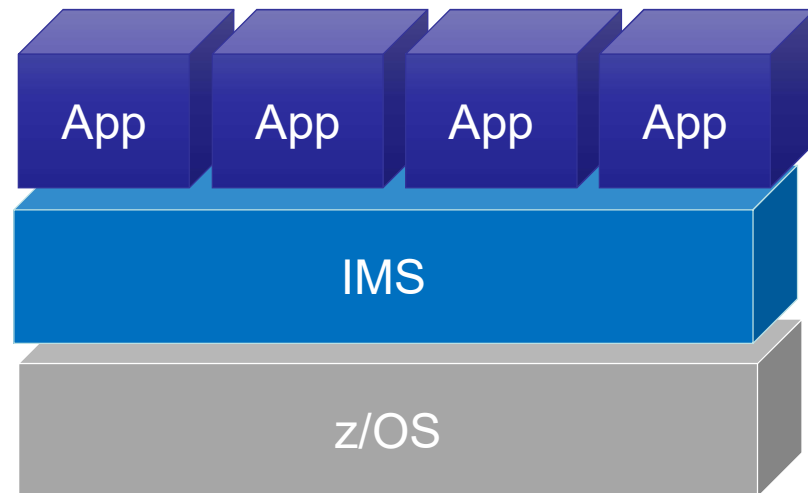
Taken from **Wikipedia**

Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- **What is IMS Virtualization?**
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?

What is IMS Virtualization?

“The ability to execute multiple versions of IMS and DB2 programs within a single physical IMS subsystem.”



How COPE works

COPE contains two portions:

- a portion that operates under ISPF, and a
- portion that executes in an IMS MPP (Message Processing Program) region.

The ISPF portion generates the system run by the IMS portion. It assigns a unique internal name to each PSB, DBD and MFS block, of the form **Cnnnnnnn** (where 'n' is a number), called a "**C-number**".

Each system to be combined into one physical IMS system will have components with different C-numbers from the components in other systems. The ISPF-generator portion of COPE parses information from DBD source, PSB source and MFS source into ISPF tables, and then regenerates the source with the C-numbers substituted.

The IMS portion of COPE translates the C-numbers back to real names when IMS invokes the application program, and the real to C-numbers when the application program calls IMS via CBLTDLI.

The Benefits of IMS Virtualization with COPE

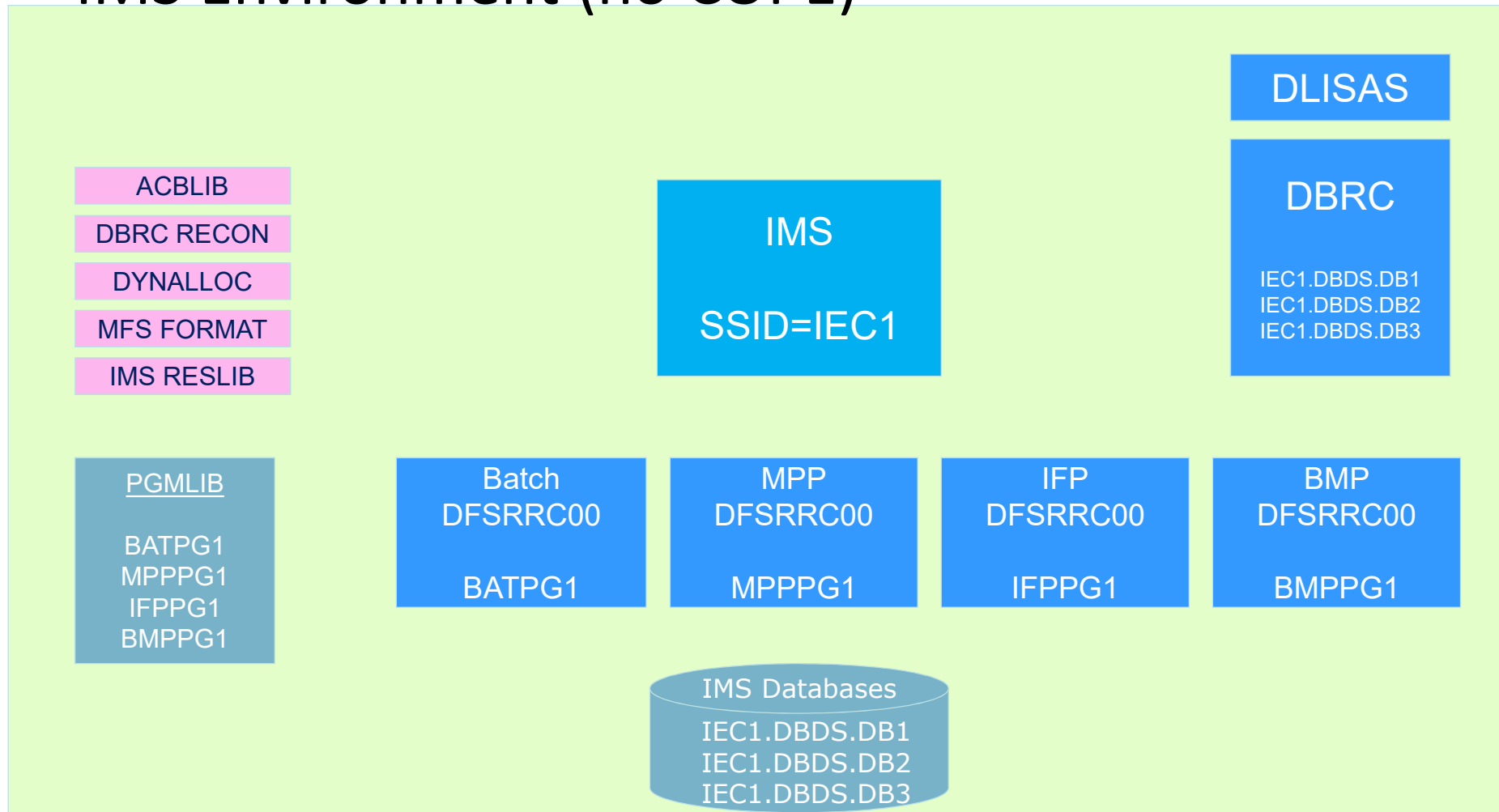
- Reduce the expertise and time to maintain IMS application systems
- Create virtual environments within one IMS physical system
 - For different phases of application development
 - Or different versions of IMS applications and databases
 - Application Developers and Testers work independently in their own IMS
- Create “disabled” virtual environments
 - That are readily available for critical initiatives
- Lower CPU resource utilization
 - By eliminating IMS address spaces
- Cope provides full IMS functional capabilities
 - Not a simulator, emulator, or system replicator



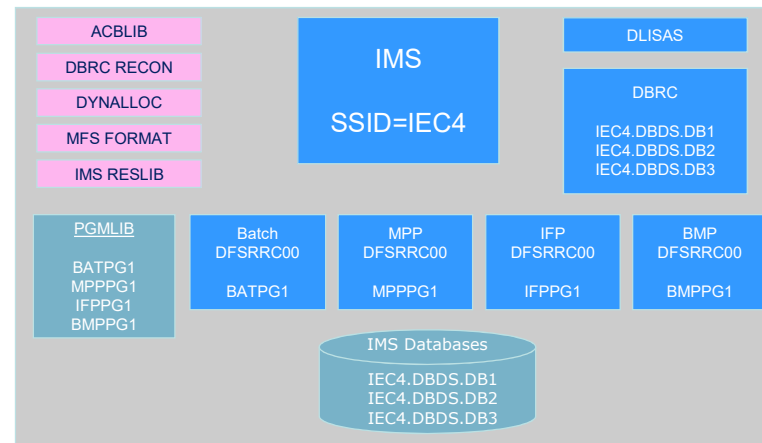
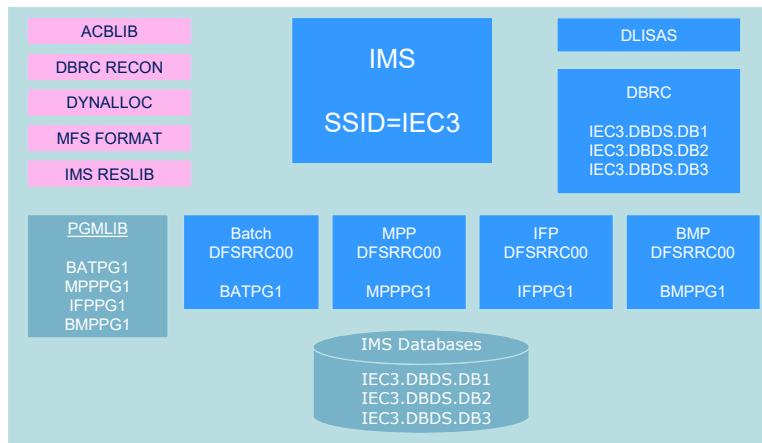
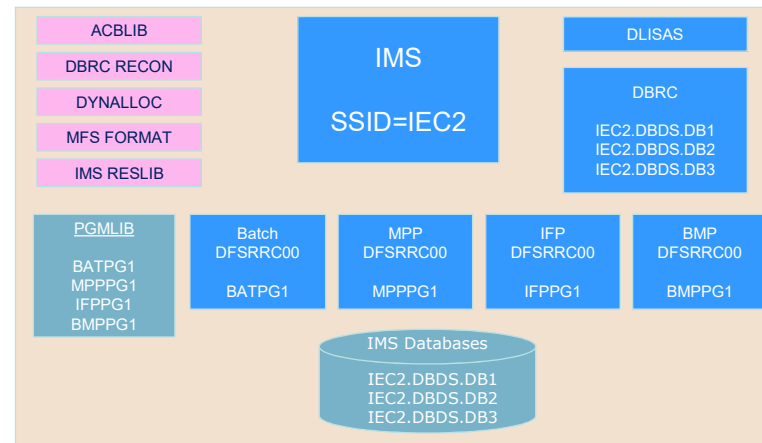
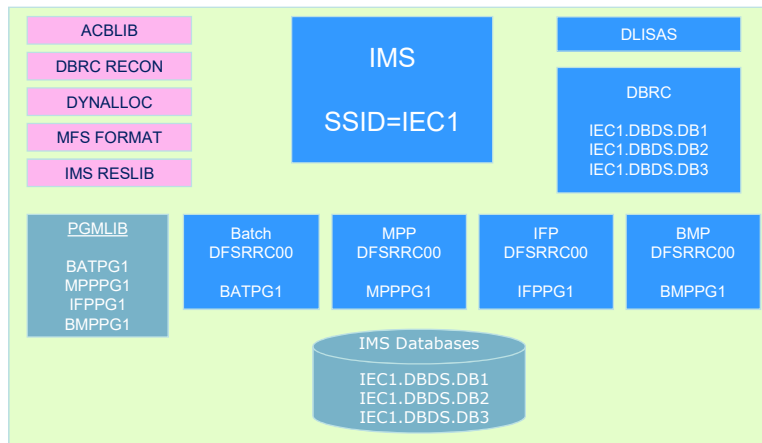
Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- What is IMS Virtualization?
- **How do we define the Virtual Environment?**
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?

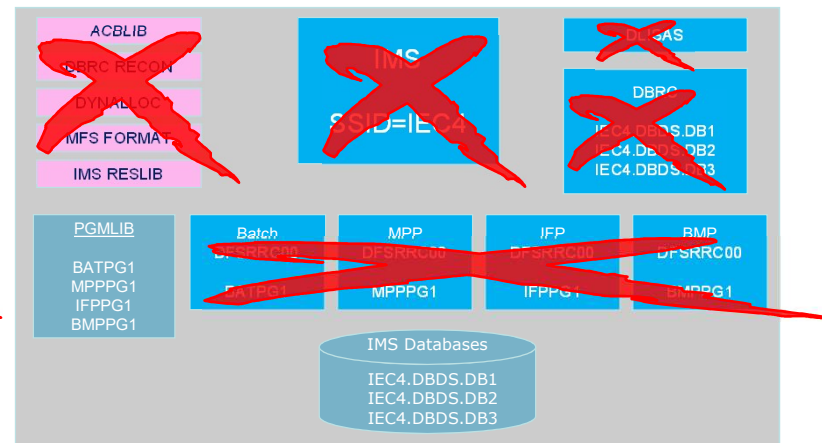
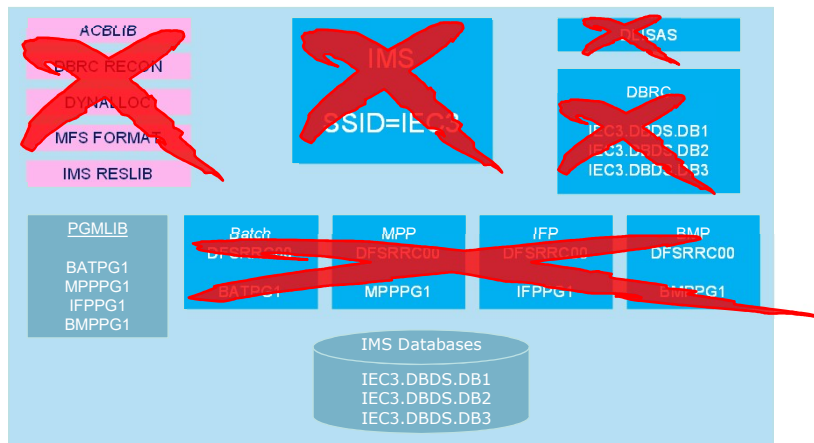
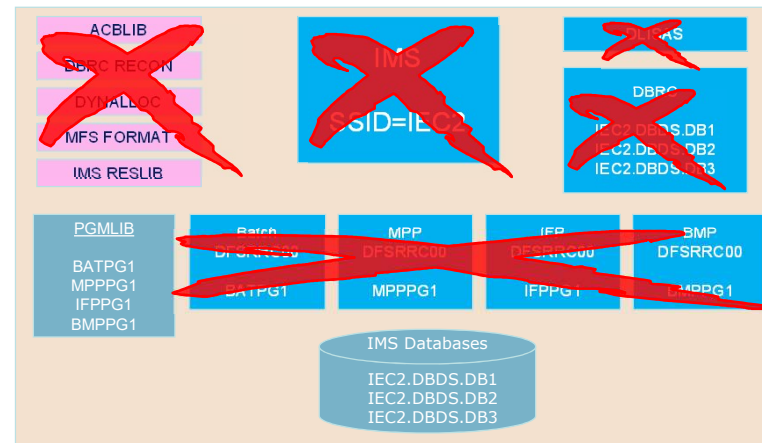
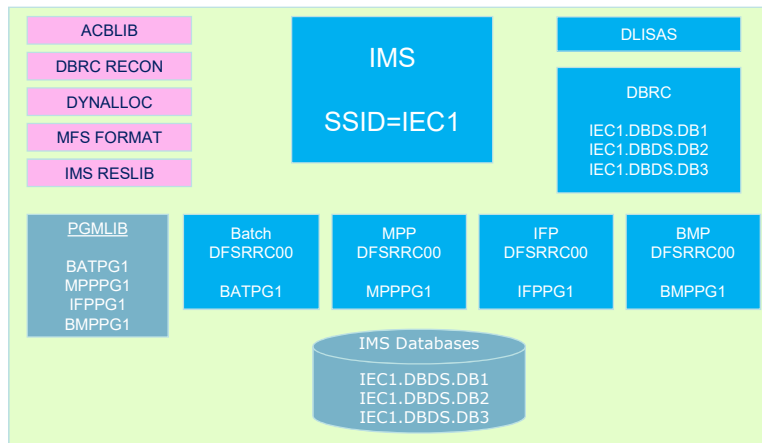
IMS Environment (no COPE)



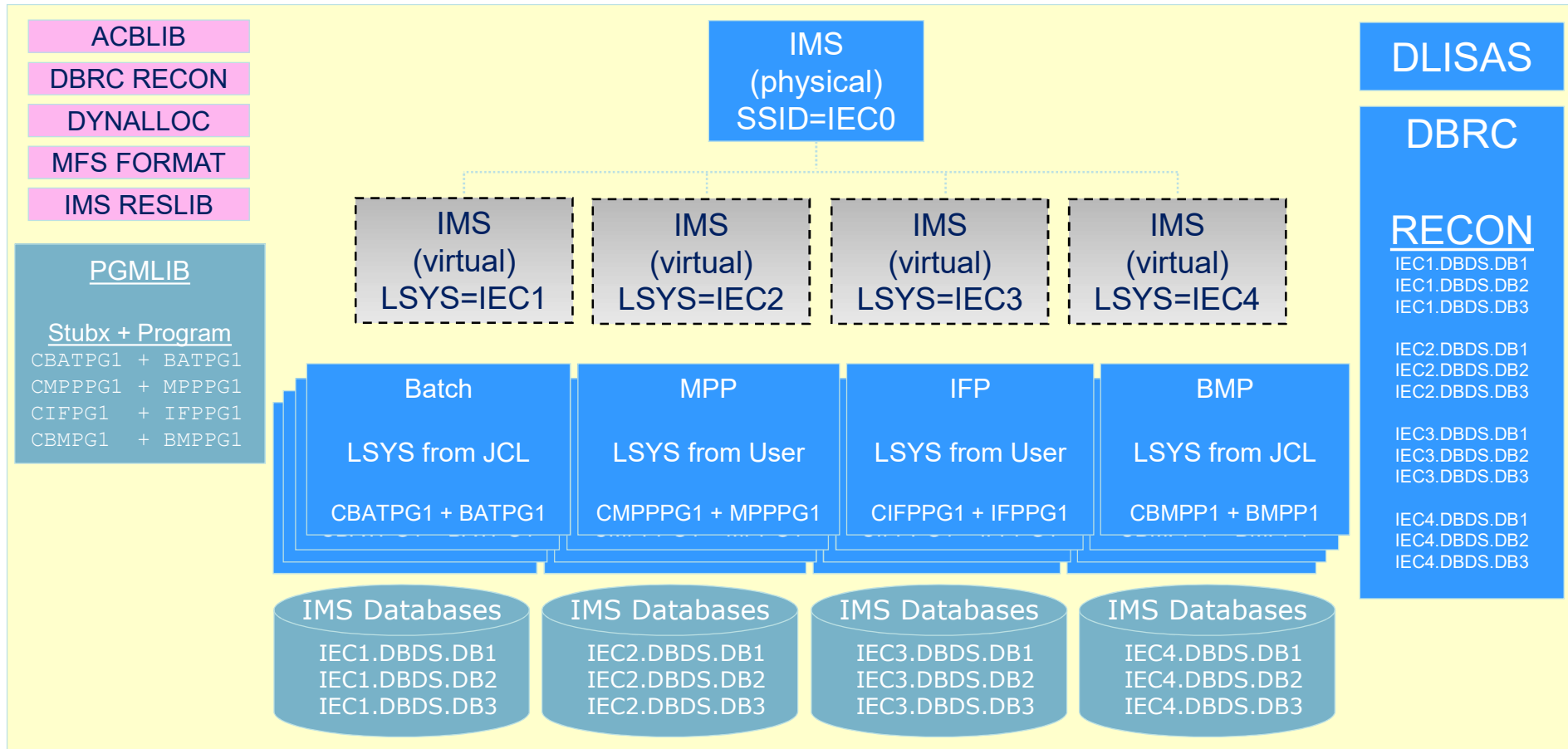
Four IMS Environments (without COPE)



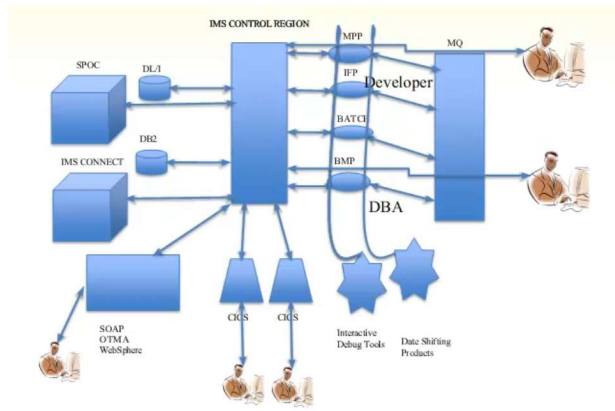
Four IMS Environments (with COPE)



IMS Virtualized Environments #1-4 (with COPE)



Virtualization Process



Original IMS Environment

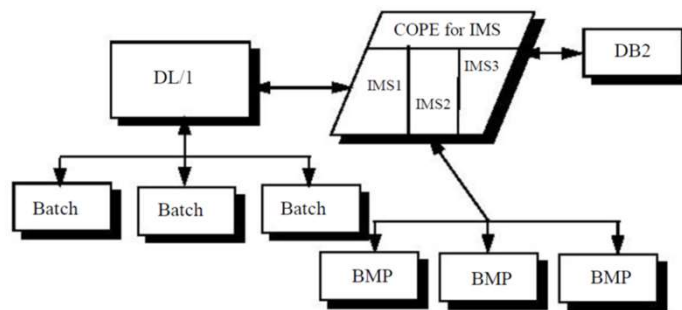
```

----- COPE Development System -----
option ==> -
1 - Setup                               Version 4.4.14
2 - Import and Generate                 Date 16/09/28
3 - Update/Copy/Move/Generate          Time 19:02
4 - Data Transform (IMS and COPE)     Julian 16.272
5 - Utilities                          Screen 1
6 - View Trace and (XPEDITOR TSO)     z/os 2.01.00
T-7 - Translate Function               IMS 14.1.0
B - Base Selection Menu
9 - IMS Type 2 commands (SPOC)
X - Exit

Physical IMS      IMSW
Procs Dataset    IMSTEST.COPE.UMOD.PROCS
Master Lsys      MASTER

Enter "JOB"      Enter "EDIT"      Enter "BROW"      Enter "UTIL"
to review job    to access        to access        to access
status          ISPF Edit      ISPF view       ISPF utility

Lsys Licenced 09      Expiry Date= 17/06/22
copyright (c) 1989-2016 standardware Inc.
  
```



Virtual IMS Environment

Process:

- Setup – defining environment
- Import – DBD's, PSB's, DYNALOC
- Change – modify definitions such as PSB's (as required)
- Data Def regeneration including renaming of objects for
 - virtual environment,
 - DBD Generation,
 - PSB Generation etc.
- Load IMS data / DB2 data

COPE ISPF Interface: Main Menu

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
----- COPE Development System -----
1 - Setup                               Version 4.4.14
2 - Import and Generate                 Date 17/08/31
3 - Update/Copy/Move/Generate          Time 12:35
4 - Data Transform (IMS and COPE)      Julian 17.243
5 - Utilities                          Screen 1
6 - View Trace                         z/OS 2.03.00
T-7 - Translate Function                IMS 14.1.0
B - Base Selection Menu
9 - IMS Type 2 Commands (SPOC)
X - Exit

Physical IMS   RELE
Procs Dataset IM.COPEU.PROCS
Master Lsys   IEC1

] Enter "JOB" ]
] to review job ]
] status ]

] Enter "EDIT" ]
] to access ]
] ISPF Edit ]

] Enter "BROW" ]
] to access ]
] ISPF View ]

] Enter "UTIL" ]
] to access ]
] ISPF Utility ]

Option ==> _
F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP  F10=LEFT   F11=RIGHT  F12=RETRIEVE

MA A 22/014
Connected to remote server/host cw06.compuware.com using lu/pool TCP06002 and port 23
```

Create the IMS
Virtualization Environment

COPE ISPF Interface: Setup IMS Virtualization

Setup IMS Virtualization

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
----- COPE Development System Setup -----
----- Initial COPE Installation Tasks -----
1 - Define Logical Systems
2 - Generate Batch JCL Procedure
3 - Define Batch JOB Card
4 - Edit External Interface (Batch Input) Sample JCL
5 - Specify Message Region Datasets
6 - Define Lsys Identifying Tokens (Re-Linking IMS Modules)
7 - Define Excluded (Not Modified by COPE) Databases and Transactions
8 - Define Common Stage 1 and Dynallocation (DFSMDA) Specifications
9 - Bind COPE DB2 Plans
----- COPE System Maintenance Tasks -----
10 - Generate Environment Member after Changes to ZDEFAULT
11 - Create a DBDLIB and PSBLIB from an IMS catalog
12 - Limit Lsys Access to Specific Users
  
```

Define IMS Logical Systems (Lsys)

```

Session B - [24 x 80]
File Edit View Communication Actions Window Help
Edit Projects and Systems - Table Data Panel ---
Commands: FIND/POPOP/REPORT View.: none
Rcd(s): S/R/I/D/C/M/DD/RR View.: L/LIBS
  
```

Rcd	PROJECT NAME	SYSTEM NAME	PREV SYSTEM	ACTIVE SYS?
.....	CPWR	IEC1		Y
.....	CPWR	IEC2	IEC1	Y
.....	CPWR	IEC3	IEC1	Y
.....	CPWR	IEC4	IEC1	Y

Define IMS Message Regions

```

Session B - [24 x 80]
File Edit View Communication Actions Window Help
Edit Message Region Datasets - Table Data Panel -----
ROW 1 OF 4
MORE -->
Commands: FIND/POPOP/REPORT View.: none
Rcd(s): S/R/I/D/C/M/DD/RR View.: none
  
```

Rcd	DD NAME	LSYS NAME	DATASET NAME	CONC ORD
.....	TASKLIB	IEC1	IM.COPE.LOAD	1
.....	TASKLIB	IEC2	IM.COPE.LOAD	1
.....	TASKLIB	IEC3	IM.COPE.LOAD	1
.....	TASKLIB	IEC4	IM.COPE.LOAD	1

INSTALLATION STEPS FOR COPE-IMS/DC

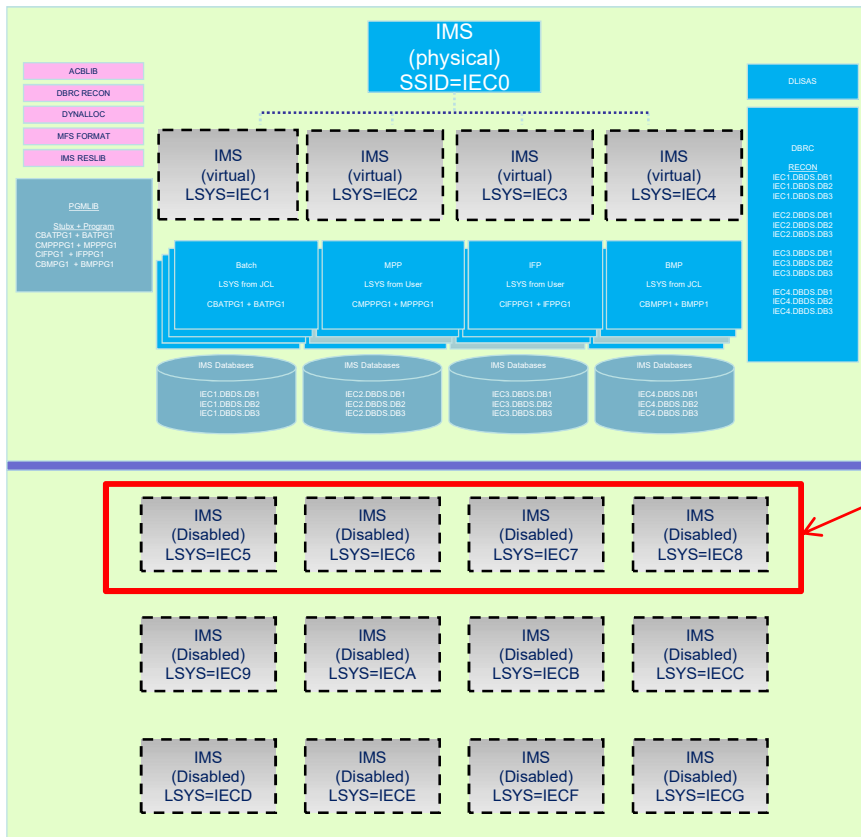
Installation Guide

- I1 - Load File 1 from tape
- I2 - Allocate datasets
- I3 - Load Files 2-n from tape
- I4 - Allocate TABLES
- I5 - Zdefault member
- I6 - TSO logon proc
- I7 - Initialize tables
- I8 - Copy JCL procs to proclib
- I9 - Serialization ENQ lock
- I10 - Allocate online libraries
- I11 - System DBD, PSB, MFS gens
- I12 - Ctl, Msg region JCL
- I13 - Copy authorized modules
- I14 - Bind DB2 plans

Administration Guide

- A1 - Define Libsets
- A2 - Define Related Types
- A3 - Allocate libset datasets
- A4 - Parse Stage 1 and Dynalloc
- A5 - Import DBDs and PSBs
- A6 - Exclude System PSBs
- A7 - Combined PSBGEN
- A8 - Describe databases
- A9 - ACBGEN
- A10 - Generate dynalloc, load USTDLMGR
- A11 - IMSGEN
- A12 - Convert MSG/BMP/Batch JCL
- A13 - Bind DB2 plans
- A14 - Initialize DBRC recons

IMS Virtualization - On Demand Systems



Session A - [24 x 80]

File Edit View Communication Actions Window Help

EdIt Projects and Systems - Table Data Panel -----

Commands: FIND/POPUP/REPORT View.: none
Rcd(s): S/R/I/D/C/M/DD/RR View.: L/LIBS

Rcd	PROJECT NAME	SYSTEM NAME	PREV SYSTEM	ACTIVE SYS?
.....	STDWARE	IEC01	_____	Y
.....	STDWARE	IEC02	IEC01	Y
.....	STDWARE	IEC03	IEC01	Y
.....	STDWARE	IEC04	IEC01	Y
.....	STDWARE	IEC05	IEC01	N
.....	STDWARE	IEC06	IEC01	N
.....	STDWARE	IEC07	IEC01	N
.....	STDWARE	IEC08	IEC01	N

- “Enabled” Logical Systems are Active
- Non-Active systems are for future use

Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- **How does COPE transform Programs and Databases?**
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?

COPE ISPF Interface: Transform IMS Resources

COPE Main ISPF Screen

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
----- COPE Development System -----
1 - Setup                               Version 4.4.14
2 - Import and Generate                  Date 17/08/31
3 - Update/Copy/Move/Generate           Time 12:35
4 - Data Transform (IMS and COPE)       Julian 17.243
5 - Utilities                            Screen 1
6 - View Trace                           z/OS 2.03.00
T-7 - Translate Function                  IMS 14.1.0
B - Base Selection Menu
9 - IMS Type 2 Commands (SPOC)
X - Exit
  
```

Step 1: Import IMS Resources

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
----- COPE Development System Import -----

Logical System ==> IEC1
Input Dataset ==> 'IMS141A.COPE.DEV.INSTALIB' (Or Catalog
                                                extract name if DBD or PSB)
----- Input IMS Definitions into COPE -----
Stage 1
S1-1 - Import Entire Stage 1 Source to COPE Dictionary
      Dynalloc
      DYN-2 - Import Dynalloc (Source or Load) to COPE Dictionary
      DBD-3  DBD    DBDCOPY-3C
Import and Generate DBD (Source/Load/Dictionary) or Import DBDCOPY Members
      PSB-4  PSB    PSBCOPY-4C
Import and Generate PSB (Source/Load/Dictionary) or Import PSBCOPY Members
      MFS-5  MFS    MFSCOPY-5C
Import and Generate MFS Source or Import MFSCOPY Members
      Recon
      REC-6 - Create and Generate Recon Database Definitions
  
```

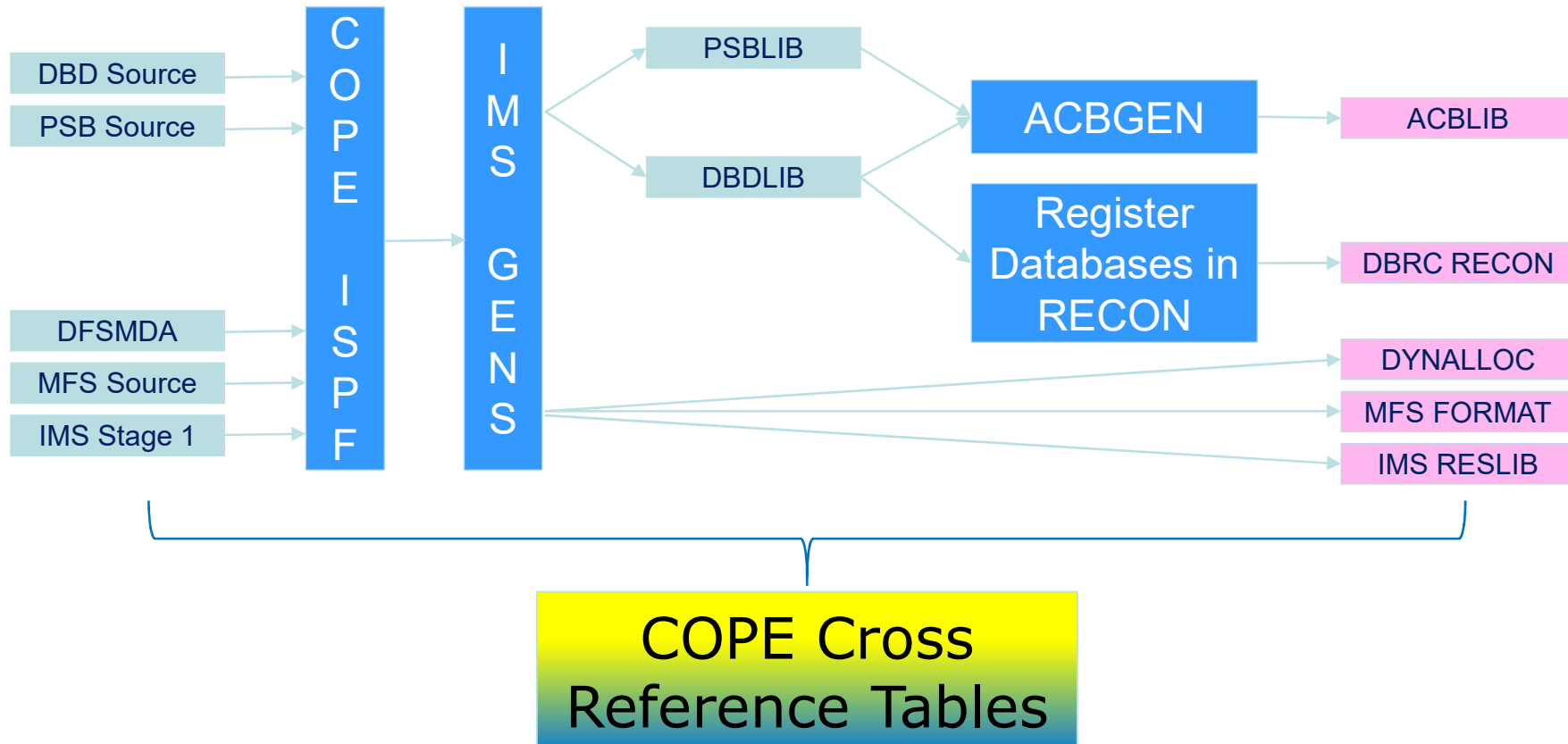
Step 2: Execute IMS Transformations

```

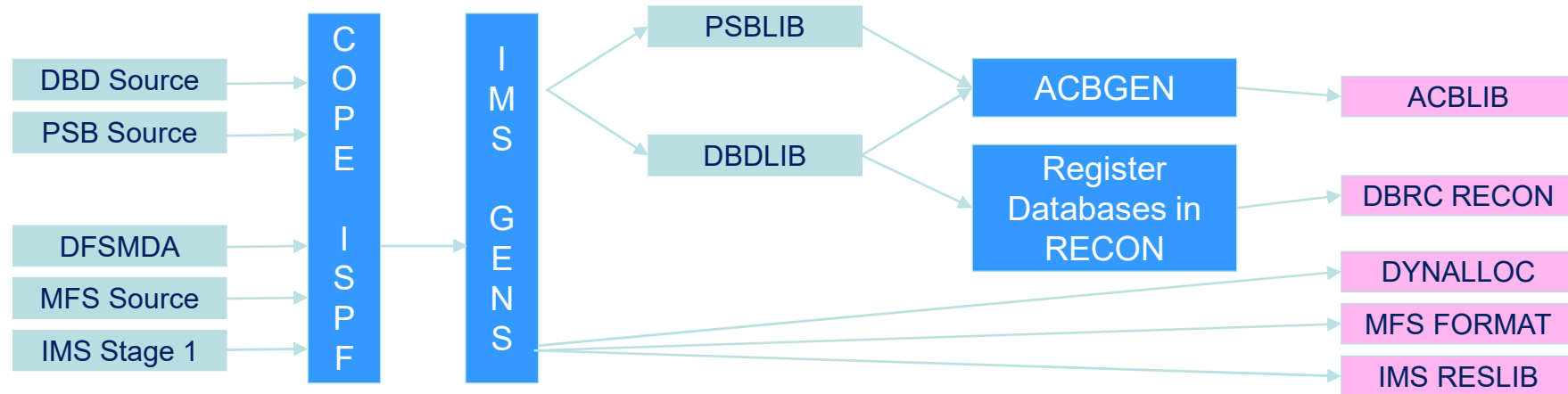
Session A - [24 x 80]
File Edit View Communication Actions Window Help
----- COPE Development System Transform -----

----- IMS Data Transformations -----
S1-1 - Perform a Stage1 Generation and Update Executing System
For COPE - Edit (and submit) a Stage 1 member
S1E-1E
S2-2 - Edit (and submit) a Stage 2 member
      DYN-3 - Perform a Dynalloc Generation for all Databases
      PSB-4 - Perform a PSBGEN
      ACB-5 - Perform an ACBGEN
      DBRC - Create/Generate DBRC definitions
----- COPE to IMS Execution Environment Transformations -----
REF-6 - Refresh COPE Name Translation Members (COPEXRF1/2/3)
MFS-7 - Generate MFS Name Translation Table (COPEMFSX)
----- COPE Internal Transformations -----
RPSB-8 - Recreate Dictionary of PSB Definitions
RSS-9 - Recreate COPE Transaction and Database Start/Stop Definitions
----- COPE Dictionary -----
D-10 - Internal COPE Dictionary Tables
Option ==>
  
```

Transforming IMS into a COPE Virtualized Environment



Transforming IMS into a COPE Virtualized Environment



DBD

```

DBD NAME=DBD1
SEGM NAME=DBD1SEG1,...
FIELD NAME=DBD1FLD1,...
...
DBDGEN
FINISH
END
    
```

DBD

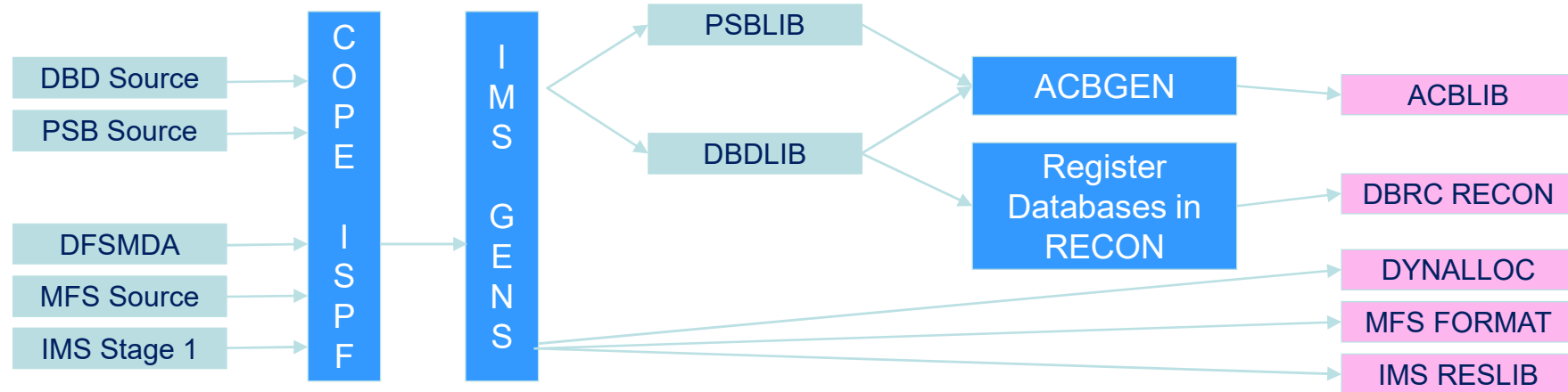
```

DBD NAME=DBD2
SEGM NAME=DBD2SEG1,...
FIELD NAME=DBD2FLD1,...
...
DBDGEN
FINISH
END
    
```

TRANSFORM

LSYS	DBD	COPE DBD	COPE DBDS
IEC1	DBD1	C1DBD1	IEC1.DBDS.DBD1
IEC2	DBD1	C2DBD1	IEC2.DBDS.DBD1
IEC3	DBD1	C3DBD1	IEC3.DBDS.DBD1
IEC1	DBD2	C1DBD2	IEC1.DBDS.DBD2
IEC2	DBD2	C2DBD2	IEC2.DBDS.DBD2
IEC3	DBD2	C3DBD2	IEC3.DBDS.DBD2

Transforming IMS into a COPE Virtualized Environment



PSB

```
PCB TYPE=DB,DBDNAME=DBD1
SENSEGE NAME=DBD1SEG1,...
...
PSBGEN PSBNAME=MPPPG1
END
```

Stage 1

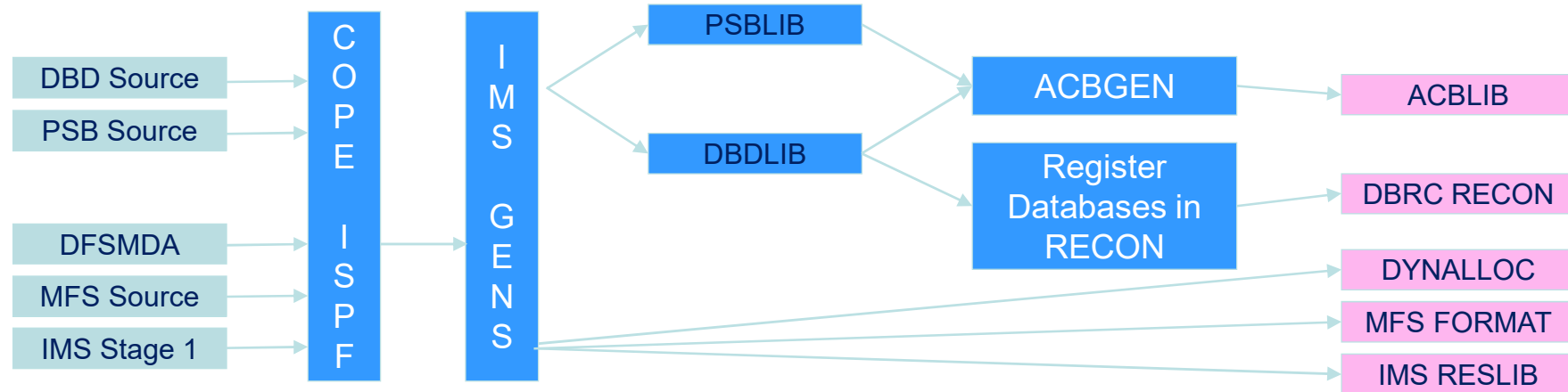
```
DATABASE DBD=DBD1
APPLCTN PSB=MPPPG1
TRANSACT CODE=TRAN1

DATABASE DBD=DBD2
APPLCTN PSB=MPPPG2
TRANSACT CODE=TRAN2
```

T R A N S F O R M

LSYS	Trancode	Program	COPE Stubx	DBD	COPE DBD
IEC1	TRAN1	MPPPG1	CMPPPG1	DBD1	C1DBD1
IEC2	TRAN1	MPPPG1	CMPPPG1	DBD1	C2DBD1
IEC3	TRAN1	MPPPG1	CMPPPG1	DBD1	C3DBD1
IEC1	TRAN2	MPPPG2	CMPPPG2	DBD2	C1DBD2
IEC2	TRAN2	MPPPG2	CMPPPG2	DBD2	C2DBD2
IEC3	TRAN2	MPPPG2	CMPPPG2	DBD2	C3DBD2

Transforming IMS into a COPE Virtualized Environment



DFSMDA

```

DFSMDA TYPE=INITIAL
DFSMDA TYPE=DATABASE,DBNAME=DBD1
DFSMDA TYPE=DATASET,
    DSNAME=IMS.DBDS.DBD1,
    DDNAME=DBD1DD
DFSMDA TYPE=DATABASE,DBNAME=DBD2
DFSMDA TYPE=DATASET,
    DSNAME=IMS.DBDS.DBD2,
    DDNAME=DBD2DD
...
DFSMDA TYPE=FINAL
END
    
```

TRANSFORM

LSYS	DBD	COPE DBD	COPE DBDS	COPE DDNAME
IEC1	DBD1	C1DBD1	IEC1.DBDS.DBD1	C1DBD1DD
IEC2	DBD1	C2DBD1	IEC2.DBDS.DBD1	C2DBD1DD
IEC3	DBD1	C3DBD1	IEC3.DBDS.DBD1	C3DBD1DD
IEC1	DBD2	C1DBD2	IEC1.DBDS.DBD2	C1DBD2DD
IEC2	DBD2	C2DBD2	IEC2.DBDS.DBD2	C2DBD2DD
IEC3	DBD2	C3DBD2	IEC3.DBDS.DBD2	C2DBD2DD

COPE and IMS Connect

- IMS supports Distributed Relational Database (DRDA) via Open Database Manager (ODBM)
- COPE uses CSL ODBM Input user Exit Routine to intercept ACCRDB DDM commands and translate PSBNAME to value dependent on Data Store name in same ACCRDB command
- Transactions inserted to IMS Message Queue are processed normally
 - Requires user to be connected to logical system

How Long Does It Take to Create the COPE Environment?

Installation Step	Duration
Install COPE	1 Day
Import Stage 1, DFSMDA, DBDs, and PSBs	1 Week
Define IMS JCL and Generate Stage 1 and Stage 2	1 Day
Load IMS and DB2 Databases	1 – 3 Weeks
Setup connections to CICS and MQ	1 Day
Total	3 – 5 Weeks

Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- **How does a Transaction run in a COPE environment?**
- What technologies work in a COPE system?

Select the COPE Logical System (LSYS)

Step 1: Signon to IMS

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
DFS3649A /SIGN COMMAND REQUIRED FOR IMS IEC0

DATE: 09/01/17    TIME: 09:37:40

NODE NAME: TCP06009

USERID: amiggg0

PASSWORD:

USER DESCRIPTOR: _
GROUP NAME:
NEW PASSWORD:

OUTPUT SECURITY AVAILABLE
  
```

Step 2: Enter COPE Tran

```

Session A - [24 x 80]
File Edit View Communication
COPE
  
```

Step 4: LSYS = IEC2 Selected

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE IEC2 AMIGGG0 11:32 IMSEMR1A
=====>
User AMIGGG0 changed logon from IEC1 to IEC2
Programs are loaded using real names (not C-numbers), from the following
concatenation of libraries (for Lsys IEC2 in region IMSEMR1A):

=LIB=> IM.COPE.LOAD

The DDname search order is: C0000002 COPESTEP STEPLIB
Use the LIB COPESTEP command to see the libs on COPESTEP.
ESTAEs curr active: COPEXP7 DFSPCRP0

IMS Rel 14.1 (14.1 in ISPF/14.1 Sim), MVS 2.03 Cope 4.4.14

AVAIL> IEC1 IEC2 IEC3 IEC4
  
```

Step 3: Enter COPE User Screen and Select LSYS

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE IEC1 AMIGGG0 11:28 IMSEMR1A
=====> IEC2_

Enter a command above, or PF1 to access the tutorial.

Lsys          - Logon to, or change to, logical system Lsys
/FOR          Format      - Display MFS format
ABS           - Display last ABend Summary screen
SS           - Start/Stop databases or transactions
TRACE ON     - Turn DLI and SQL call trace on

AVAIL> IEC1 IEC2 IEC3 IEC4
  
```

LSYS	IMS User
IEC1	AMIGGG0
IEC2	AMIGGG0

Executing a Transaction in COPE Environment

Step 1: Enter Transaction in LSYS IEC2

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE IEC2 AMIGGG0 12:39 IMSEMR1A
====> /FOR IVTNO_

Fri 09/01/17

Enter a command above, or PF1 to access the tutorial.

Lsys          - Logon to, or change to, logical system Lsys
/FOR Format    - Display MFS format
ABS           - Display last ABend Summary screen
SS            - Start/Stop databases or transactions
TRACE ON      - Turn DLI and SQL call trace on

AVAIL> IEC1 IEC2 IEC3 IEC4
  
```

Step 2: Enter Data into MFS Screen

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
*****
* IMS INSTALLATION VERIFICATION PROCEDURE *
*****

TRANSACTION TYPE : NON-CONV (OSAM DB)
DATE              : 09/01/2017

PROCESS CODE (*1) :
LAST NAME         :
FIRST NAME        :
EXTENSION NUMBER  :
INTERNAL ZIP CODE :

(*1) PROCESS CODE
ADD
DELETE
UPDATE
DISPLAY
TADD

SEGMENT# :
  
```

Step 3: Run Program in COPE

MPP
COPERC00

1. Run COPE Stubx = CDFSIVD1
2. Find LSYS = IEC2 in IOPCB
3. Find Program = DFSIVP1 in PGMLIB
4. Run program = DFSIVP1
5. Dynamically Allocate Databases

COPE Program and Transaction Cross Reference Table

LSYS	Trancode	Program	COPE Stubx	DBD	COPE DBD
IEC2	IVTNO	DFSIVP1	CDFSIVP1	DFSIVD1	CDFSIVD1

COPE User to Lsys Cross Reference Table

LSYS	IMS User
IEC2	AMIGGG0

COPE Dynamic Allocation Cross Reference Table

LSYS	DBD	COPE DBD	COPE DBDS	COPE DDNAME
IEC2	DFSIVD1	CDFSIVD1	IEC2.DBDS.CDFSIVD1	CDFSIVD1

Executing a BMP, DBB or Batch Job in COPE

Method 1: Specify LSYS Name in IMSID PARM (ex. IEC2)

BMP and DBB (13TH positional parm)
Batch Job (11TH positional parm)

```
//STEP EXEC PGM=DFSRRRC00,  
//   PARM=(BMP,PROG,PSB,,,,,,,,,IEC2)
```

Method 2: Specify LSYS Name in Temporary DS (ex. IEC3)

BMP, DBB, or Batch Job

```
//STEP1   EXEC PGM=IEFBR14  
//COPEBSYS DD DSN=&&IEC3,  
//           UNIT=SYSDA,SPACE=(TRK,1)
```

Method 3: Specify LSYS Name in JOB Card (ex. IEC4)

BMP (2ND positional parm – Programmer's Name Field)

```
//FRED JOB (ACCT),IEC4,  
//   MSGLEVEL=(1,1),CLASS=F
```


COPE Start/Stop Application

Step 1: COPE User Screen

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE IEC1 AMIGGGO 10:27 IMSEMR1A
=====
_
Fri 09/01/17

Enter a command above, or PF1 to access the tutorial.

Lsys          - Logon to, or change to, logical system Lsys
/FOR Format    - Display MFS format
ABS           - Display last ABend Summary screen
SS           - Start/Stop databases or transactions
TRACE ON     - Turn DLI and SQL call trace on

AVAIL> IEC1 IEC2 IEC3 IEC4
  
```

Step 2: COPE Start/Stop Application

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE DATABASE/TRANSACTION START/STOP
SELECT FUNCTION ==>

ACTION      ==> (S-START P-STOP OR BLANK-DISPLAY)
DB/TR       ==> DB
NAME        ==>
SYSTEM      ==> IEC1_ (BLANK FOR LIST)
USER NAME   ==> AMIGGGO
DISPLAY     ==> (G-GROUPS P-STOPPED BLANK-ALL)
LOG SWITCH  ==> NOFEOV (NORMALLY NOFEOV)
  
```

LSYS = IEC1

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE START/STOP DATABASE
SELECT FUNCTION ==>

SYSTEM: IEC1 DB:
USER: AMIGGGO 10:51 AMIGGGO 17.244 DISPLAY:
(S-START P-STOP X-DISPLAY)
S/P/X DATABASE G STOPPED DESCRIPTION
- AUTODB++ B 0/4 AUTODB
CUSDB A
CUSDB++ B 1/7 CUSDB
DBFSAMD3 A STOPPED
  
```

LSYS = IEC2

```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
COPE START/STOP DATABASE
SELECT FUNCTION ==>

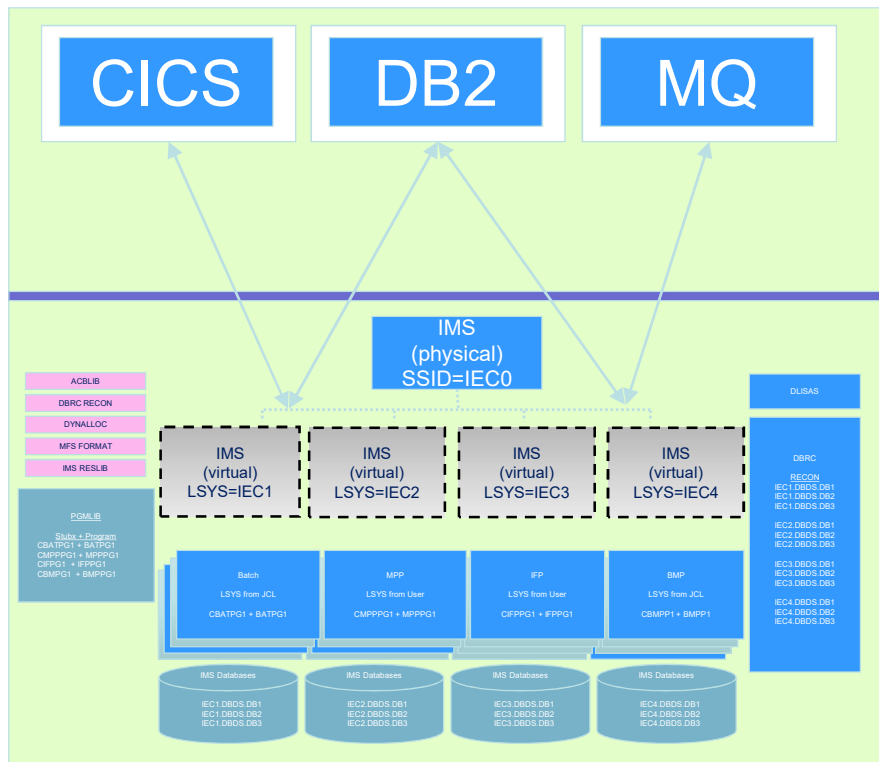
SYSTEM: IEC2 DB:
USER: AMIGGGO 10:53 AMIGGGO 17.244 DISPLAY:
(S-START P-STOP X-DISPLAY)
S/P/X DATABASE G STOPPED DESCRIPTION
- AUTODB++ B 0/4 AUTODB
CUSDB A STOPPED
CUSDB++ B 2/7 CUSDB
DBFSAMD3 A STOPPED
  
```

COPE LSYS Databases Can Have Different Statuses

Agenda

- The Compuware DevOps story
- What is Virtualization in common?
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- **What technologies work in a COPE system?**

COPE Supports Many Applications and Tools



- Dynamic Resource support
 - BMC Delta
 - IBM ETO Support
 - IBM Dynamic Resource Definition (DRD)
- Application Debugging
 - Compuware Xpediter (TSO and Eclipse)
 - Compuware Abend-AID
 - Compuware File-AID
 - IBM Debug Tool
 - Topaz for Total Test support of IMS
 - stubbing of IMS database calls (BMP only)
- Date/Time Altering Software
 - IBM Hourglass
 - Compuware Xchange

Vendor updates and Working Group business



30.10.2017

Compuware Announces Day One Support of the IBM IMS V15.1

Compuware



Compuware Announces Day One Support of IBM IMS V15.1

*Integration Across the Compuware Product Line
Helps Joint Customers Quickly Capitalize on New
Advances*

DETROIT—October 27, 2017—Compuware Corporation, the world's leading mainframe-dedicated software company, is pleased to announce Day One support for IBM IMS V15.1 transactional database on IBM Z. Compuware's support extends across its product line, including Abend-AID, File-AID, Strobe, Xpediter and COPE, the company's IMS virtualization solution, as well as Topaz Workbench. Day One interoperability will help shared customers quickly realize the benefits of IBM's latest IMS enhancements, while increasing efficiencies and reducing costs through virtualization.

"IBM's IMS solution is already the most trusted name in transactional databases for mainframes. IMS V15.1 builds upon that trust through unmatched encryption and processing capabilities, combined with more dynamic development, scalability, and API openness," said Compuware CEO Chris O'Malley. "This aligns with our quest to help Compuware customers harness the virtues of the mainframe to achieve greater productivity and competitive advantage in the digital economy."

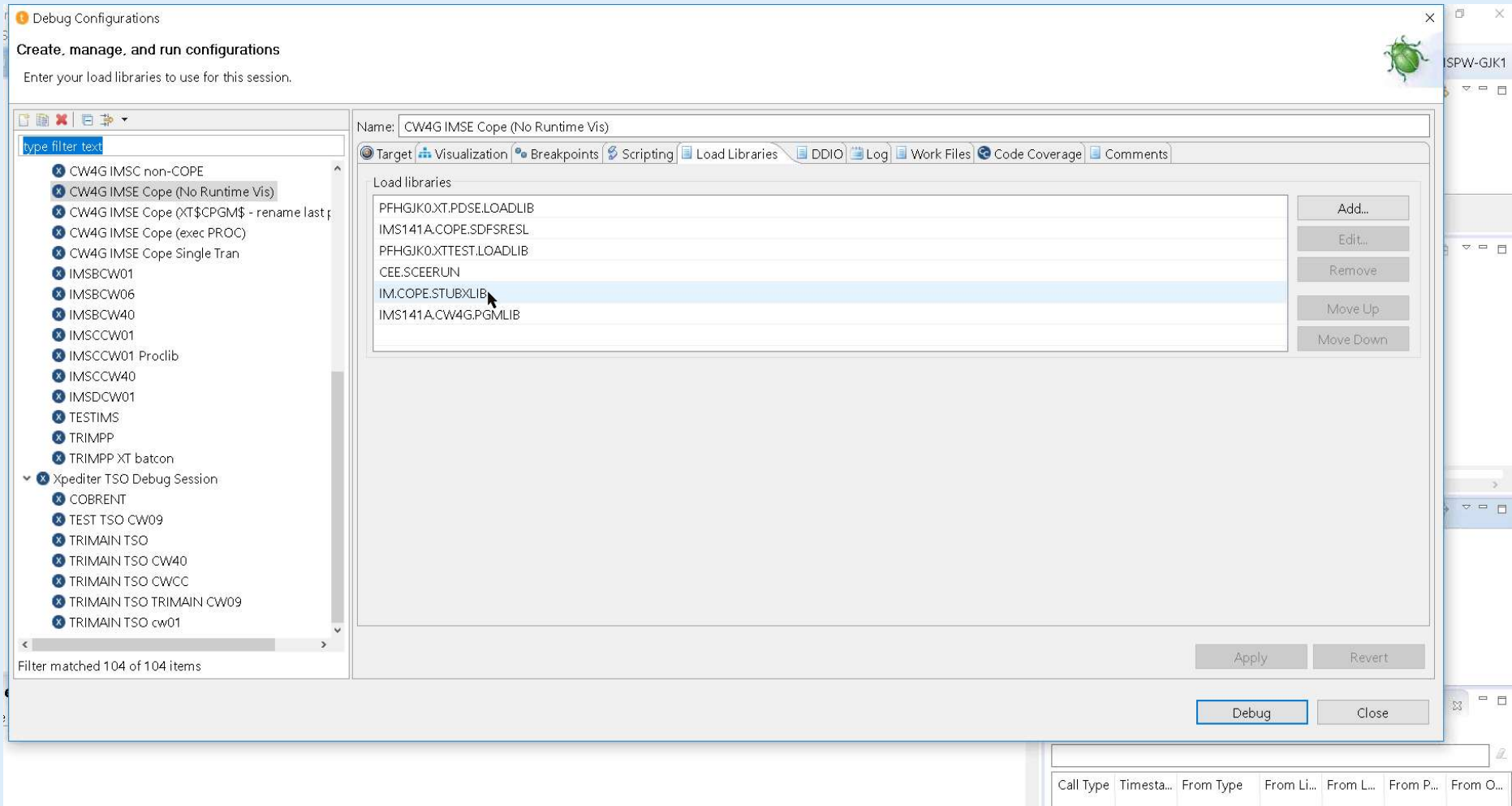
IBM IMS is a hierarchical database and transaction processing subsystem for IBM Z mainframes, including the newest incarnation, the z14. The new IBM IMS V15.1 will allow users to fully leverage the z14's security and throughput enhancements, while also offering greater developer flexibility and platform connectivity within diverse infrastructures. Compuware's support extends across the development, execution and test data

COPE Integration

- Xpediter TSO, Expeditor for IMS
 - Eclipse works with COPE
- Xpediter Exchange
- Abend-AID for IMS works with COPE
- File-AID for IMS will work with COPE

COPE Integrations

Debug programs in COPE regions with Xpediter Eclipse



Debug Configurations
Create, manage, and run configurations
Enter your load libraries to use for this session.

Name: CW4G IMSE Cope (No Runtime Vis)

Target Visualization Breakpoints Scripting **Load Libraries** DDIO Log Work Files Code Coverage Comments

Load libraries

- PFHGJK0.XT.PDSE.LOADLIB
- IMS141A.COPE.SDFSRESL
- PFHGJK0.XTTEST.LOADLIB
- CEE.SCEERUN
- IM.COPE.STUBXLIB**
- IMS141A.CW4G.PGMLIB

Buttons: Add... Edit... Remove Move Up Move Down Apply Revert Debug Close

Left sidebar: Filter matched 104 of 104 items

- × CW4G IMSC non-COPE
- × CW4G IMSE Cope (No Runtime Vis)
- × CW4G IMSE Cope (XT\$CPGM\$ - rename last p
- × CW4G IMSE Cope (exec PROC)
- × CW4G IMSE Cope Single Tran
- × IMSBCW01
- × IMSBCW06
- × IMSBCW40
- × IMSCCW01
- × IMSCCW01 Proclib
- × IMSCCW40
- × IMSDCW01
- × TESTIMS
- × TRIMPP
- × TRIMPP XT batcon
- × Xpediter TSO Debug Session
 - × COBRENT
 - × TEST TSO CW09
 - × TRIMAIN TSO
 - × TRIMAIN TSO CW40
 - × TRIMAIN TSO CWCC
 - × TRIMAIN TSO TRIMAIN CW09
 - × TRIMAIN TSO cw01

Call Type	Timesta...	From Type	From Li...	From L...	From P...	From O...
-----------	------------	-----------	------------	-----------	-----------	-----------

COPE Integrations

COPE and Abend-AID for IMS

```
Session A - Session 1.WS
File Edit View Communication Actions Window Help
Abend-AID ----- IMS Diagnostic Summary ----- Row 000001 of 000014
COMMAND ==> SCROLL ==> PAGE

IMS-AID Diagnostics

Application Program Name: EABMPPOL          IMS Rel: 1410 IEC6
Calling PARM FORMAT: AIB                   Region Type: MPP Online
PSB Name: EABMPPOL                         COPE Lsys: IEC4

Unable to determine the address of the last IMS call issued from the
application program.
This may be caused by the following:
1. The last subroutine call was not an IMS call.

Entry=0000087(IMSEMRA1) Code=U0779 H06AC569 AssistMenu=PF24
MA A 02/016
Connected to remote server/host cw01.compuware.com using lu/pool TCW01462 and port 23
\\dtw-mfprint01\W04P03 on W04P03.NASA.CI
```

The Benefits of IMS Virtualization with COPE

- **Administration of IMS test environments**
 - We have one customer who manages 150 COPE Logical Systems with one person. There are multiple DBA people designing applications and developing DBDs and PSBs and MFS but the administration of the COPE systems is accomplished with a single individual.
 - We have another customer who manages 20 logical Systems with a single individual. This person copies database and program definitions from existing non-COPE systems and replicates the entire environment. In addition to duplicating the IMS definitions (STAGE1, DBD, PSB etc.) he clones all databases (HALDB, HIDAM, GSAM etc.). The COPE SPOC feature is used so new environments can be added to the executing COPE system with no interruption of service to other users. He allows two days to clone an entire environment with 400 + databases.
- **Less usage of CSA**
- **Potential elimination of duplicate MQM system resources**

The Benefits of IMS Virtualization with COPE

- **Buffer pools:**
 - Duplicate DB buffer pools are removed. There is a 'rule of thumb' that you can calculate that you can replace any number of buffer pools with 1.3 times the size of the largest one.
 - All duplicate TP buffer pools can be replaced with a single definition equivalent to the largest one.
 - Elimination of duplicate DB2 systems buffers (not data). The reduction of working sets can be massive.
- **Message region**
 - All message regions can be replaced with $1.3 * \text{Largest number of message regions for any existing system}$.
- **DASD**
 - The only DASD savings is the elimination of duplicate IMS system datasets (DBDLIB, PSBLIB, FORMAT, OLDS, ACBLIBS together with their source datasets).
 - Each Logical System (Lsys) has duplicate data datasets.

Overhead of COPE

Measuring IMS resource usage is difficult/impossible. Comparing multiple IMS non-COPE systems with a COPE system with different users and transaction volumes and transactions is not possible in any meaningful way if the results are to be extended to a different system with different DB2 and DL1 data and different applications.

In the early days of COPE usage, we had a customer use **STROBE** to find the overhead of COPE usage. The differences were so small that no significant difference was detectable.

The overhead of execution under COPE is restricted to an additional GU to a HDAM database to find the users logical system (Lsys) and an additional program load caused by the STUBX (dataset of COPE) being loaded before the application. With a correct setup of LE this is very small.

Occasionally there is an additional message switch caused by overflow PSBs being required. This impact is very small since only a single GU database call is required followed by an insert of the input message.

The ACBLIB increase can be calculated by the following:

(Number of TP PCBs plus (the number of BMP plus Batch PSBS) multiplied with the number of logical systems).

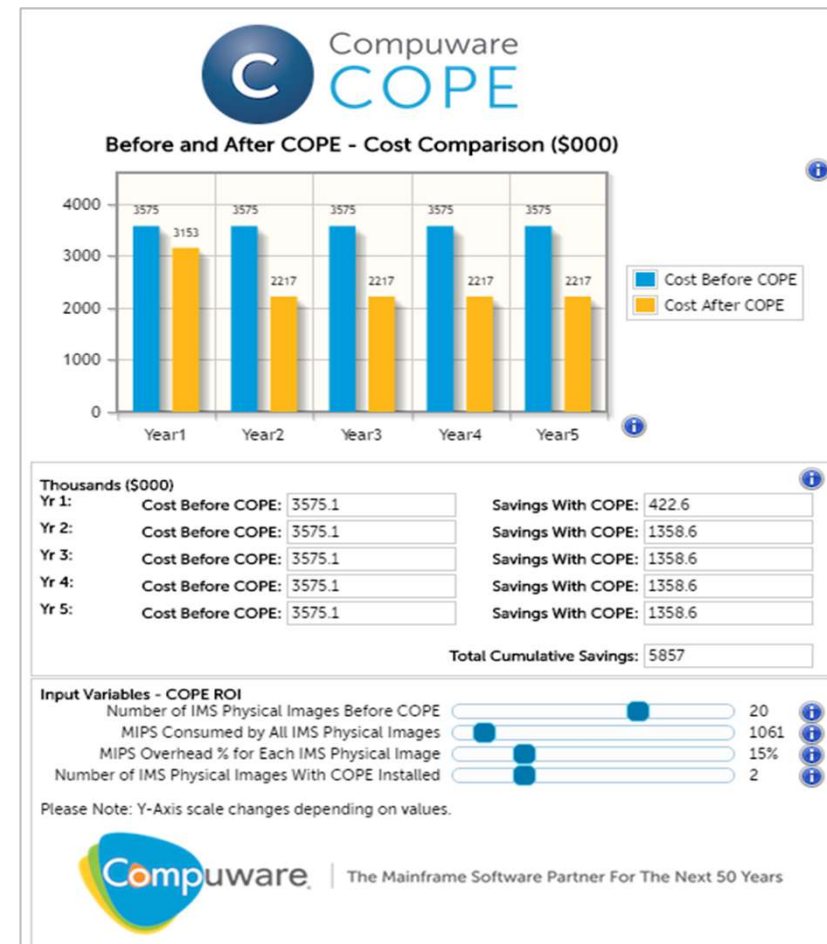
The ACBs can be put above the 64M line so there is insignificant impact.

The Benefits of IMS Virtualization with COPE

Cost Justification

- No CPU resources for desired number of virtual environments
- Licensing cost of IMS because of less IMS systems needed

Use the ROI calculator to find reasonable numbers for your shop:



https://resources.compuware.com/cope-roi-calculator%20?_ga=1.245897092.1218504557.1491236421

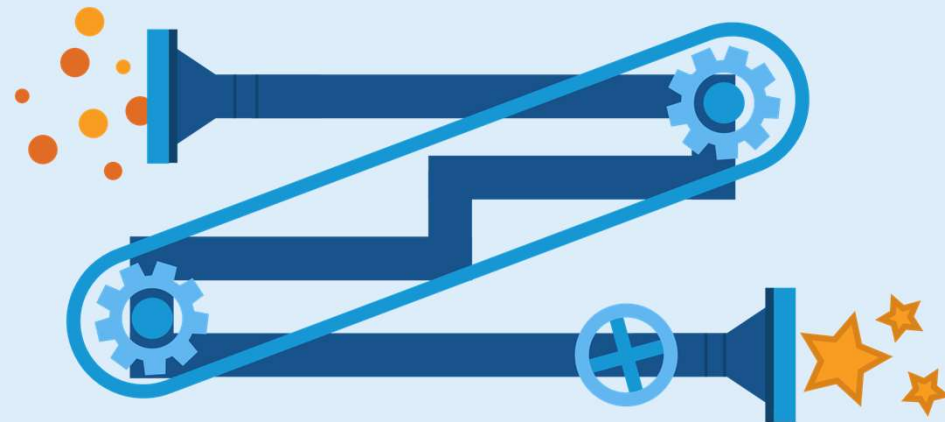
Using the COPE ROI Calculator

Inputs





- Number of COPE virtual IMS environments required for 5 years
- MIPS used today for existing IMS systems
- Percent overhead required for each IMS system
- Number of COPE IMS environments needed to support required IMS (from above)

Outputs

- Cost comparison
- Before and after licensing COPE over 5-year period



In Summary...

-  Compuware COPE™ supports rapid deployment with Virtual IMS systems
-  Compuware COPE™ reduces CPU by eliminating IMS address spaces
-  Compuware COPE™ supports Program and Database versioning
-  Compuware COPE™ does not require any application changes

Since 2017 with an IMS track
(formerly IMS Technical Symposium)

IBM Systems
Technical University

May 14 - 18

Novotel West London
London, UK



TechU



www.ibm.com/training/events/London2018

THANK YOU

For more information contact:

Thomas.Esser@compuware.com



The Mainframe Software Partner
For The Next 50 Years