New environment needed for IMS testing?

Name: John Butterweck
Email: john.butterweck@compuware.com
Company: Compuware

November 2018
Session MG

Agenda

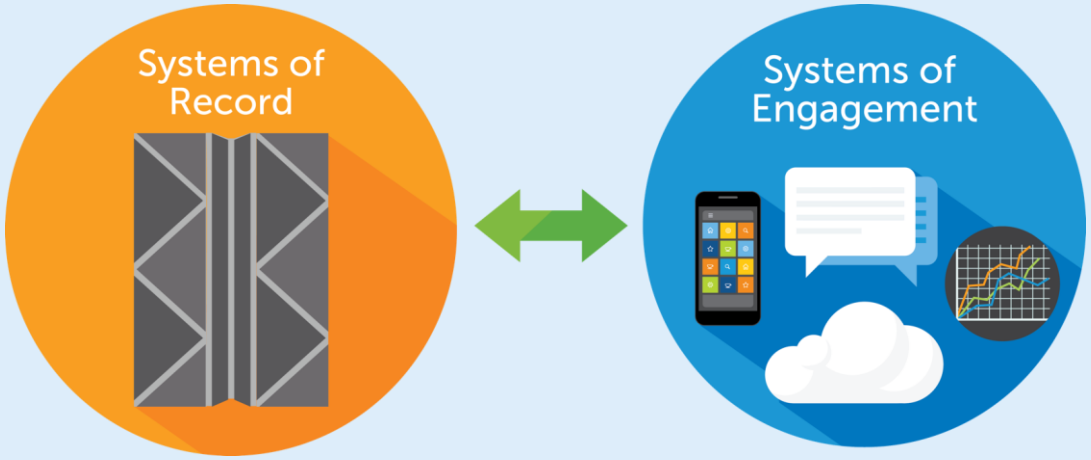
- The Compuware DevOps story
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?
- Demo
- Wrap up

Agenda

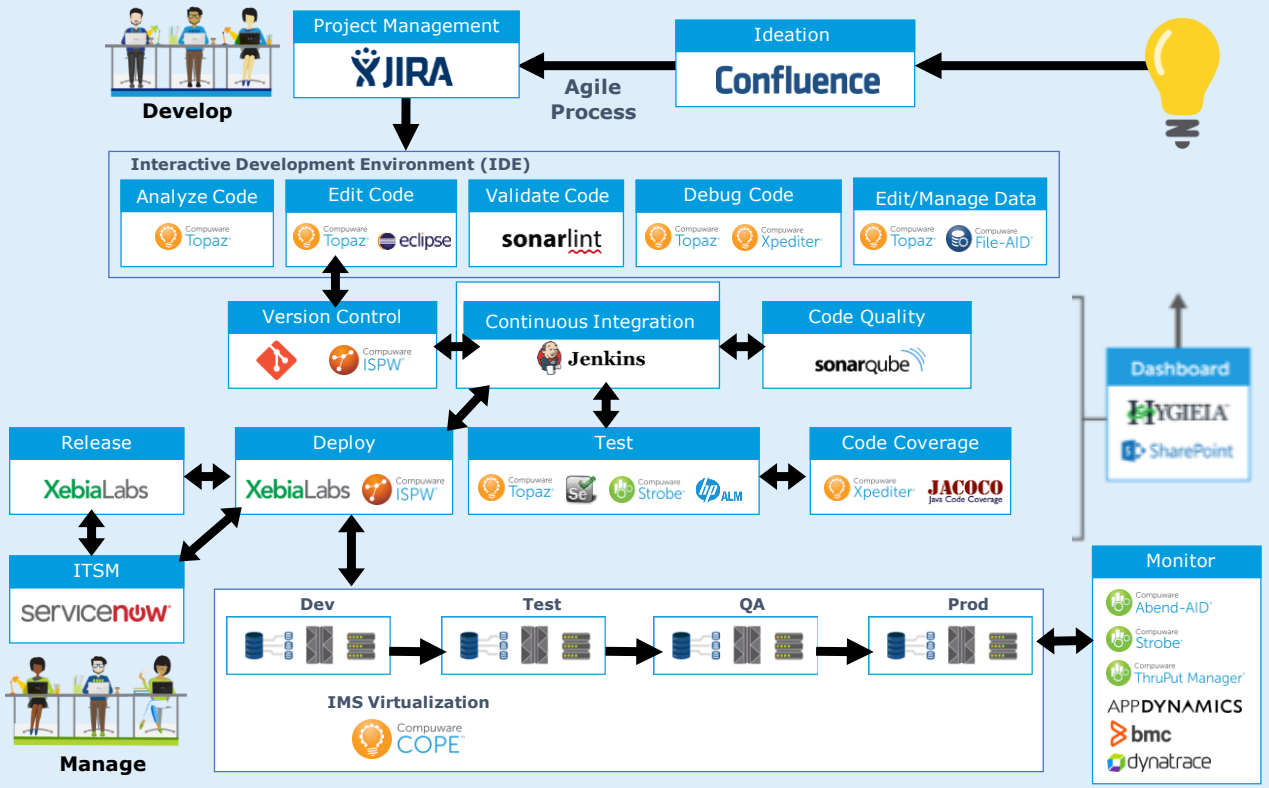
- **The Compuware DevOps story**
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?
- Demo
- Wrap up

Today You Need to Master These with intelligent tools

Mobility | Analytics | Social | Cloud



DevOps Toolchain

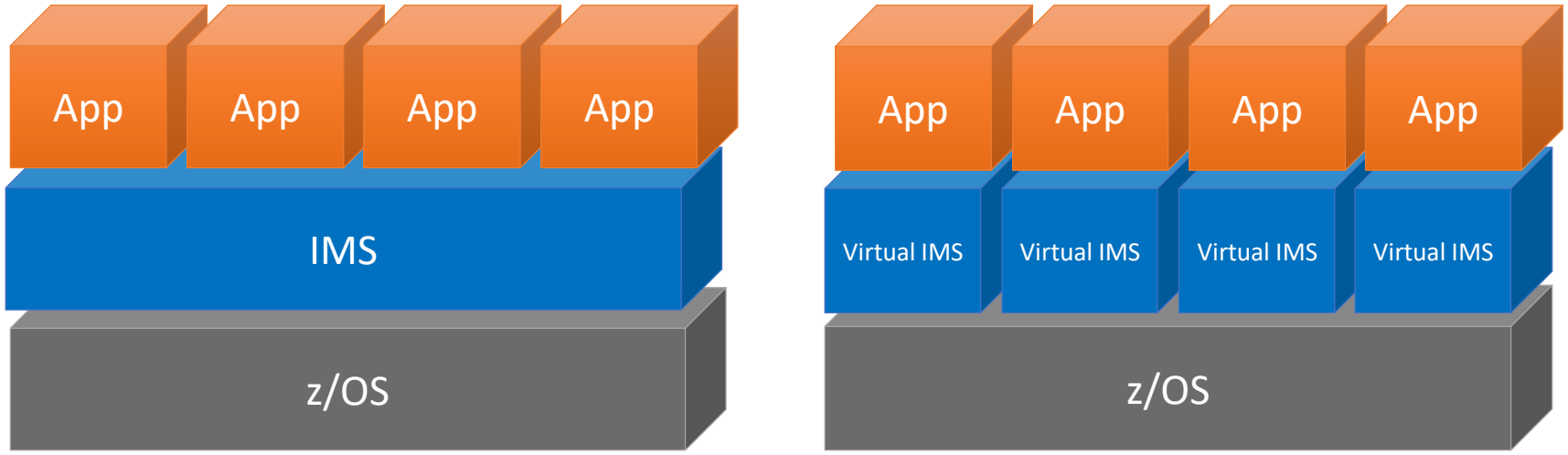


Agenda

- The Compuware DevOps story
- **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?
- Demo
- Wrap up

What is IMS Virtualization?

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



IMS Environment (Without COPE for IMS)

OLDS/SLDS/RLDS

DBDLIB/PSBLIB/ACBLIB

DYNALLOC

MFS FORMAT

IMS RESLIB

IMS

SSID=IEC1

Db2

DLISAS

DBRC

IEC1.DBDS.DB1
IEC1.DBDS.DB2
IEC1.DBDS.DB3

PGMLIB

BATPG1
MPPPG1
IFPPG1
BMPPG1

Batch
DFSRRC00

BATPG1

MPP
DFSRRC00

MPPPG1

IFP
DFSRRC00

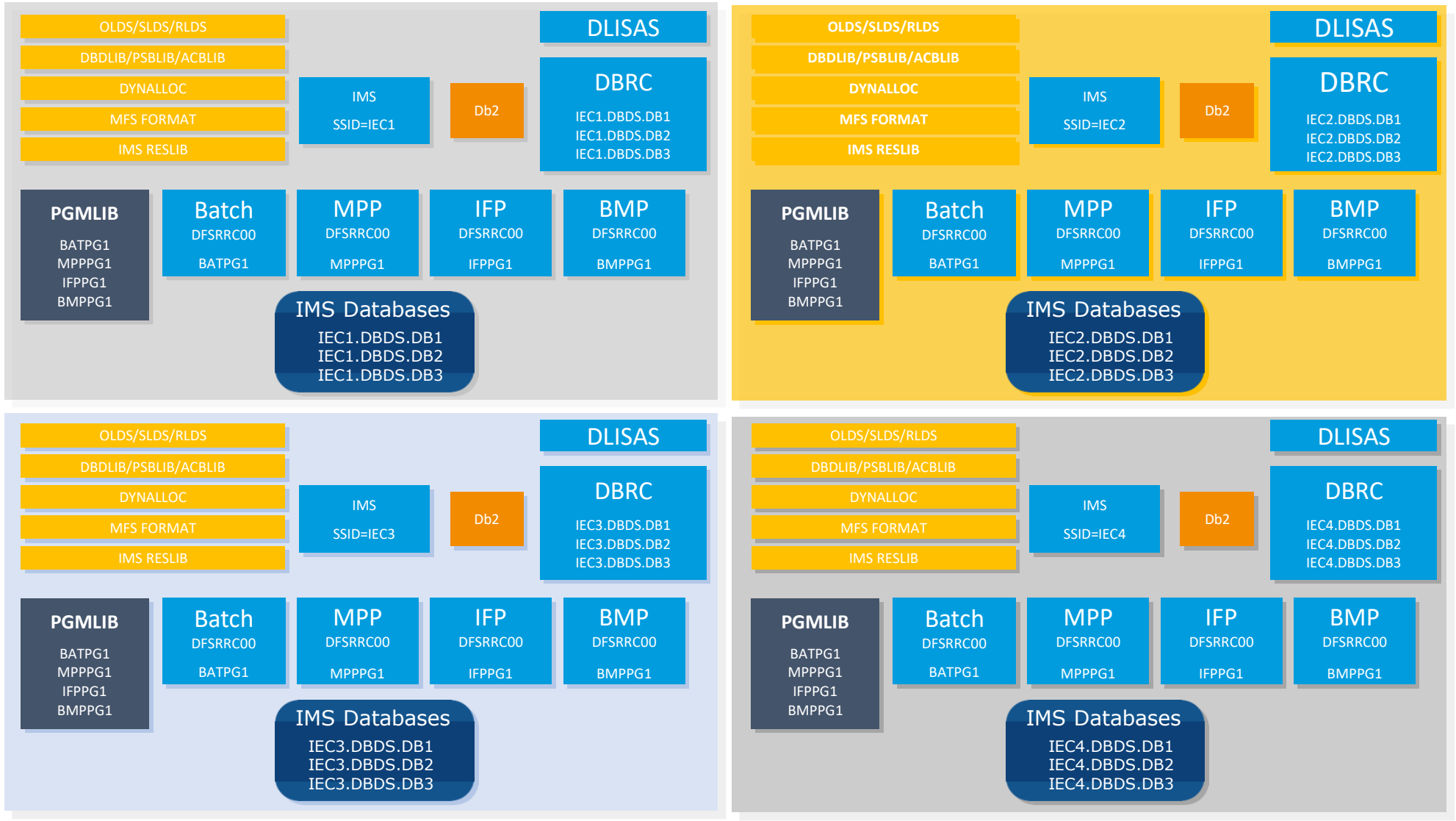
IFPPG1

BMP
DFSRRC00

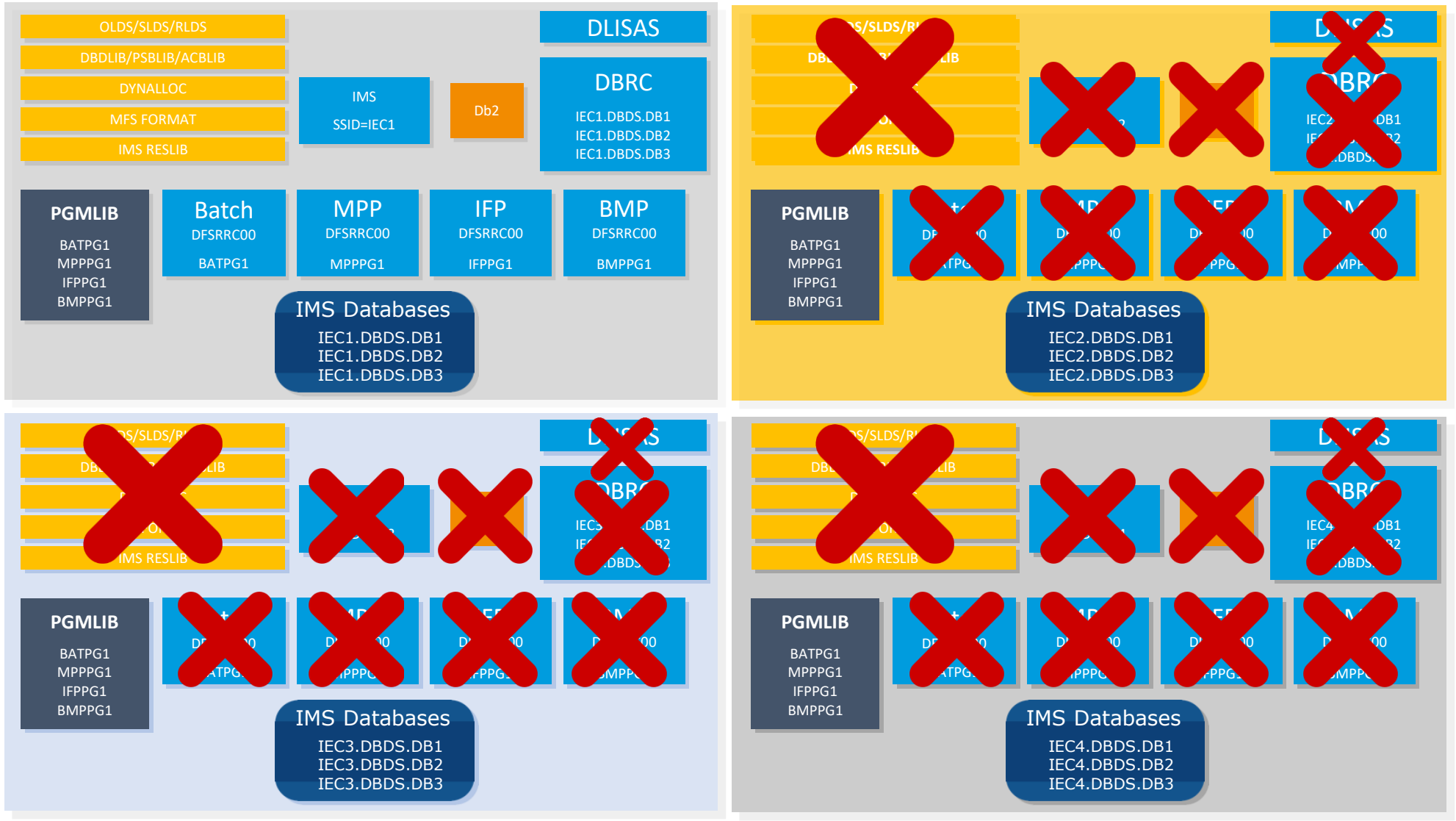
BMPPG1

IMS Databases
IEC1.DBDS.DB1
IEC1.DBDS.DB2
IEC1.DBDS.DB3

Four IMS Environments (Without COPE for IMS)



Four IMS Environments (With COPE for IMS)

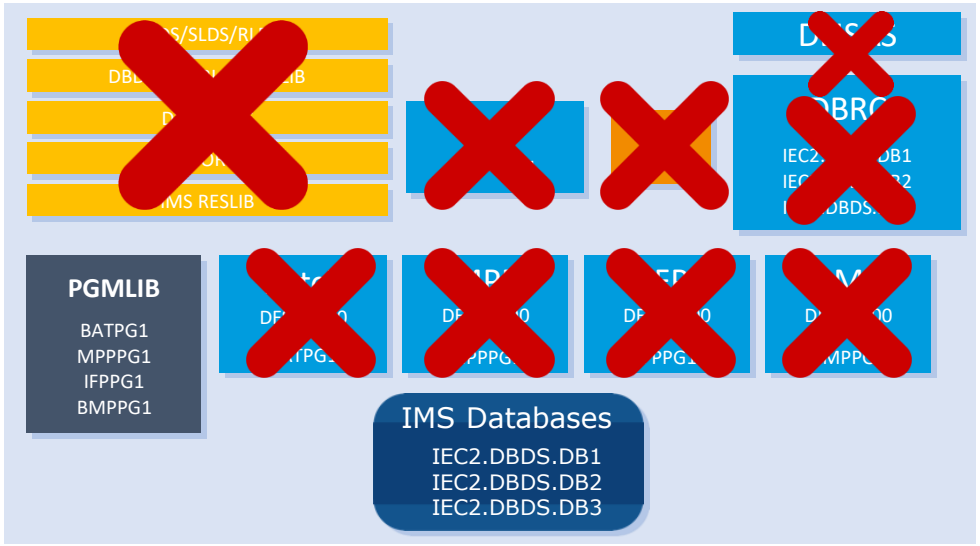


Four IMS Environments (Resource Savings with COPE)

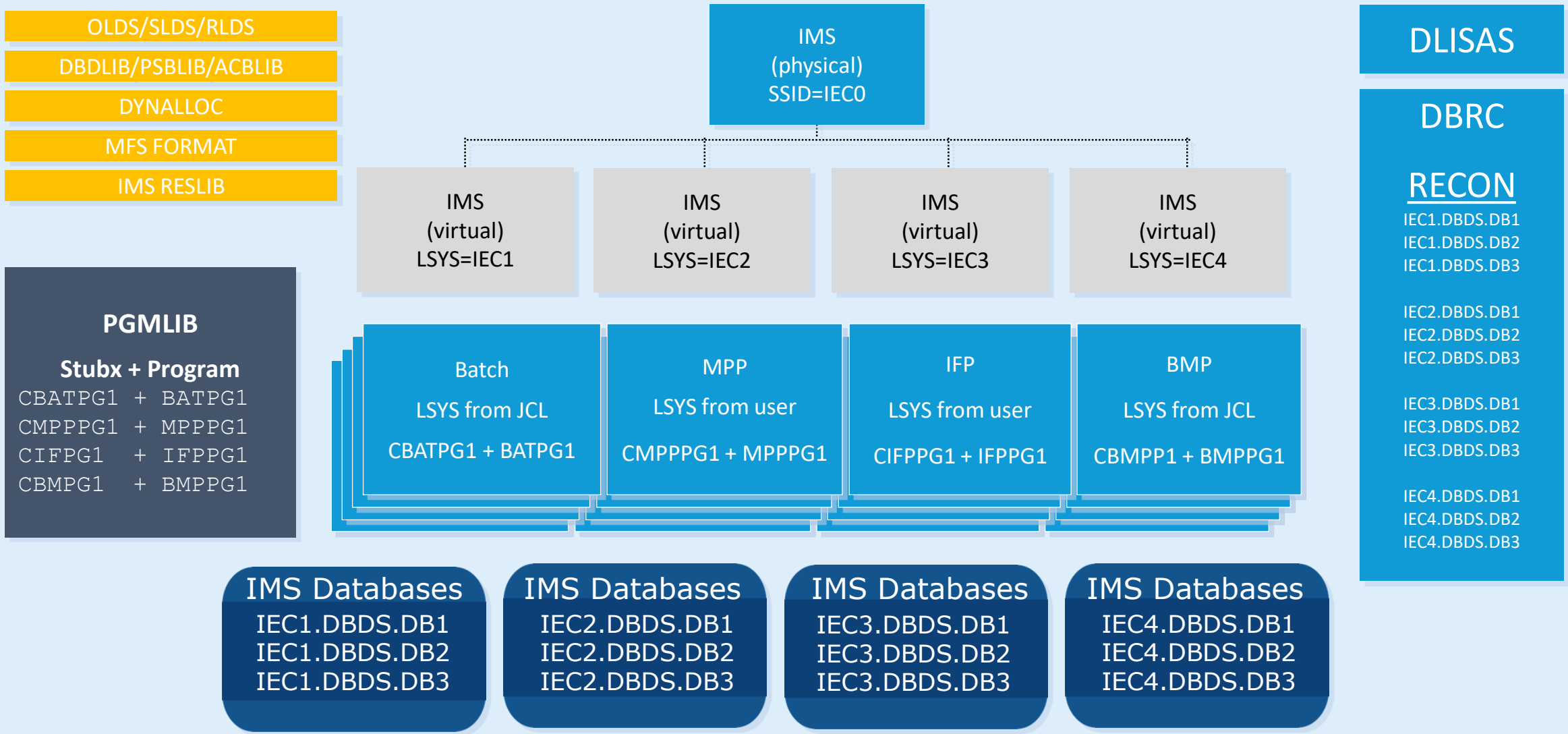
Eliminated Resources	Reason and "Rule of Thumb"
DBDLIB/PSBLIB/ACBLIB, FORMAT, OLDS/SLDS/RLDS	Eliminate duplicate resources
TP Buffer Pools	Replace with definition of largest buffer
DB Buffer Pools	Replace all pools with 1.3 * size of largest pool
IMS Control Regions, DBRC, DLISAS, Message Regions	Replace with 1.3 * largest # of message regions
ACBLIB increase in one IMS LSYS	(#TP PCB + #BMP + #Batch) * #LSYS

More Eliminated Resources

Db2 System Buffers and Db2 Working Sets
Db2 Address Space
MQM System Resources



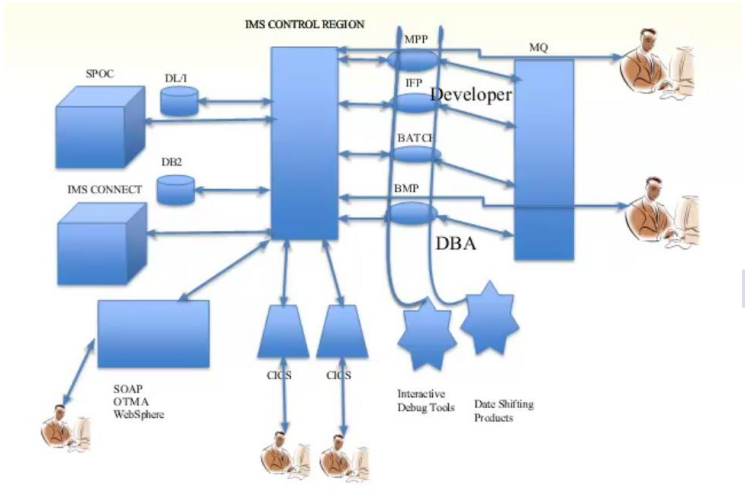
IMS Virtualized Environments (With COPE for IMS)



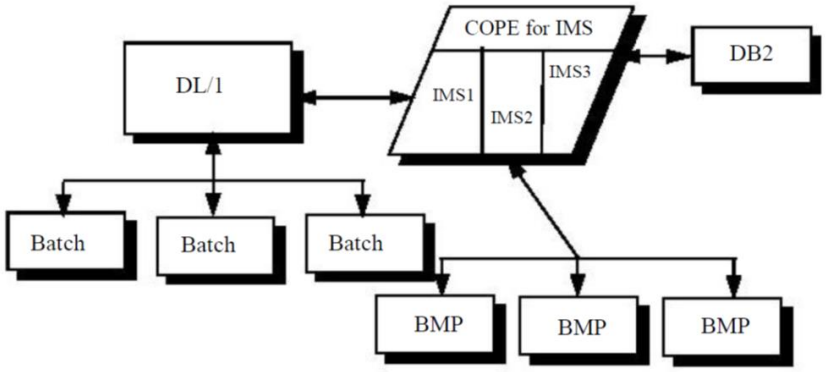
Agenda

- The Compuware DevOps story
- 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?
- Demo
- Wrap up

Virtualization Process



Original IMS Environment

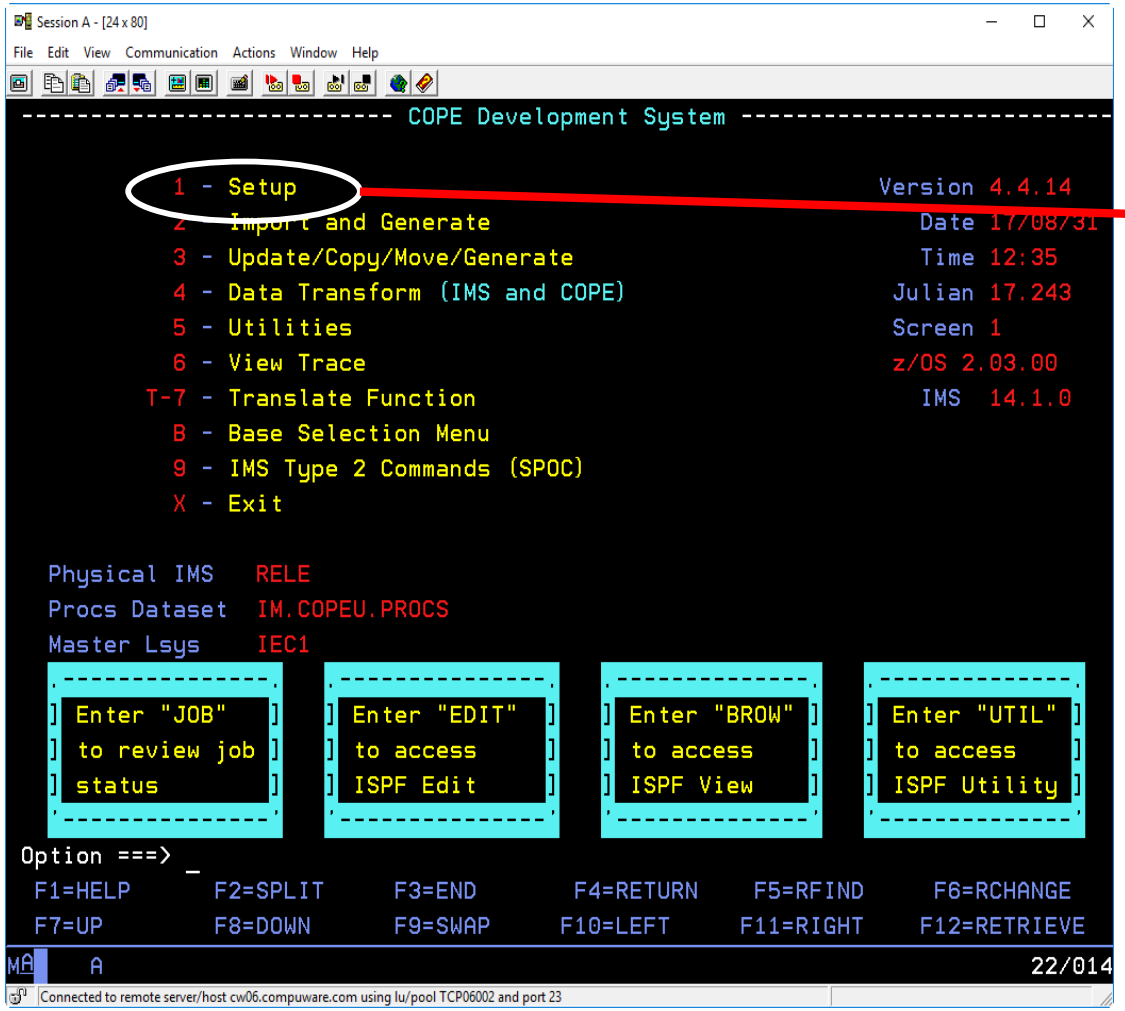


Virtual IMS Environment

Process:

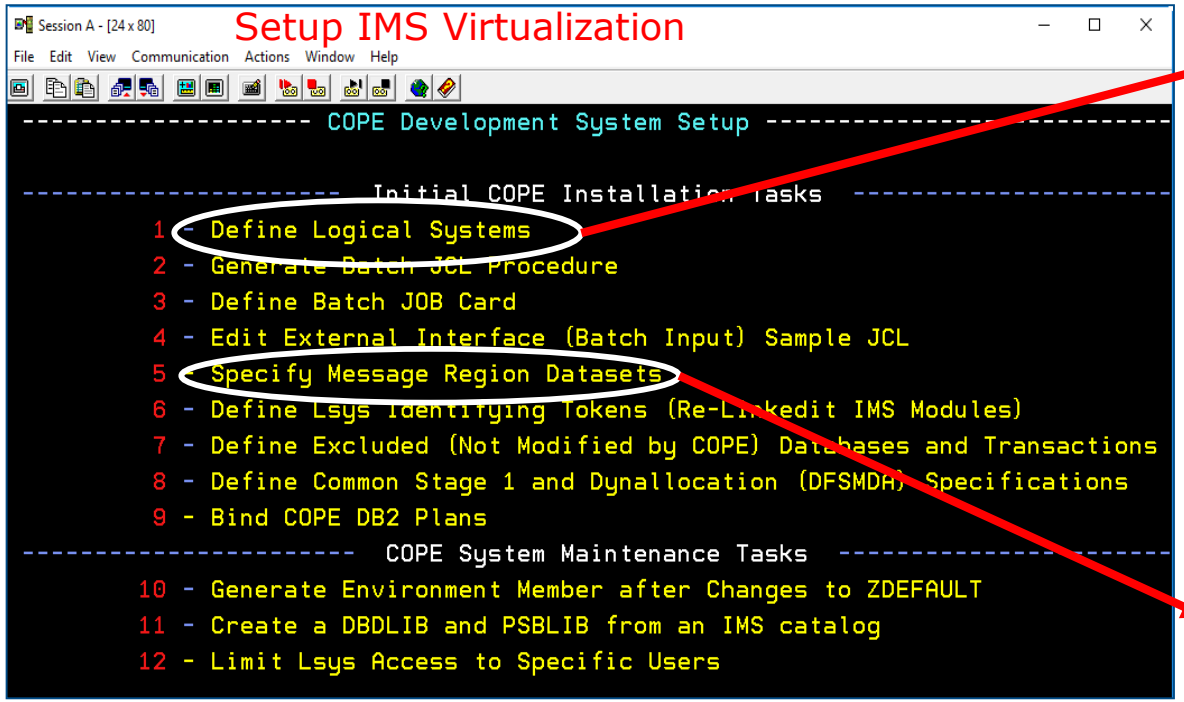
- Setup – defining environment
- Import – DBD's, PSB's, DYNALOC
- Change – modify definitions such as PSB's (as required)
- Data Def regeneration including renaming of objects for
  - virtual environment,
  - DBD Generation,
  - PSB Generation etc.
- Load IMS data / DB2 data

COPE ISPF Interface: Main Menu

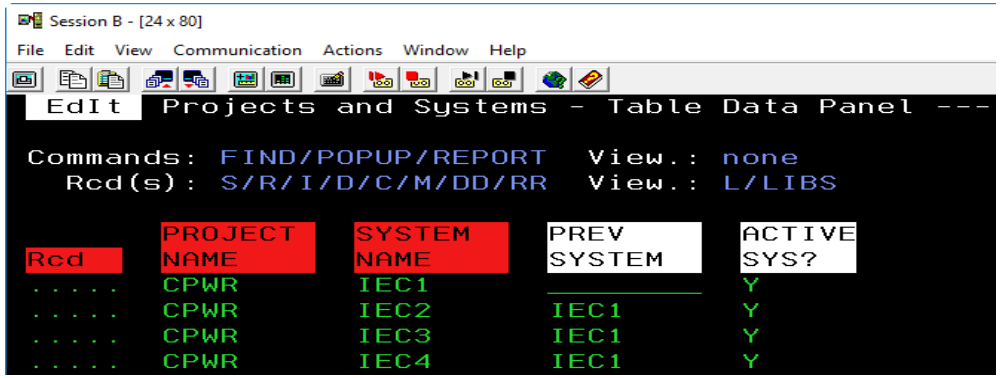


Create the IMS Virtualization Environment

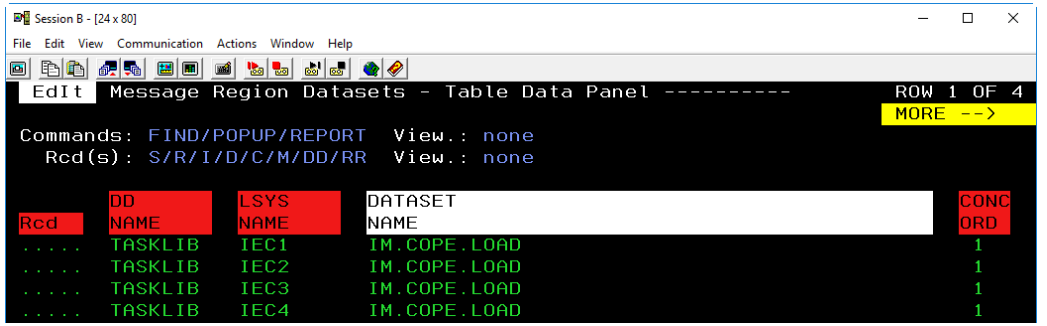
COPE ISPF Interface: Setup IMS Virtualization



Define IMS Logical Systems (Lsys)

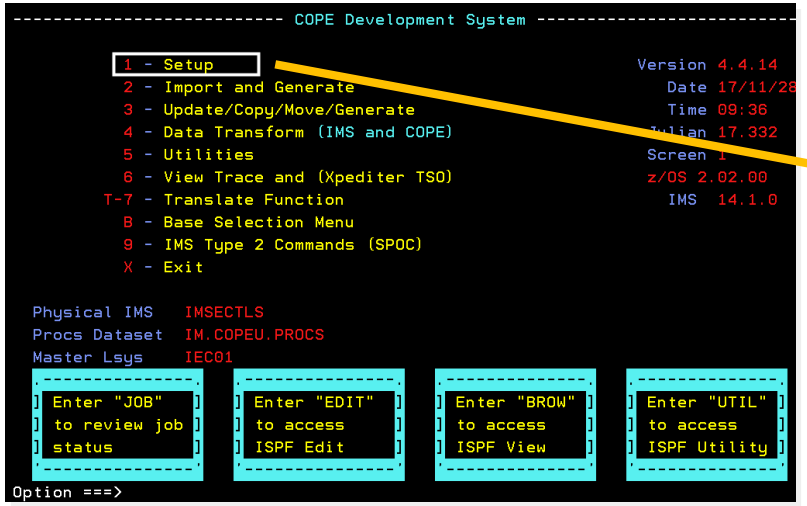


Define IMS Message Regions Datasets

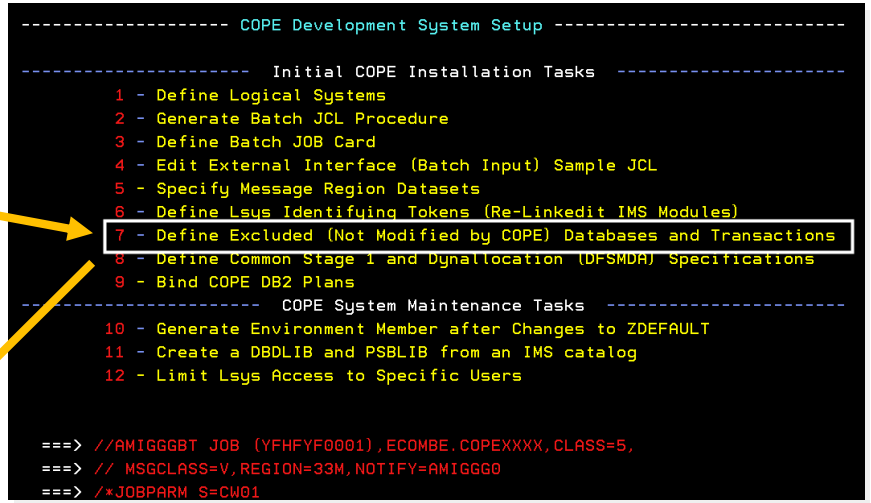


“Exclude” Resources

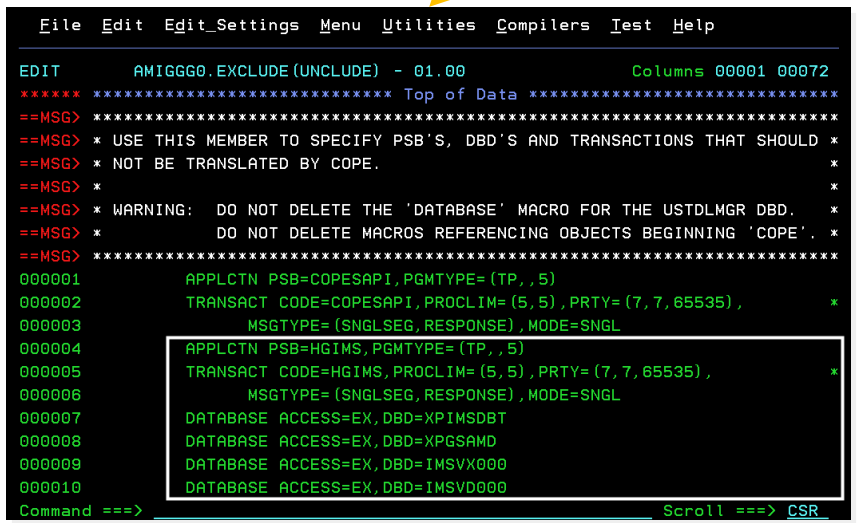
Setup “Exclude” List



Exclude Transactions, Programs, Databases



Edit “Exclude” List

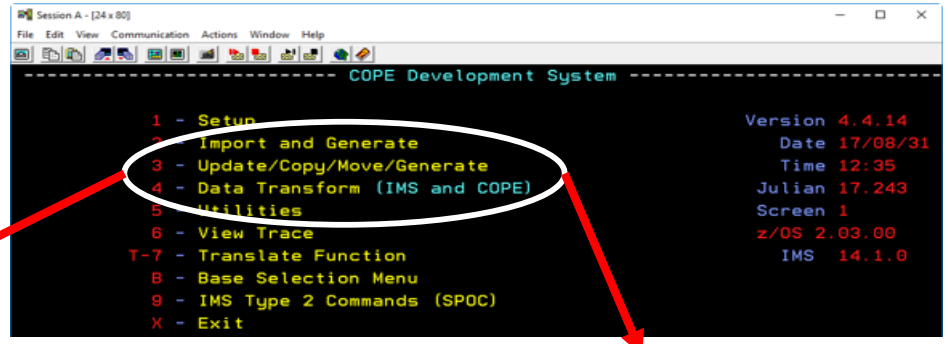


Agenda

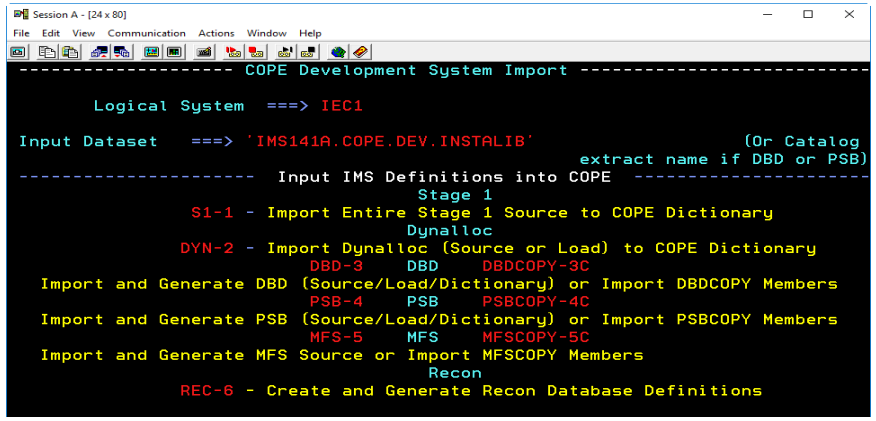
- The Compuware DevOps story
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- **How does COPE transform Programs and Databases?**
- How does a Transaction run in a COPE environment?
- What technologies work in a COPE system?
- Demo
- Wrap up

COPE ISPF Interface: Transform IMS Resources

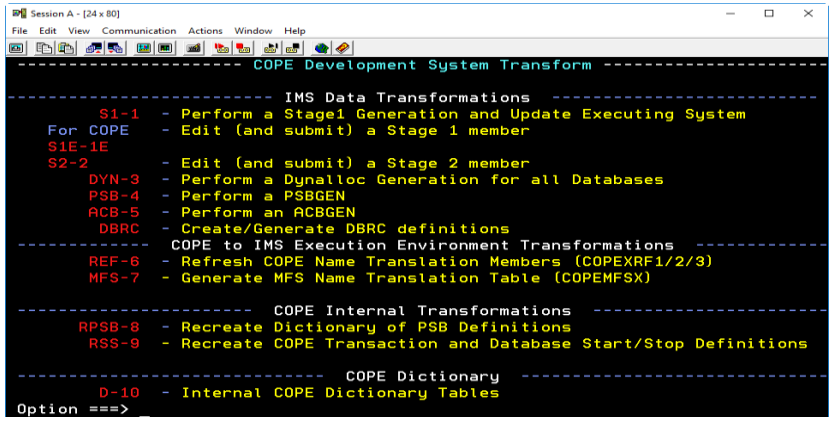
COPE Main ISPF Screen



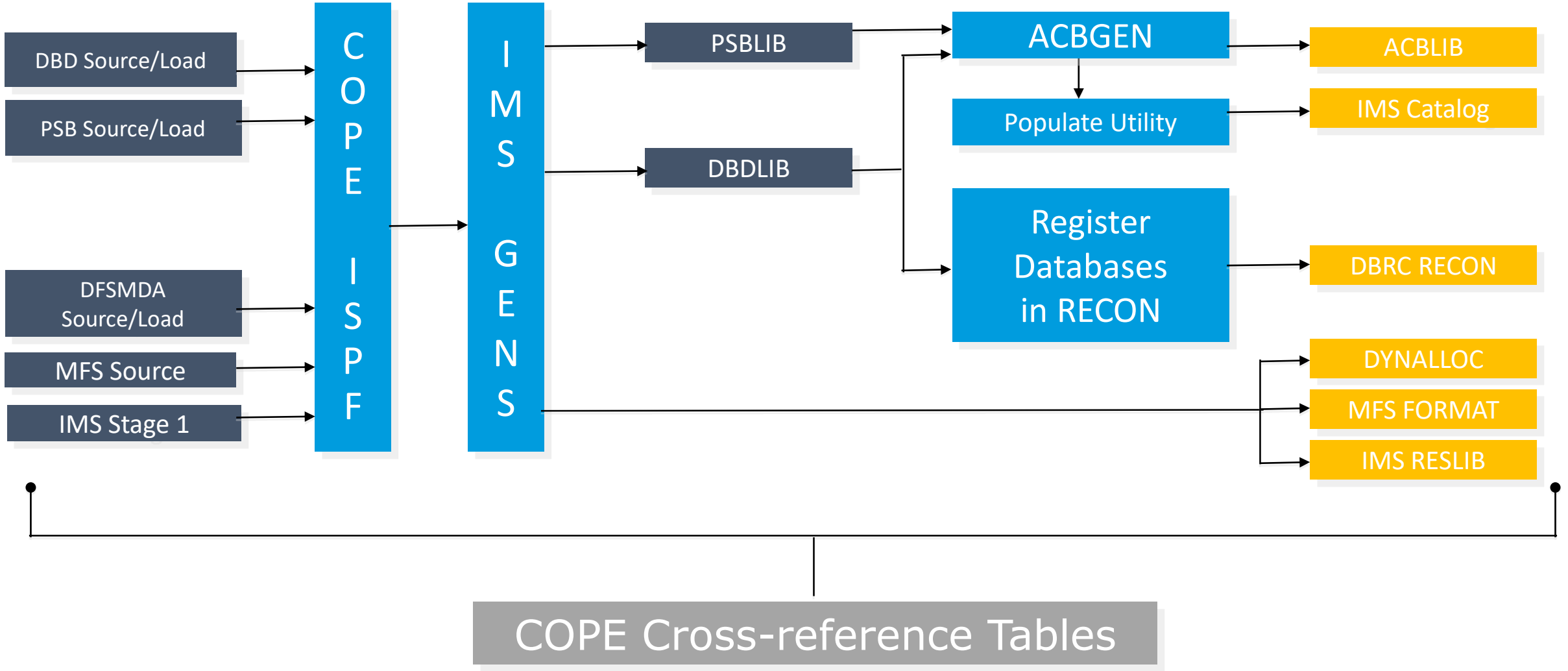
Step1: Import IMS Resources



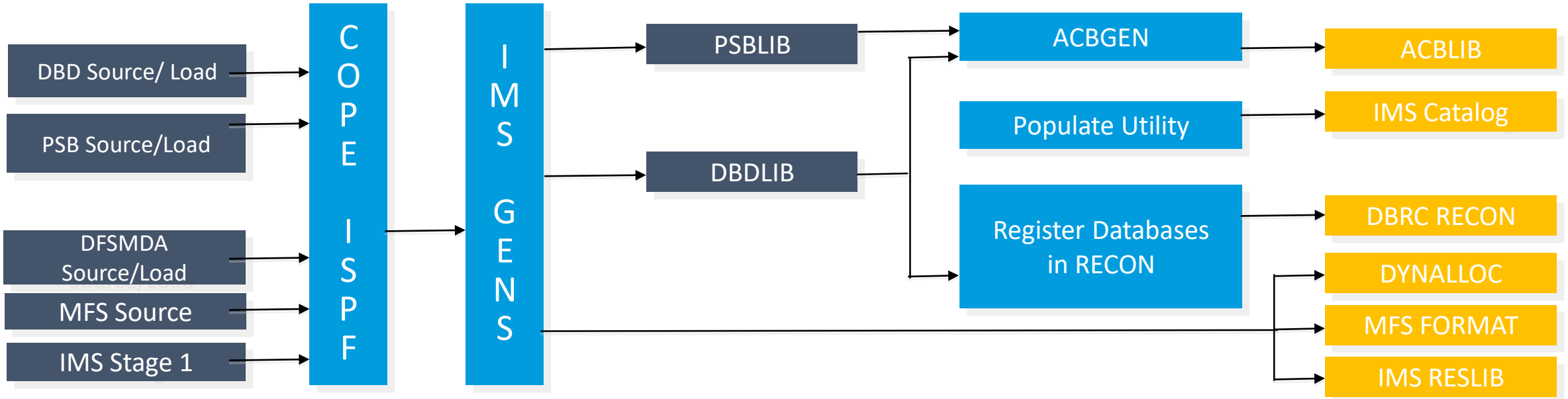
Step 2: Execute IMS Transformations



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
```

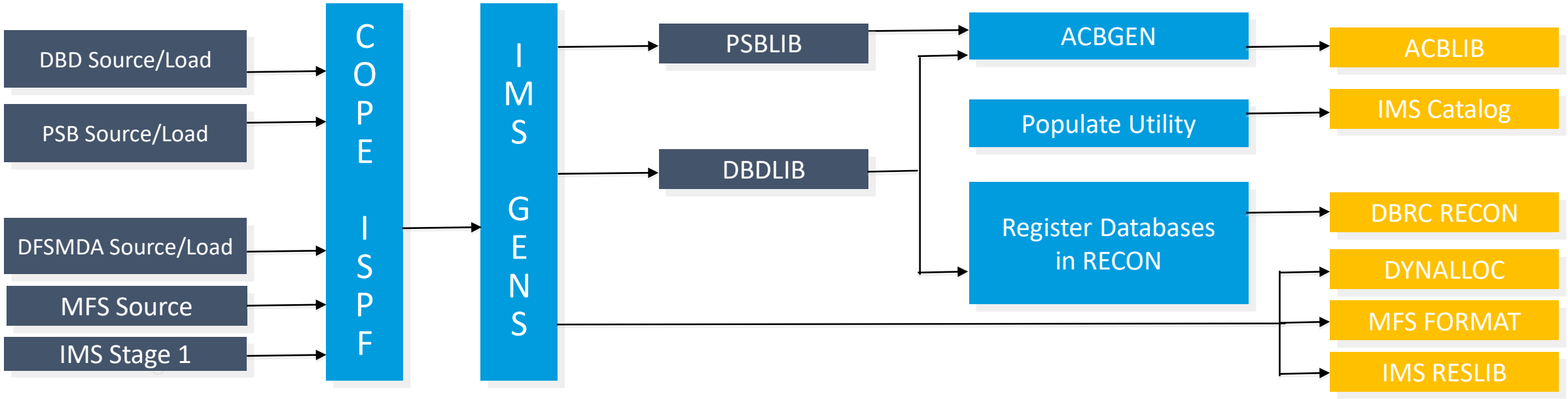
DBD

```
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
SENSEG NAME=DBD1SEG1,…
…
PSBGEN PSBNAME=MPPPG1
END
```

Stage 1

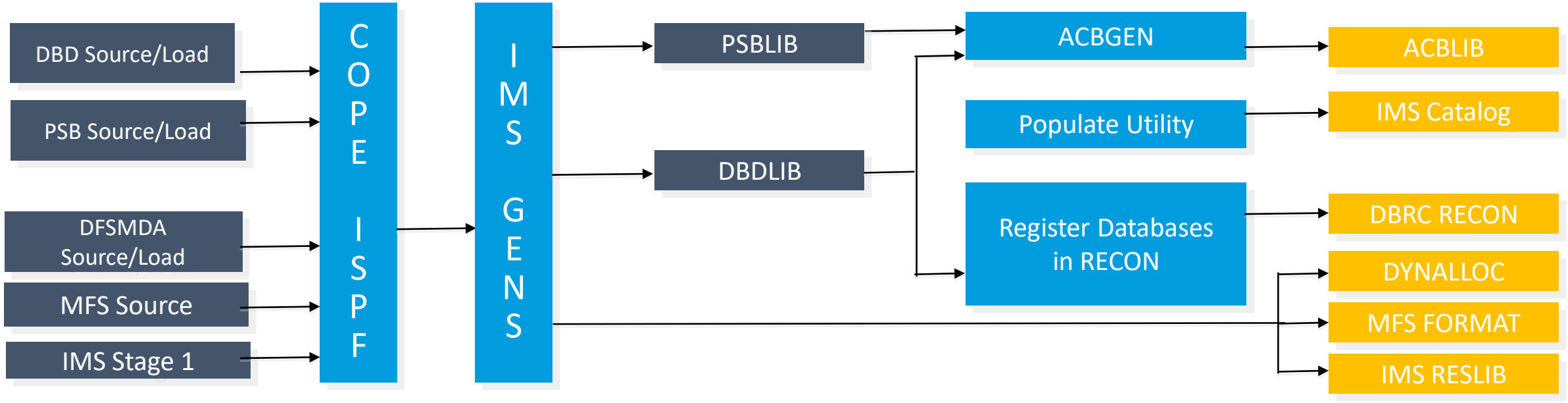
```
DATABASE DBD=DBD1
APPLCTN PSB=MPPPG1
  TRANSACT CODE=TRAN1

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

TRANSFORM

LSYS	Trancode	Program	COPE Stubx/PSB	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

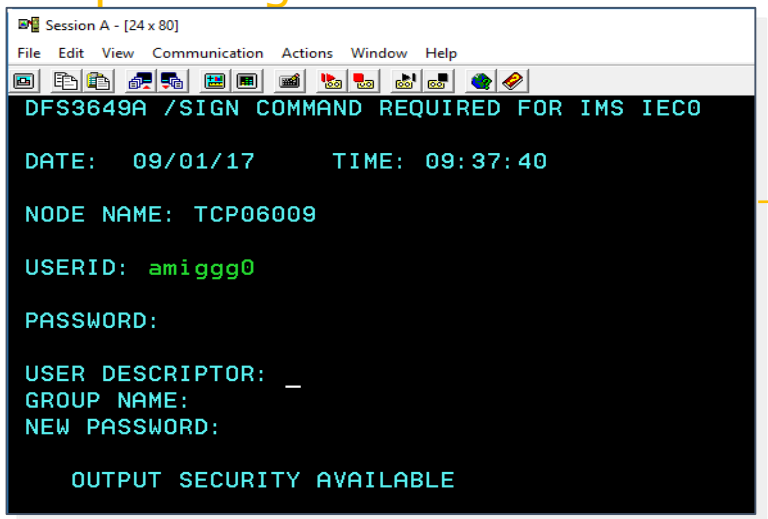
LSYS	DBD	COPE DBD	COPE DBDS	COPE DDNAME
IEC1	DBD1	C1DBD1	IEC1.DBDS.DBD1	C1DBD1DD
IEC2	DBD1	C2DBD1	IEC2.DBDS.DBD1	C2DBD1DD
IEC3	DBD1	C3DBD1	IEC3.DBDS.DBD1	C3DBD1DD
IEC1	DBD2	C1DBD2	IEC1.DBDS.DBD2	C1DBD2DD
IEC2	DBD2	C2DBD2	IEC2.DBDS.DBD2	C2DBD2DD
IEC3	DBD2	C3DBD2	IEC3.DBDS.DBD2	C2DBD2DD

Agenda

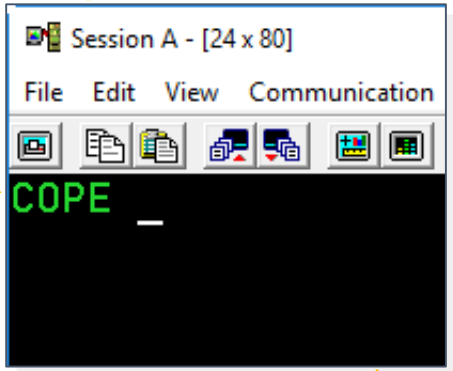
- The Compuware DevOps story
- What is IMS Virtualization?
- How do we define the Virtual Environment?
- How does COPE transform Programs and Databases?
- **How does a Transaction run in a COPE environment?**
- What technologies work in a COPE system?
- Demo
- Wrap up

Select the COPE for IMS Logical System (LSYS)

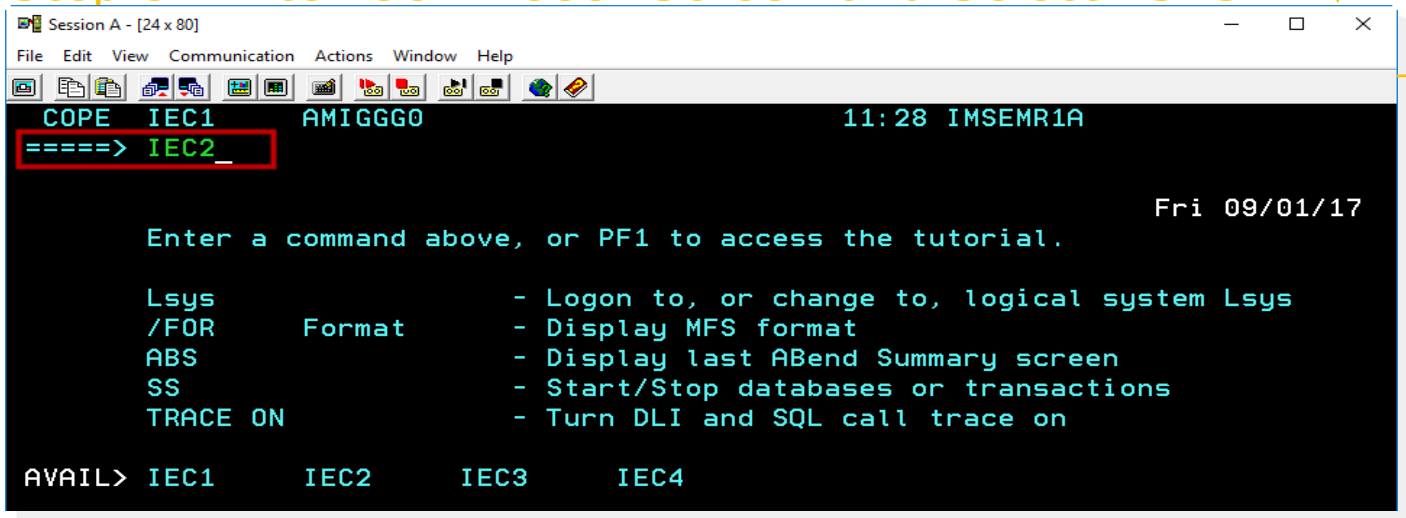
Step 1: Sign on to IMS



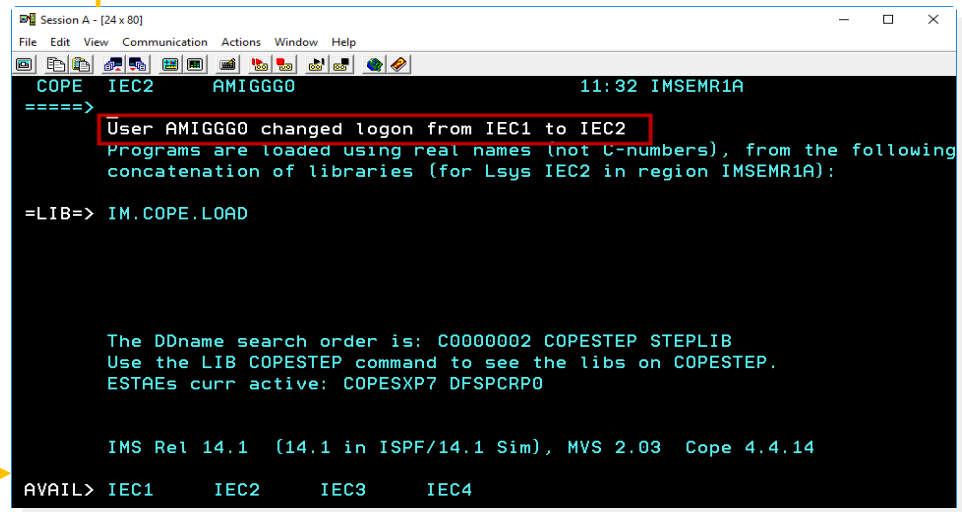
Step 2: Enter COPE Tran



Step 3: Enter COPE User Screen and Select LSYS



Step 4: LSYS = IEC2 Selected



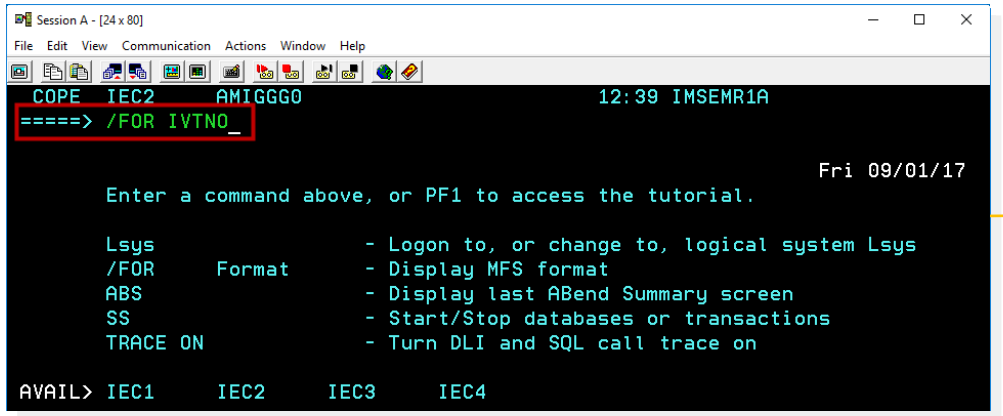
COPE Cross-reference Table

LSYS	IMS User
~~IEC1~~	~~AMIGGG0~~
IEC2	AMIGGG0

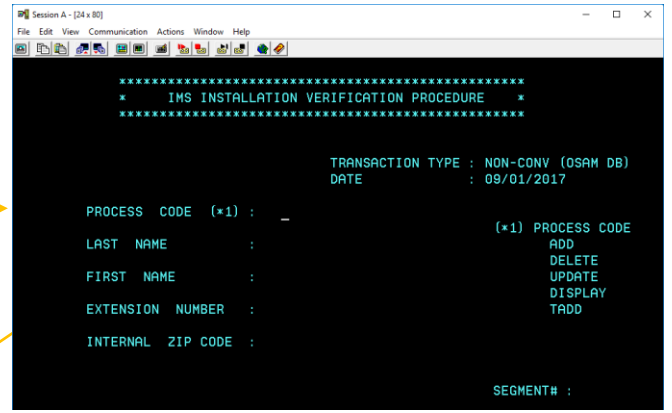
Compuware | The Mainframe Software Partner For The Next 50 Years

Executing a Transaction in COPE for IMS

Step 1: Enter Transaction in LSYS IEC2



Step 2: Enter Data into MFS Screen



Step 3: Run Program in COPE

MPP
COPERC00

1. Run COPE Stubx = CDFSIVP1
2. Find USERID in IOPCB
3. Associate with USERID with LSYS
4. Find program = DFSIVP1 in correct PGMLIB
5. Run program = DFSIVP1
6. Dynamically allocate databases

COPE Program and Transaction Cross-reference Table

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

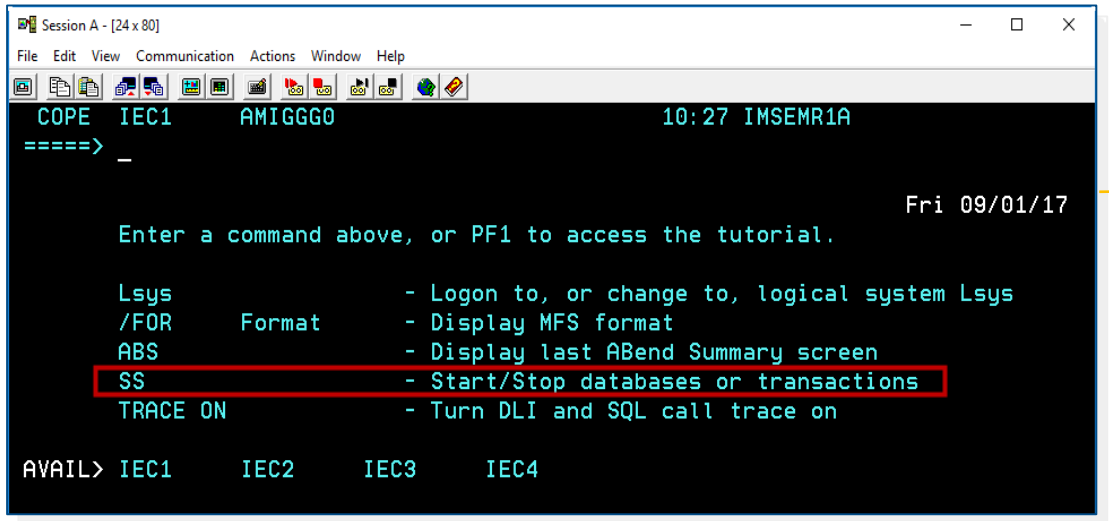
COPE User to LSYS Cross-reference Table

LSYS	IMS User
IEC2	AMIGGG0

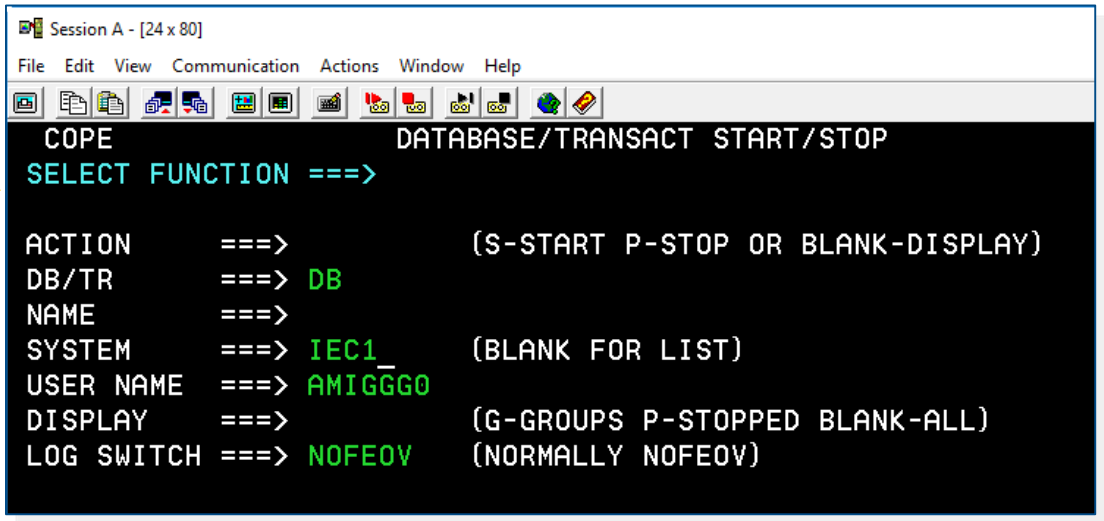
COPE for IMS Start/Stop Application

GUIDE SHARE EUROPE UK REGION

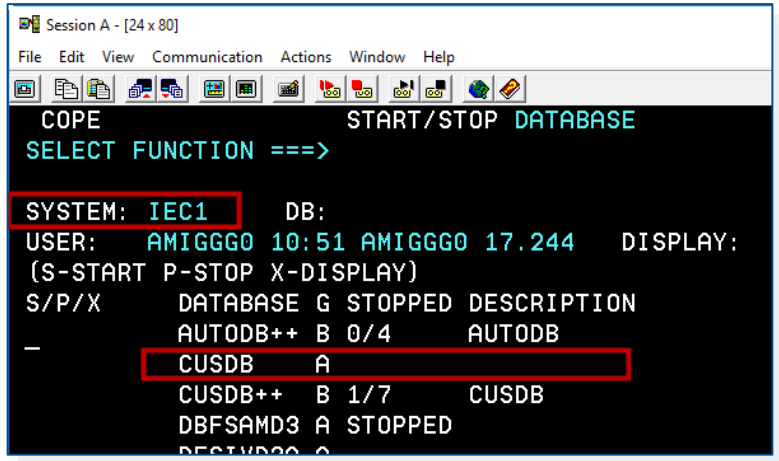
Step 1: COPE User Screen

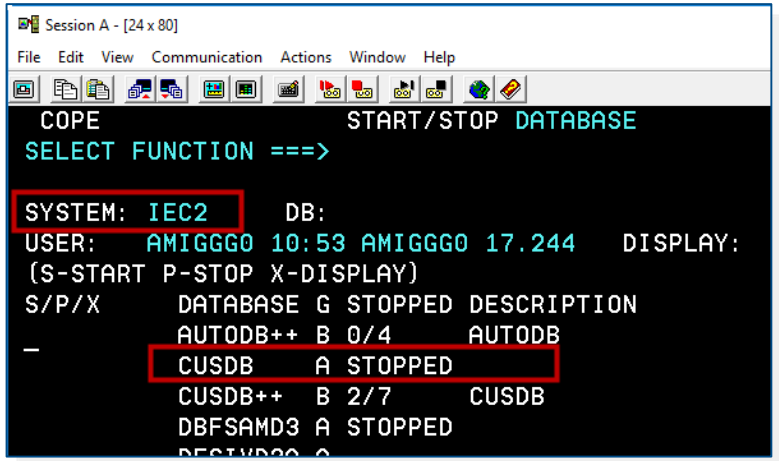


Step 2: COPE Start/Stop Application



LSYS = IEC1





LSYS = IEC2

COPE LSYS Databases Can Have Different Statuses

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=DFSRRC00,
//       PARM=(BMP,PROG,PSB,,,,,,,,,,IEC2)
```

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

BMP, DBB or Batch Job

```
//STEP1      EXEC PGM=DFSRRC00
//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
```

Agenda

- The Compuware DevOps story
- 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?**
- Demo
- Wrap up

COPE with IBM, BMC, CA and Other Utilities

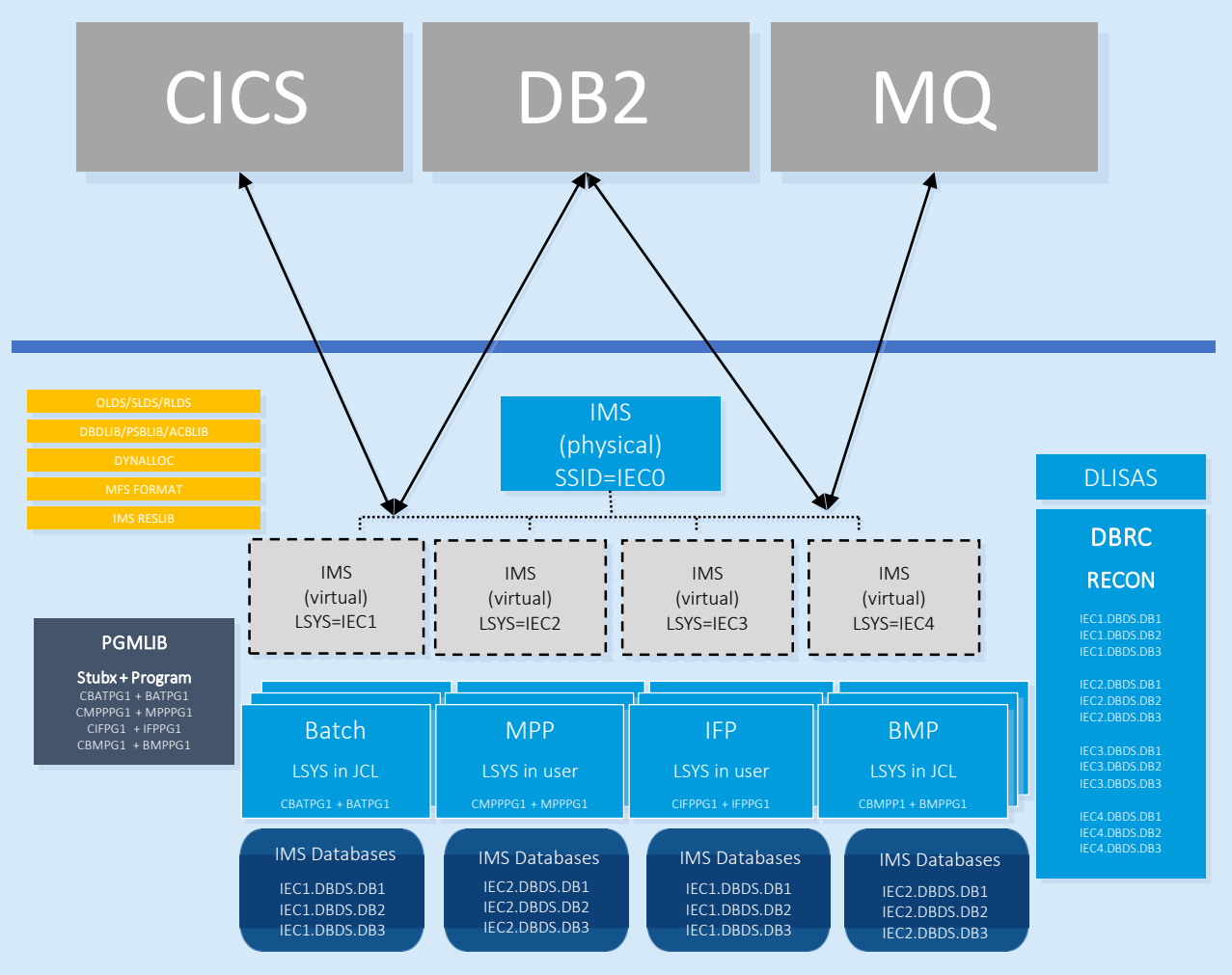
COPE has special code to translate database and program utility inputs to their IMS LSYS names

Specify LSYS name in temporary dataset for utility

IBM, BMC, CA and other Utilities

```
//STEP1      EXEC PGM=DFSRRC00
//COPEBSYS DD DSN=&&IEC3,
//                UNIT=SYSDA,SPACE=(TRK,1)
```

COPE for IMS Supports Many Applications and Tools



- **Dynamic Resource Support**
  - BMC Delta
  - IBM ETO support
  - IBM DRD
- **Application Debugging**
  - Compuware
    - Xpediter (TSO and Eclipse)
    - Abend-AID
    - File-AID (in plan)
  - IBM Debug Tool
- **Date/Time Altering Software**
  - IBM Hourglass
  - Compuware Xchange

Agenda

- The Compuware DevOps story
- 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?
- **Demo**
- Wrap up

Agenda

- The Compuware DevOps story
- 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?
- Demo
- **Wrap up**

The Benefits of IMS Virtualization with COPE

- **Less usage of CSA**
  - Reduction in number of IMS control regions and their associated address spaces
- **Potential elimination of duplicate MQM and Db2 system resources**
- **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 wit 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 * 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:

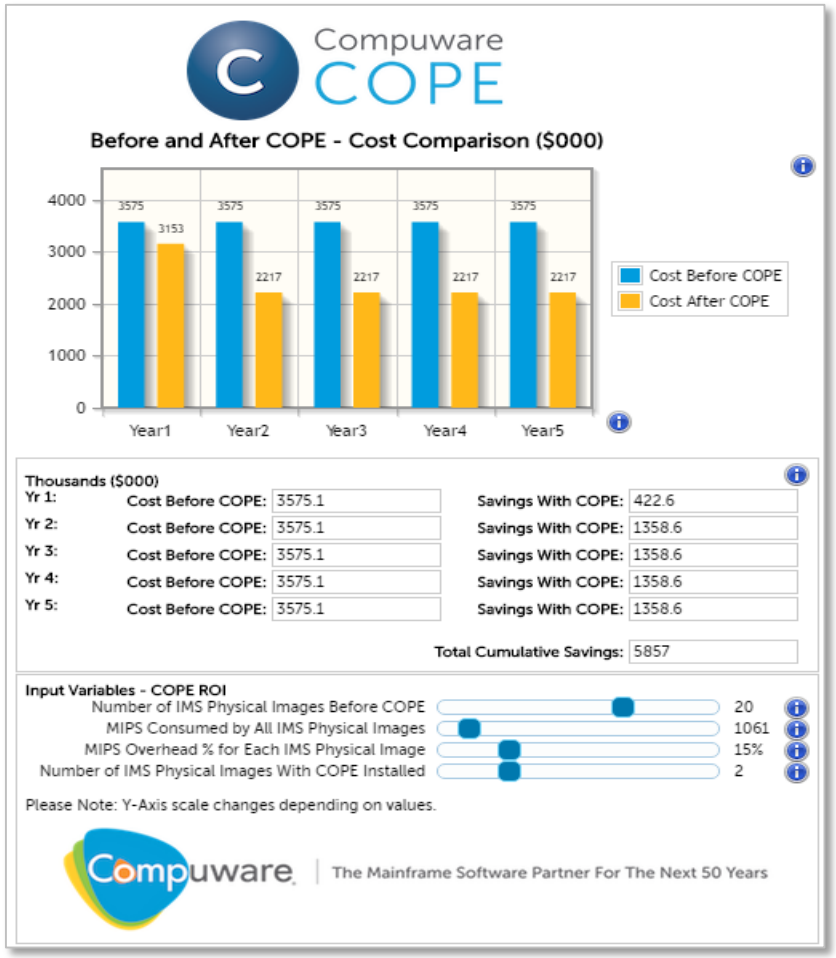
(Number of TP PCBs plus (the number of BMP plus Batch PSBS) multiplied with the number of logical systems).

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



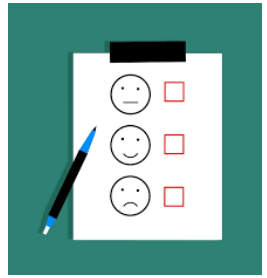
In Summary…

- 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

We want your feedback!

- Please submit your feedback online at ….
  - http://conferences.gse.org.uk/2018/feedback/MG

- Paper feedback forms are also available from the Chair person

- This session is MG

- Thank You