Take Control of Your IMS Environment

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Agenda

- The value of testing
- Challenges to providing good test environments
- Managing your test environments
- Refreshing your test environments
- Some futures
- Summary

What Causes Outages

Based on extensive feedback from clients, we estimate that, on average, unplanned application downtime is caused: 20 percent of the time by hardware (e.g., server and network), OSs, environmental factors (e.g., heating, cooling and power failures) and disasters; **40 percent of the time by application failures including "bugs," performance issues or changes to applications that cause problems (including the application code itself or layered software on which the application is dependent);** and 40 percent of the time by operator errors, including not performing a required operations task or performing a task incorrectly (e.g., changes made to infrastructure components that result in problems and incur unexpected downtime).

Thus, approximately **80 percent** of unplanned downtime is **caused by people and process issues**, while the remainder is caused by technology failures and disasters. Improving availability requires a different strategy and set of investment choices for each of the three unplanned downtime categories." -- ***Gartner Group***

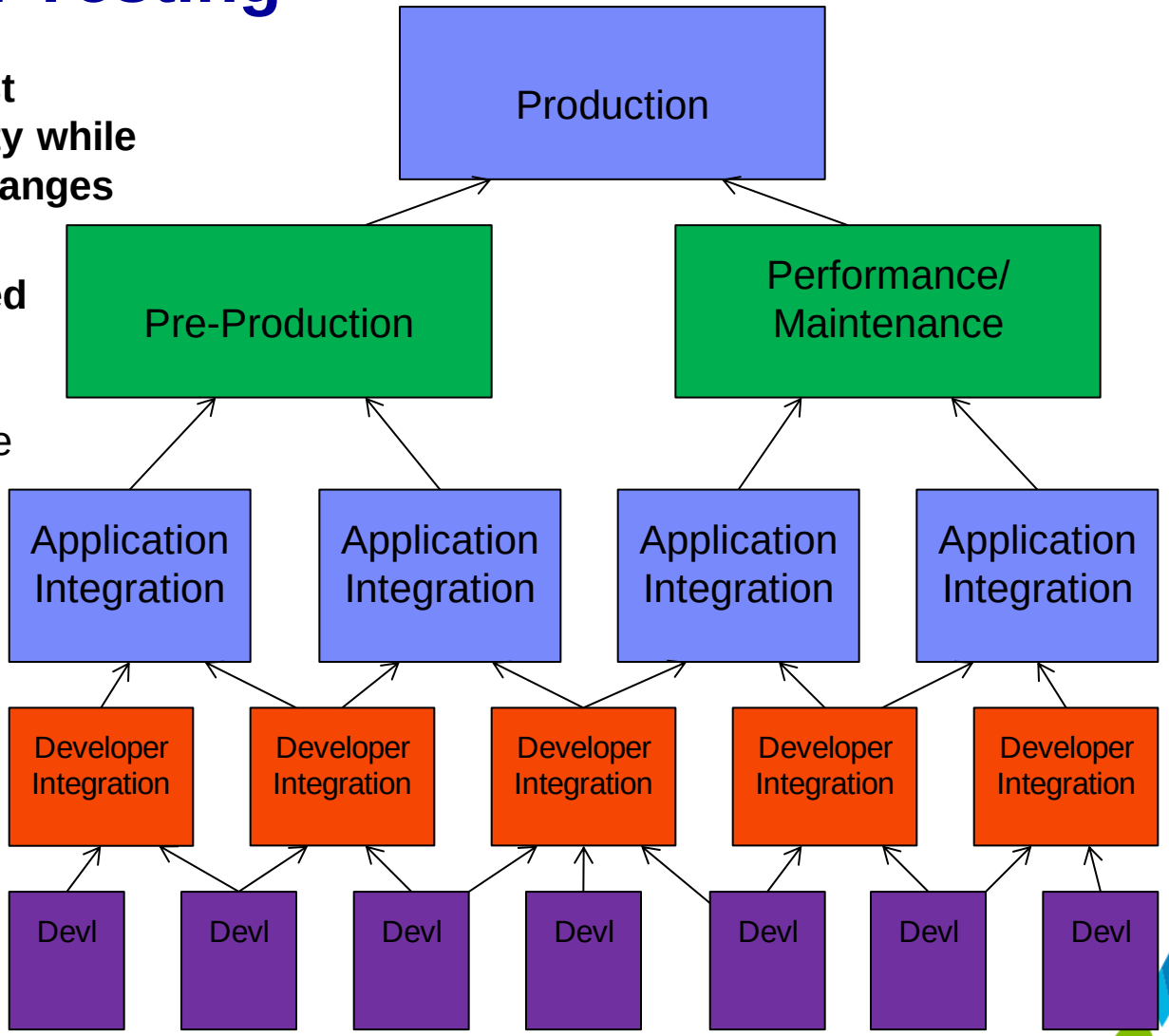
Why is Test Data Management Important?

- **Improving business critical applications**
  - Improve application reliability
  - Increase functionality
  - Shorten time to market
  - Reduce development and testing costs
- **Sharing resources and skills for development and testing**
  - Setting up a test environment usually involves:
    - Systems programmer
    - DBA
    - Application developer
    - Tester
  - Test databases are typically shared
- **Meeting technical requirements**
  - Application testing done in a production replica
  - Technical changes tested before production implementation
- **Meeting regulatory requirements**
  - Protection of personal or sensitivity data

Various Levels of Testing

- **Testing environments must support production stability while allowing for application changes**
- **Different testing levels need different environments**
  - Environmental functionality/maintenance
  - Amount of data
  - Privacy
  - Other application dependencies

How do we keep test environments current?



Creating and Maintaining Test Environments

- **Creating test environments requires a lot of host resources**
  - Running Volume copies
  - Running the UNLOAD/RELOAD, IMAGE/RECOVERY or dataset copies
- **Cloning is a complicated process**
  - Putting up a brand new IMS system environment
    - New PROCLIBs and JOBs with all new names
    - All new sysgens, RECONS, MDA members
    - Constantly comparing libraries to insure a quality copy process
  - Copying databases
    - UNLOAD/RELOAD jobs possible outage for source databases
    - IMAGE/RECOVERY jobs possible pointer error on target or source outage
- **The cloned environment must be maintained!**

Managing your IMS systems

IMS Configuration Manager can help

- A structured process for managing IMS systems, their resources, and parameters
- A version agnostic approach to introducing changes
- Near-instant discovery of all the IMS systems and their parameter configuration
- Intelligent reporting on IMS parameters and resources
- Graphical user interface for managing systems

Auto discovery of IMS Systems

IMS Configuration maps an entire IMS topology in seconds

Empty member list

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                              System Member List
Command ===> ____________________________________________________ Scroll ===> PAGE

Enter NEW to create a new Member

     Name      Type     IMSplex   VV.R  Description
/    *         *        *         *     *
****************************** Bottom of data ********************************
```

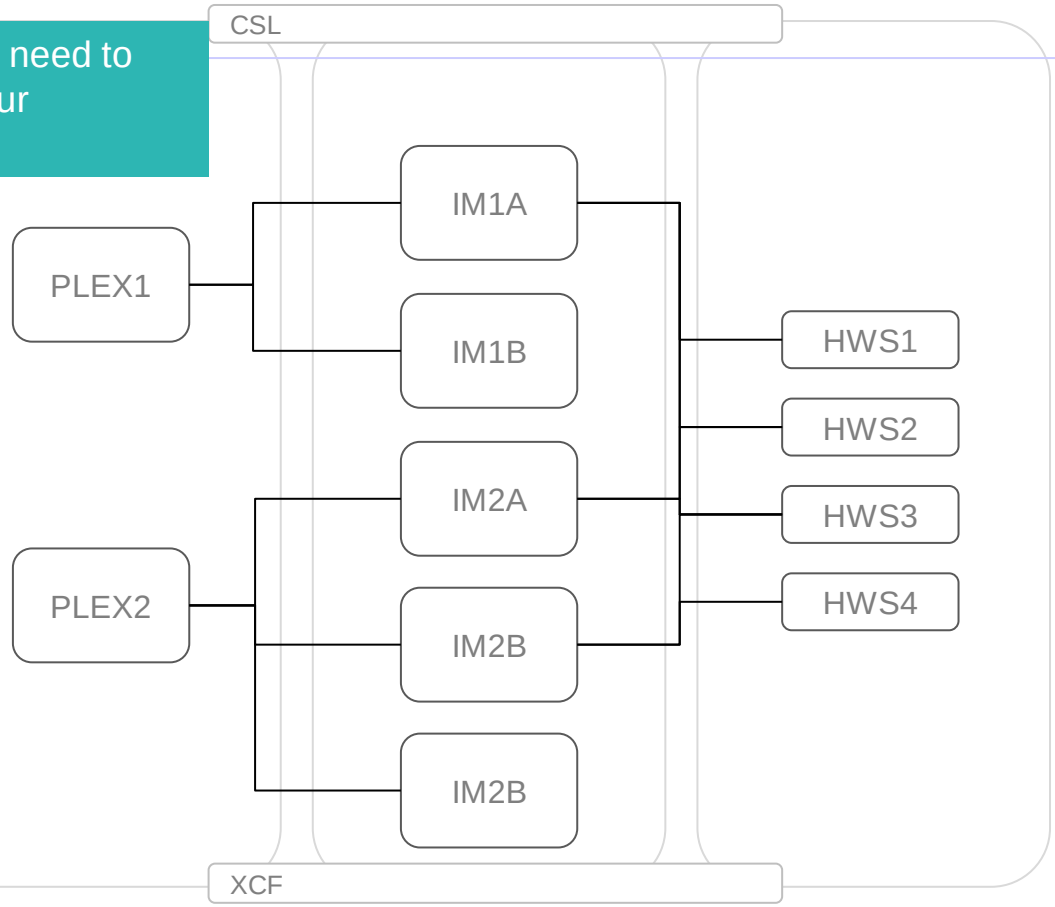
```
VIEW       GPL210.DEVT.SGPLSAMP(GPLDSCVR) - 01.25
Command ===> ____________________________________________________________
****** ***************************** Top of Data *******
000001 //GPLDSCVR JOB ,CLASS=A,NOTIFY=&SYSUID
000002 //GPLUTIL  EXEC PGM=GPLUTIL
000003 //STEPLIB  DD  DISP=SHR,DSN=<HLQ.V2R1M0.SGPLLINK>
000004 //         DD  DISP=SHR,DSN=<HLQ.VnRnMn.SDFSRESL>
000005 //SYSIN    DD  *
000006 *
000007 DISCOVER TO(REPOSITORY,GPLREPOS)
000008 /*
000009 //GPLREPOS DD  DISP=SHR,
000010 //             DSN=<HLQ.V2R1M0.REPOSTRY>
000011 //SYSPRINT DD  SYSOUT=*
000012 //
****** **************************** Bottom of Data *****
```

+ Discovery job

Review the results of IMS Systems Topology Mapping

- Identify IMSplexes, IMS systems, and IMS Connect across all LPARs

Find what you need to consider in your evaluation



Complete IMS topology

File Help

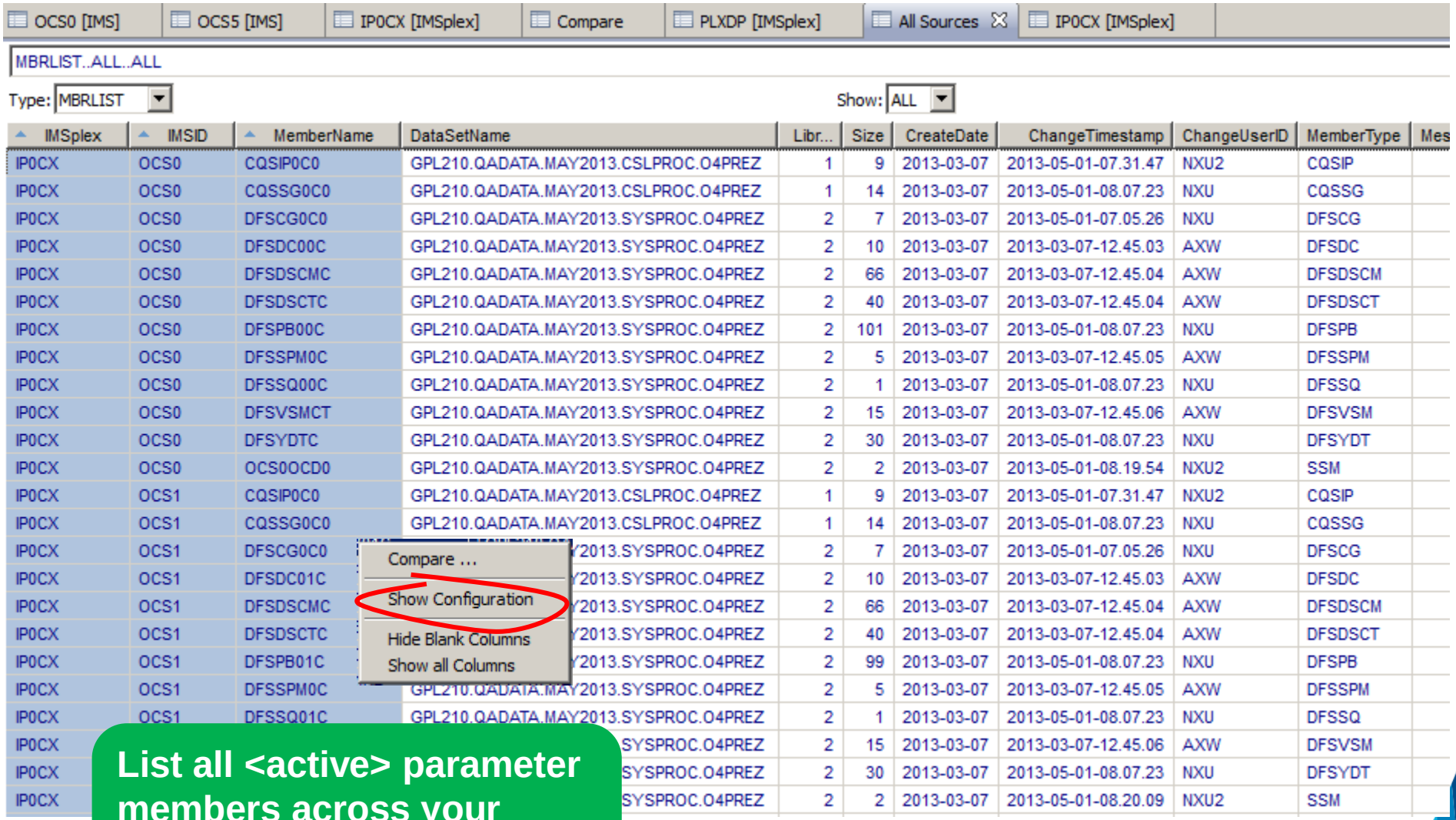
System Member List Row 1 of 103 More: <>

Command ===> Scroll ===> PAGE

Enter NEW to create a new Member

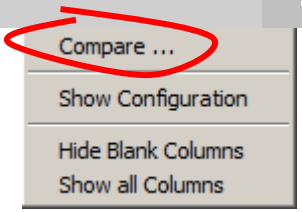
/	Name	Type	IMSplex	VV.R	Description
	*	*	*	*	*
	CACTHWS0	IMSCON		10.1	
	CDQ1SC	SCI	PLCDH	1.5	
	DCH1OD	ODBM	PLCDH	1.2	
	DCJ1OD	ODBM	PLCDJ	1.2	
	DCJ1OM	OM	PLCDJ	1.5	
	DCJ2OD	ODBM	PLCDJ	1.2	
	DDH1OM	OM	PLDDH	1.6	
	DDJ1OD	ODBM	PLDDJ	1.3	
	DDJ1OM	OM	PLDDJ	1.6	
P	IBDP	IMS	PLXDP	11.1	
	IBDR	IMS	PLBDP	11.1	
	ICDH	IMS	PLCDH	12.1	
	ICDJ	IMS	PLCDJ	12.1	
	ICDP	IMS	PLXDP	12.1	
	ICDQ	IMS	PLDDQ	12.1	
	ICDR	IMS	PLCDP	12.1	
	ICMIC00	IMSCON	+3	12.1	
	ICMIC01	IMSCON		12.1	
	ICMIC02	IMSCON	PLXDP	13.1	

```
                                IMSPlex Active Members                  Row 1 of 35
Command ===> _____________________________________________ Scroll ===> CSR

IMSplex . . . : PLXDP
Search . . _____________________________________________

  / System        Prompt    Description
- _ IMS
  + _ IBDP
  + _ IDDP
- _ IMSCON
  + _ ICMIC00
  - _ ICMIC02
      _ HWSCFG02
      _ BPECFG11
      _ HWSEXIT1
- _ ODBM
  - _ S3XDPOD
      _ CSLDIPS3
      _ CSLDCPS3
      _ BPECFPLP
- _ OM
  - _ S1XDPOM
      _ CSLOIPS1
      _ BPECFPLP
- _ RM
  + _ S1XDPRM
  + _ S3XDPRM
- _ SCI
  + _ S1XDPSC
  + _ S3XDPSC
- _ REPO
  - _ S1XDPRP
      _ FRPCFGS1
      _ BPECFPLP
```



List all <active> parameter members across your enterprise and drill-down to parameter values

Compare configuration across all plexes to make sure you are using the best system configuration for evaluation



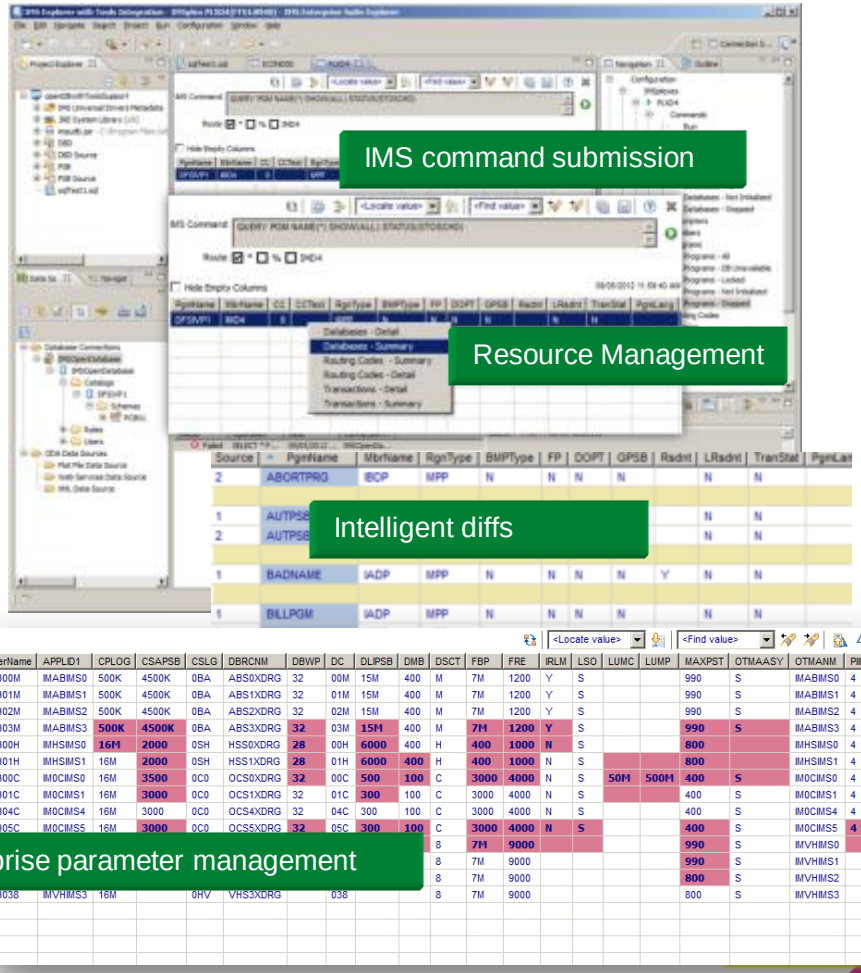
<Locate value> <Find value>

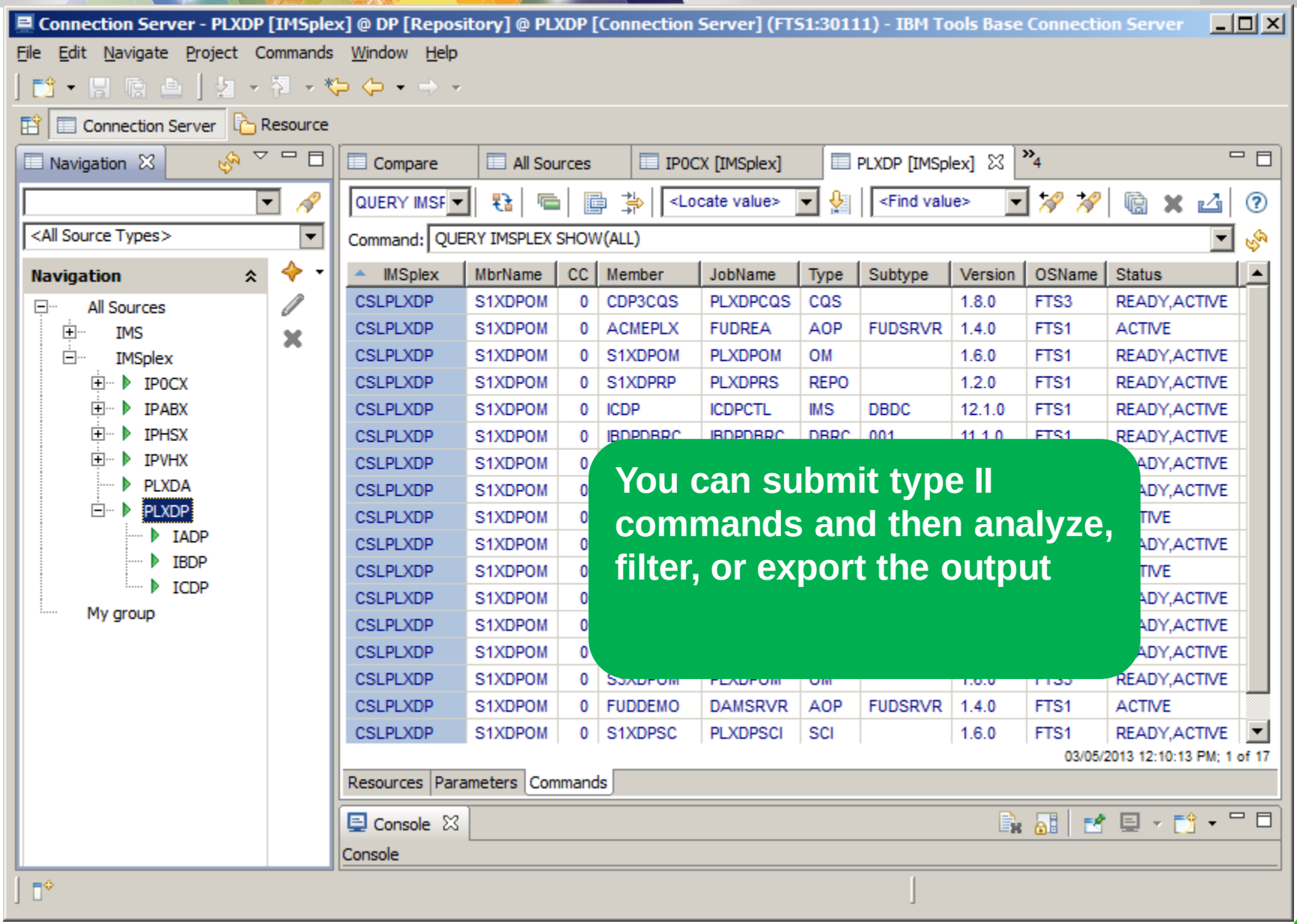
MemberName	APPLID1	CPLOG	CSAPSB	CSLG	DBRCNM	DBWP	DC	DLIPSB	DMB	DSCT	FBP	FRE	IRLM	LSO	LUMC	LUMP	MAXPST	OTMAASY	OTMANM	PIINCR	PIMAX
DFSPB00M	IMABIMS0	500K	4500K	0BA	ABS0XDRG	32	00M	15M	400	M	7M	1200	Y	S			990	S	IMABIMS0	4	2000
DFSPB01M	IMABIMS1	500K	4500K	0BA	ABS1XDRG	32	01M	15M	400	M	7M	1200	Y	S			990	S	IMABIMS1	4	2000
DFSPB02M	IMABIMS2	500K	4500K	0BA	ABS2XDRG	32	02M	15M	400	M	7M	1200	Y	S			990	S	IMABIMS2	4	2000
DFSPB03M	IMABIMS3	**500K**	**4500K**	0BA	ABS3XDRG	**32**	03M	**15M**	400	M	**7M**	**1200**	**Y**	S			**990**	**S**	IMABIMS3	4	2000
DFSPB00H	IMHSIMS0	**16M**	**2000**	0SH	HSS0XDRG	**28**	00H	**6000**	400	H	**400**	**1000**	**N**	S			**800**		IMHSIMS0	4	2000
DFSPB01H	IMHSIMS1	16M	**2000**	0SH	HSS1XDRG	**28**	01H	**6000**	**400**	H	**400**	**1000**	N	S			**800**		IMHSIMS1	4	**2000**
DFSPB00C	IM0CIMS0	16M	**3500**	0C0	OCS0XDRG	**32**	00C	**500**	**100**	C	**3000**	**4000**	N	S	**50M**	**500M**	**400**	**S**	IM0CIMS0	4	**8000**
DFSPB01C	IM0CIMS1	16M	**3000**	0C0	OCS1XDRG	32	01C	**300**	100	C	3000	4000	N	S			400	S	IM0CIMS1	4	8000
DFSPB04C	IM0CIMS4	16M	3000	0C0	OCS4XDRG	32	04C	300	100	C	3000	4000	N	S			400	S	IM0CIMS4	4	8000
DFSPB05C	IM0CIMS5	16M	**3000**	0C0	OCS5XDRG	**32**	05C	**300**	**100**	C	**3000**	**4000**	**N**	**S**			**400**	S	IM0CIMS5	**4**	**8000**
DFSPB008	IMVHIMS0	16M		0HV	VHS0XDRG		008			8	**7M**	**9000**					**990**	S	IMVHIMS0		
DFSPB018	IMVHIMS1	16M		0HV	VHS1XDRG		018			8	7M	9000					**990**	S	IMVHIMS1		
DFSPB028	IMVHIMS2	16M		0HV	VHS2XDRG		028			8	7M	9000					**800**	S	IMVHIMS2		
DFSPB038	IMVHIMS3	16M		0HV	VHS3XDRG		038			8	7M	9000					800	S	IMVHIMS3		

Only show differences; only highlight significant differences

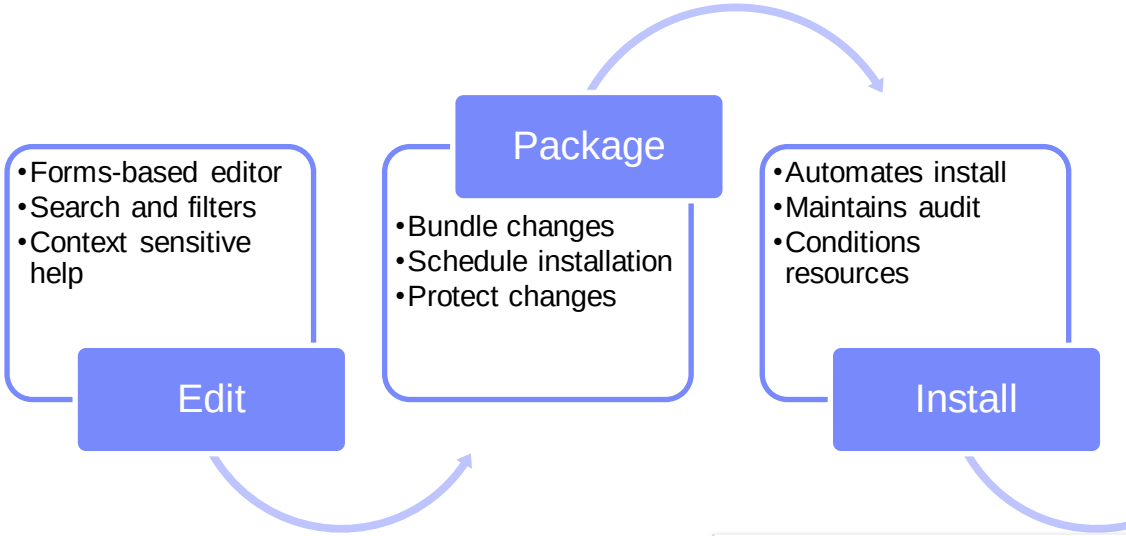
Centralized management of IMS systems

- Map IMS topology
- Analyze PROCLIB parameters across global sites
- Run CSL commands
- Manage MODBLK resources
- Search, filter, compare, and export results to spreadsheet applications
- Provides tight integration with IMS Connect Extensions GUI
- Works with z/OS Explorer, IMS Explorer, CICS Explorer, and Rational offerings

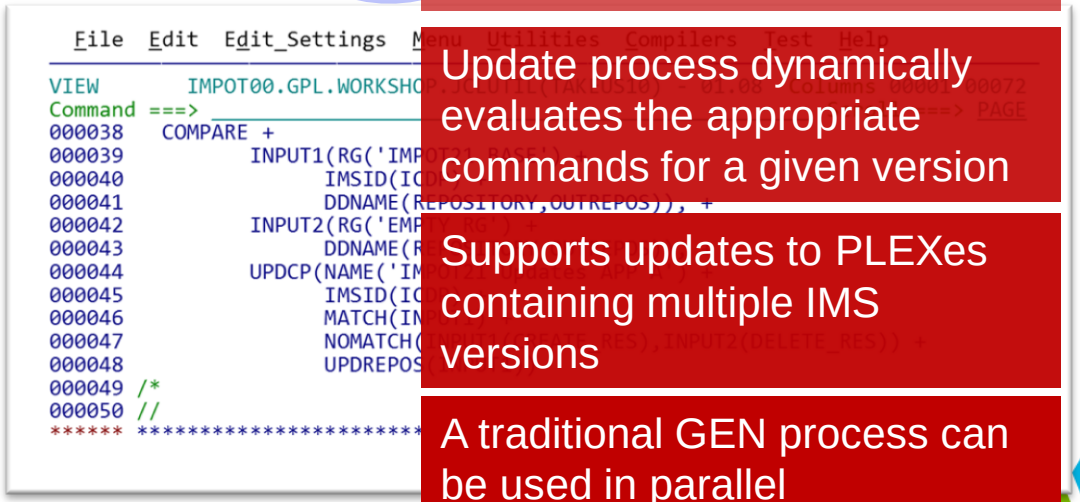




ICM Processes: updating resources using DRD



Batch processes can also be used to identify differences for changes from external sources. Change packages can be created from the difference



Resource representation a superset of all IMS versions

Update process dynamically evaluates the appropriate commands for a given version

Supports updates to PLEXes containing multiple IMS versions

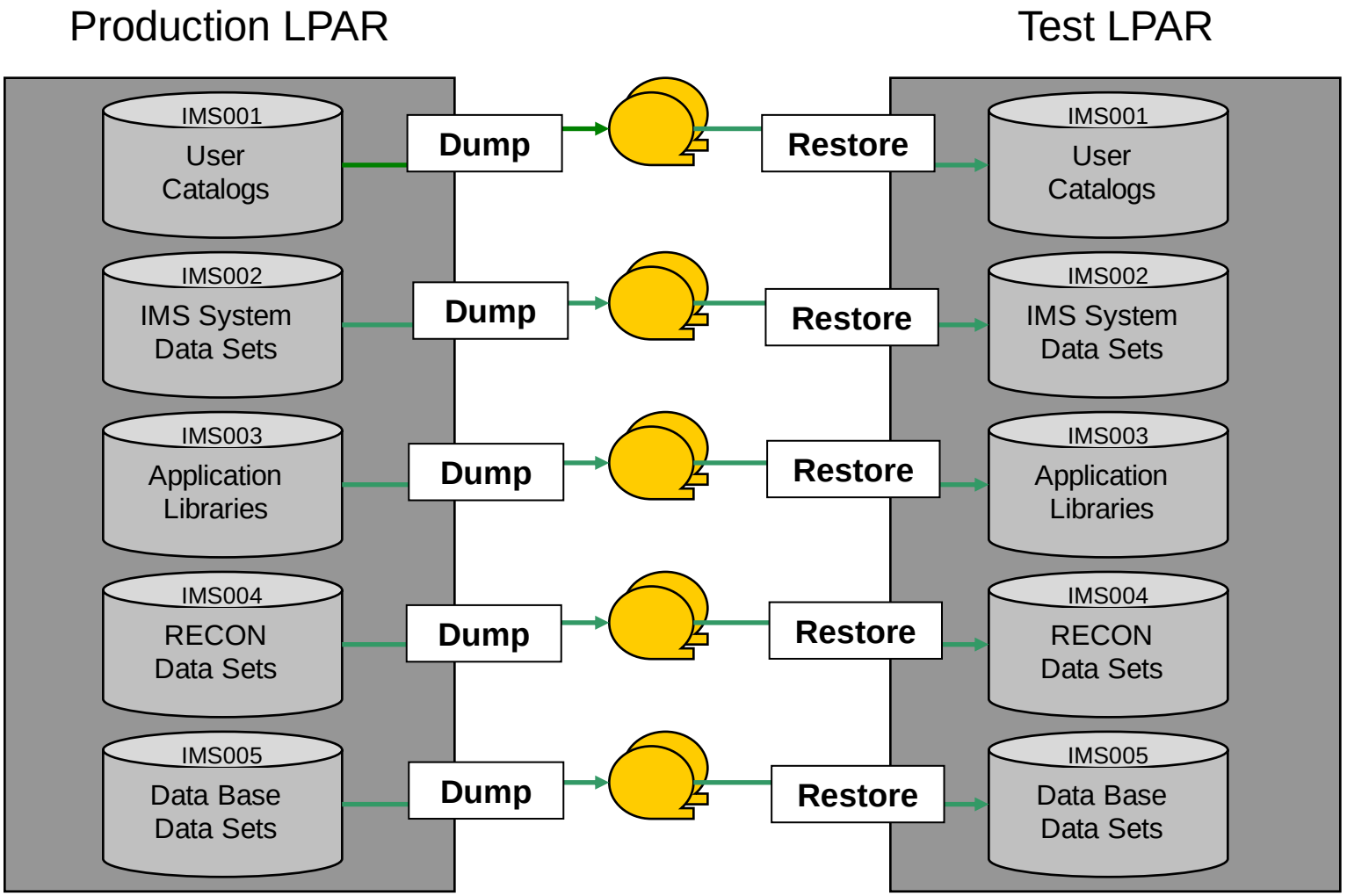
A traditional GEN process can be used in parallel

Refreshing IMS Systems

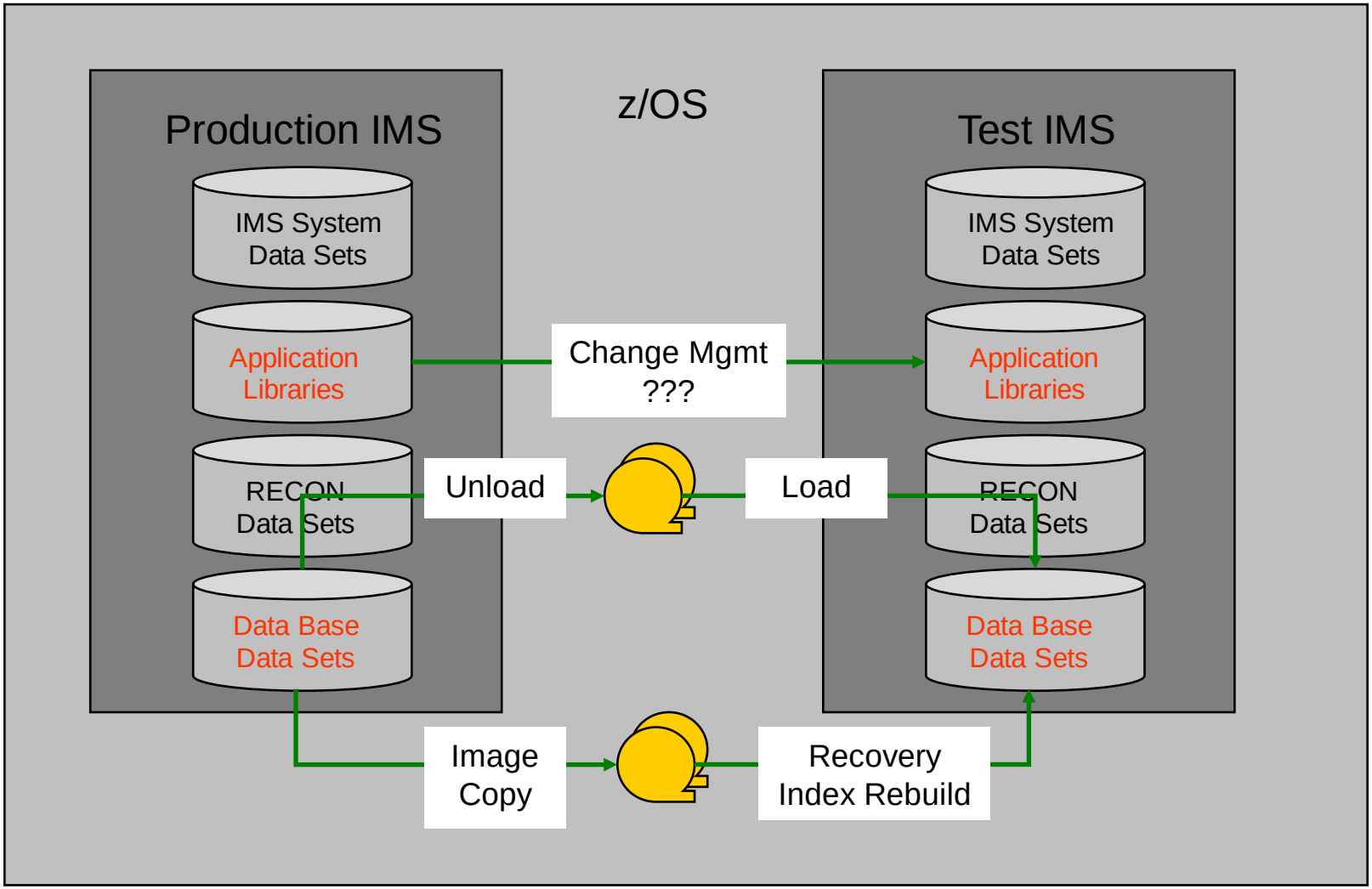
Cloning Terminology

- **A clone is an exact but independent replica**
  - Clone a DB2 or IMS system by volume
  - Clone a table space or database by data set
- **DB2/IMS system cloning and table space/database refresh**
  - The act of replicating the data, making the replica accessible, and then using the replica in lieu of the original data
- **System cloning automation**
  - Clones a complete DB2 or IMS system including all its databases
- **DB2 table and index space and IMS database refresh**
  - Refreshes specific DB2 table and index spaces or IMS databases

Traditional IMS System 'Cloning'

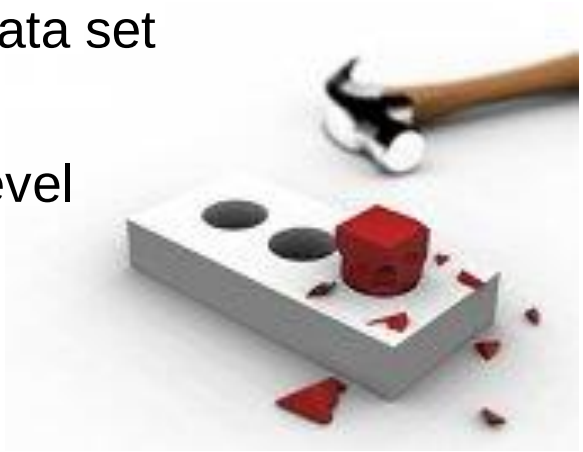


Traditional IMS Database 'Cloning'

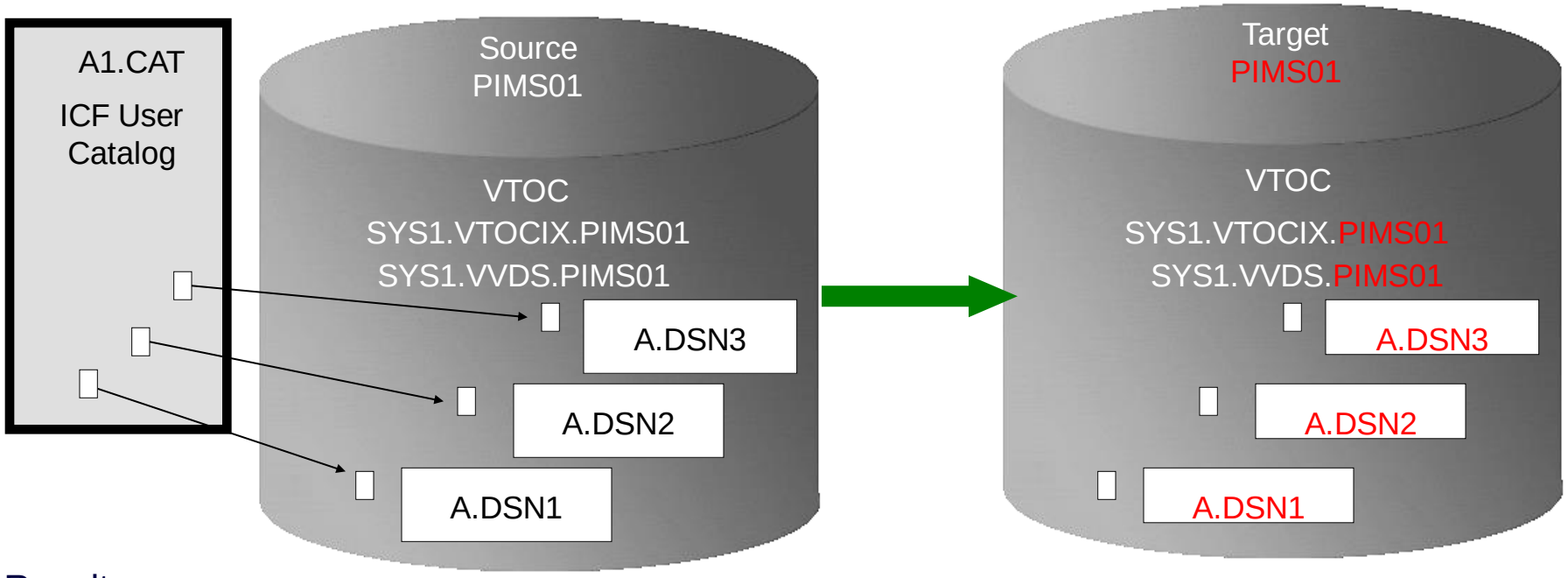


Volume Level Copy
Challenges to Data Access on the Same or Shared LPAR

- **DB2 or IMS system cloning is best done using volume replication**
  - Data set copy goes through source and target data set allocation and deallocation for each data set
  - Consistency groups only supported at volume level
- **Volume data is replicated fast and easy but…**
  - How do you access the cloned data?
- **Inherent Problems:**
  - VOLSERs may have the same volume names as the source
  - Volume VTOC, VTOCIX and VVDS would reference the source VOLSERs
  - Data set names are the same on source and target volumes



Challenges to Data Access
Data Set Name and Cataloging Issues



Result:

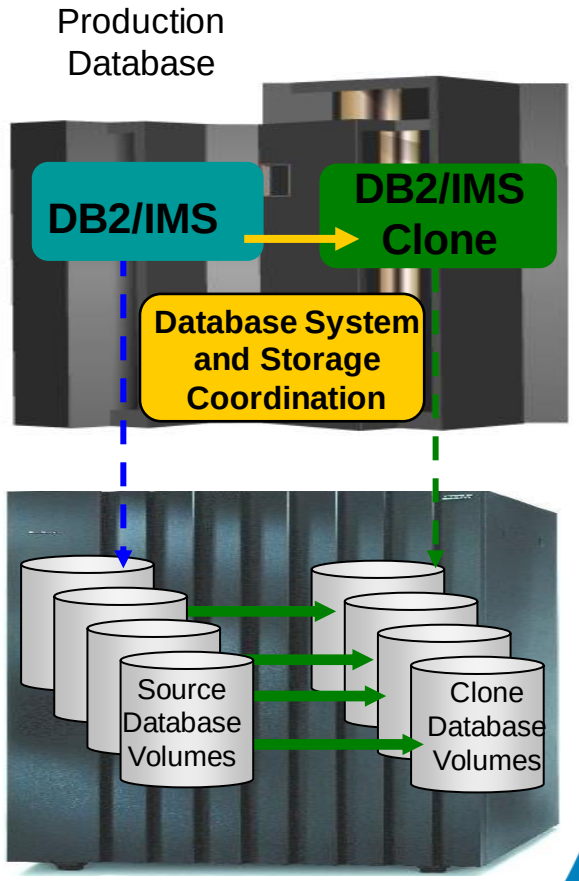
1. Volser will be same as source so target volume will be offline
2. VTOCIX and VVDS reflect source volser
3. Data sets on the volume are copied, but keep their original name
4. Only the source data sets are cataloged; even if the catalog is on the cloned volumes, it isn't connected to the system's master catalog

Storage Aware Database Tools Solve Data Access Challenges

- **DB2 system or IMS system cloning by volume**
  - Changes the target volume identifiers if they are the same as the source
  - Renames the VTOC, VTOCIX, and VVDS to match the target volume
  - Renames and catalogs all data sets to a new HLQ
  - Updates the DB2 or IMS metadata
  - Makes data accessible on the same or shared LPAR

IMS or DB2 Cloning Tool System Cloning Automation

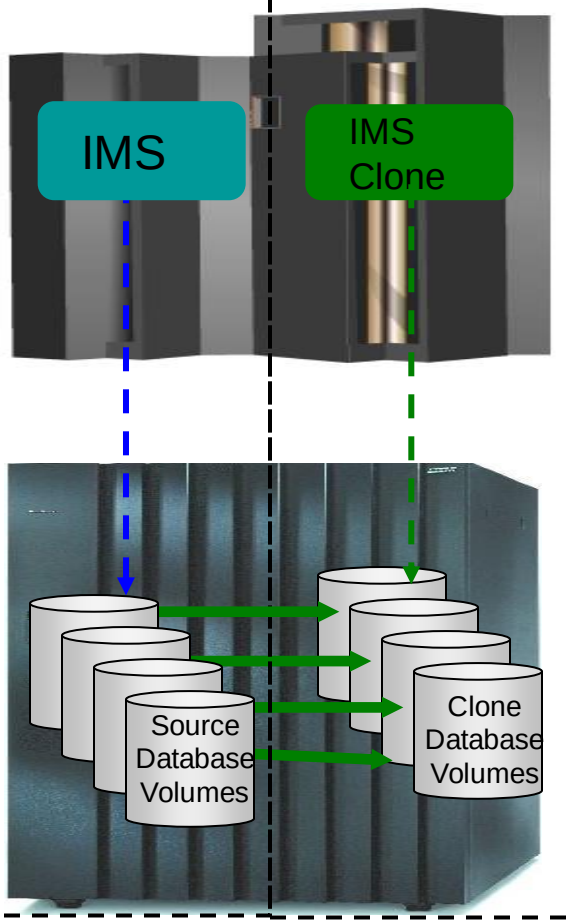
- **Performs automated cloning of DB2 or IMS systems**
- **Data is copied using storage-based volume level fast-replication**
- **Performs rapid volume reconditioning and data set renaming on cloned volumes to solve the data access challenges**
  - Target volumes retain their target volume label
  - Renames the VTOC, VTOCIX, and VVDS to match the target volume
  - Renames and catalogs all data sets to a new HLQ
- **Adjusts target DB2 system to accommodate and accept the cloned data**
  - DB2 catalog, directory, BSDS, active / archive Log
  - Makes data accessible on the same or shared LPAR
- **Adjusts target IMS to accommodate and accept the cloned data**
  - IMS RECONs, PROCLIB, JOBS, JCL, MDA members



IMS System Cloning Steps

Production IMS
'Source'

Target IMS

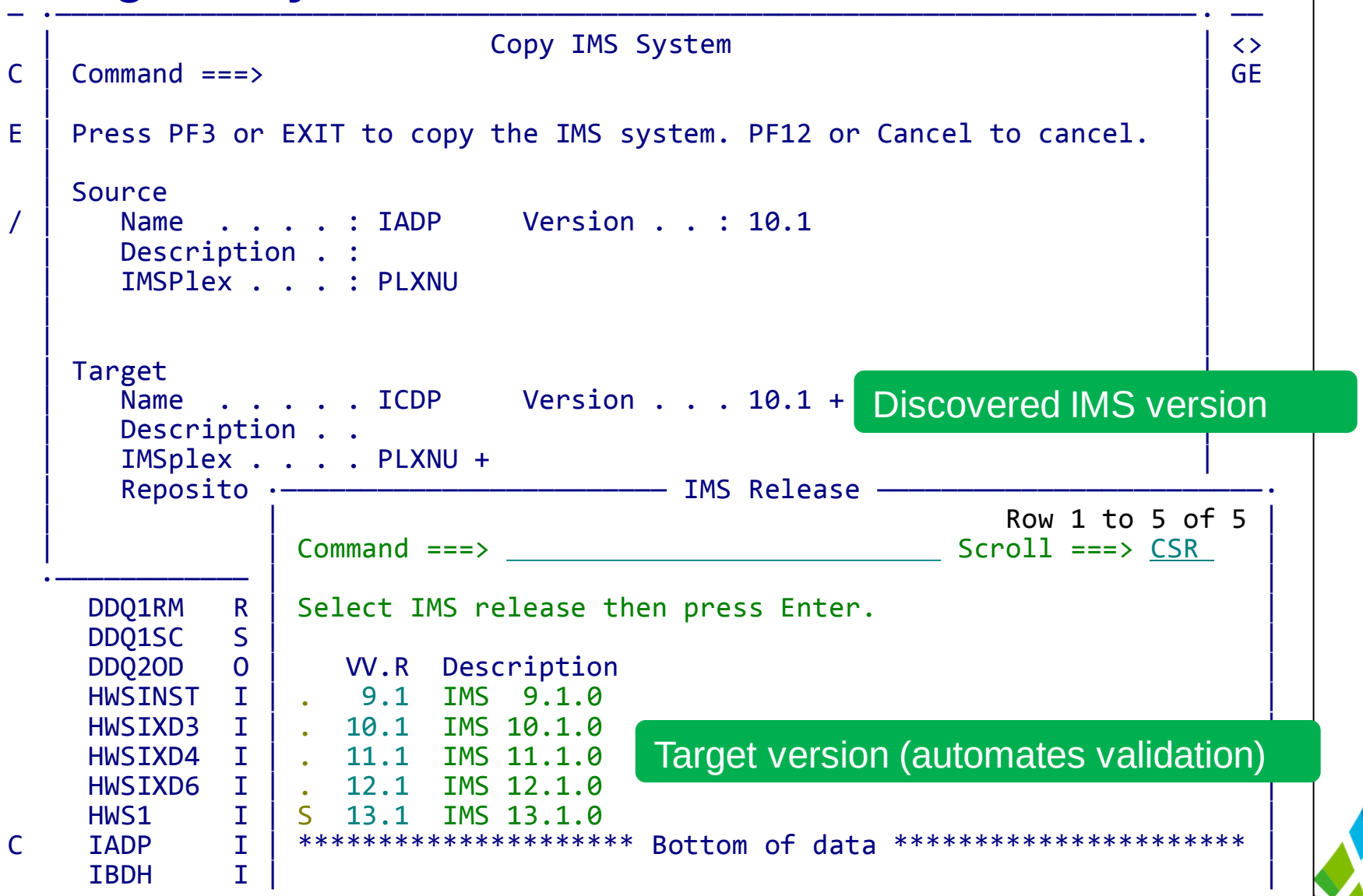


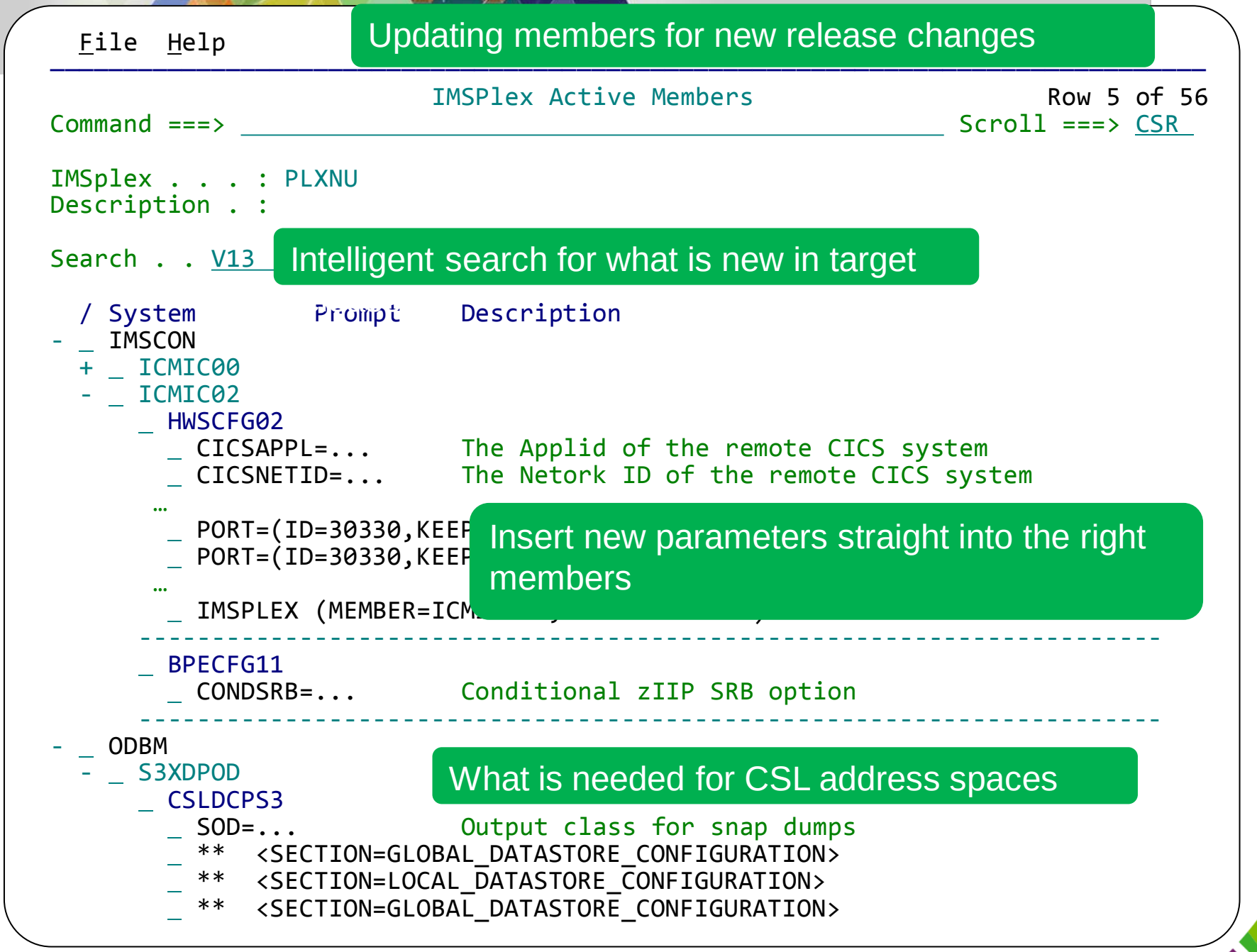
1. IMS volume selection
2. A. Suspend IMS
   B. Consistency Group
3. Volume copy
4. Resume IMS if 2A
5. Rename data sets and catalogue
6. Update cloned IMS meta data
7. Start cloned IMS

Target IMS System (Clone) Updates

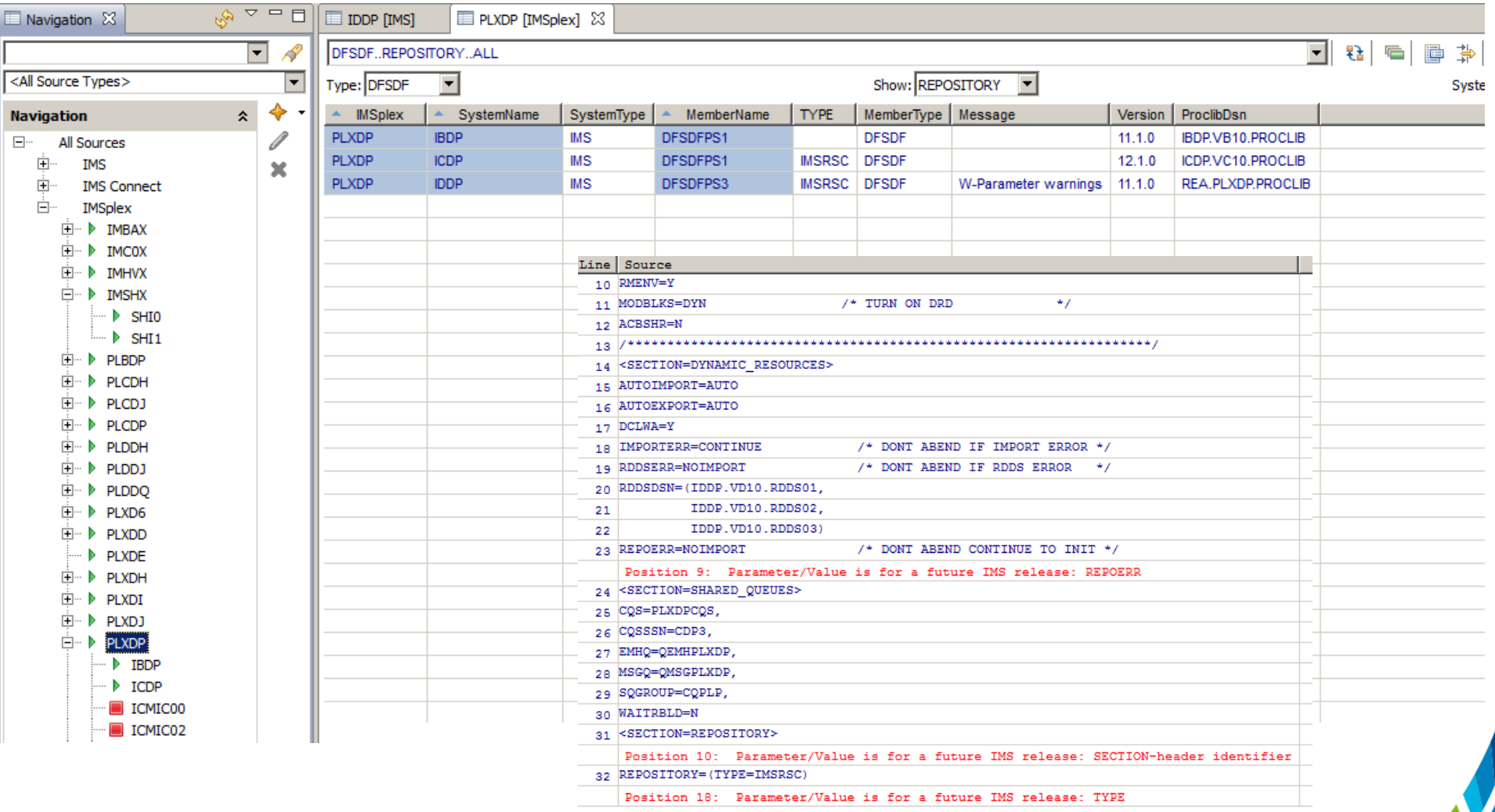
- **RECONs data sets**
  - Data set names, IMS subsystem IDs, and VOLSERs are updated in the following RECON records: header record, database data set records, online log records, and back-out records
  - Optionally, the following RECON records can be updated if they were on volumes that were cloned:
    - Image copy records, change accumulation records
    - System log data set (SLDS) records
    - Recovery log data set (RLDS) records
- **IMS PROCLIB and JOBS and user JCL libraries**
  - New values for IMSID, VOLSERS, and data set names in the JCL members within these libraries
- **MDA members for databases and system data sets**
  - RECON data sets
  - Online Log data sets (OLDS)
  - Write-ahead data sets (WADS)

Updating test system resources with ICM





Find Parameter changes needed for copied parameter members in target system



Adding support for the new features you want using Semantic search

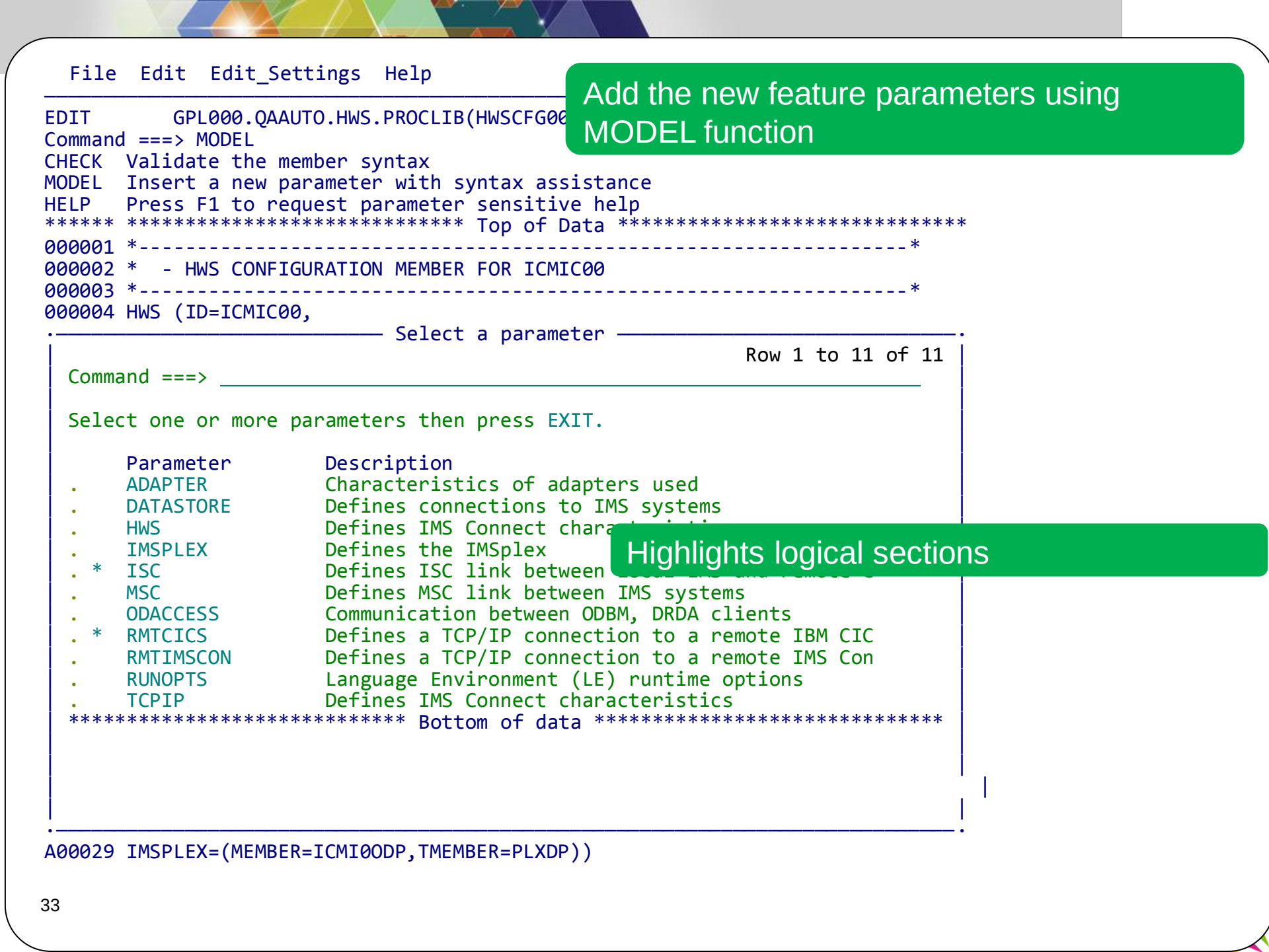
```
IMSplex . . . : PLXNU
Description . :

Search . . ISC
```

Intelligent search for new feature

```
  / System          Prompt     Description
  - _ ICDP
      _ DFSDC000
        _ ISCTCPIP=...         Defines an LU 6.1 via TCPIP link
        _ RCVYSTSN=...         STSN recovery? Yes or No
      ------------------------------------------------------------------
       …
      _ DFSDSCT0
        _ AUTLID=...           ISC other system half session qualifier
        _ LCLICON=...          Local ICON that IMS communicates with via
      ------------------------------------------------------------------
      _ DFSHSB00
        _ LNK                  Timing values for ISC link surveillance
        _ SWITCH               Switch if a surveillance mechanism trigger
      ------------------------------------------------------------------
  + _ IDDP
- _ IMSCON
  - _ ICMIC00
      _ HWSCFG00
        _ CICSAPPL=...         The Applid of the remote CICS system
        _ CICSNETID=...        The Netork ID of the remote CICS system
        …
        _ RESVSOC=...          The number of send sockets reserved for th
        _ RMTCICS=...          Defines a TCP/IP connection to a remote IB
        _ HWS (ID=ICMIC00,     Identifier
        …
```

Finds IMS Connect as well as IMS

Shows all parameters that are impacted



Add the new feature parameters using MODEL function

Highlights logical sections

Update System Resource Definitions

- **Update definitions to new release specification**
  - Create Stage 1 out if Systems generation used
- **Activate DRD in evaluation IMS if needed**
  - Create System RDDS if DRD restart used for cold start
  - Import RDDS to IMS Repository to use Repository for cold start
- **If DRD active, resources can be changed using DRD if changes are needed**

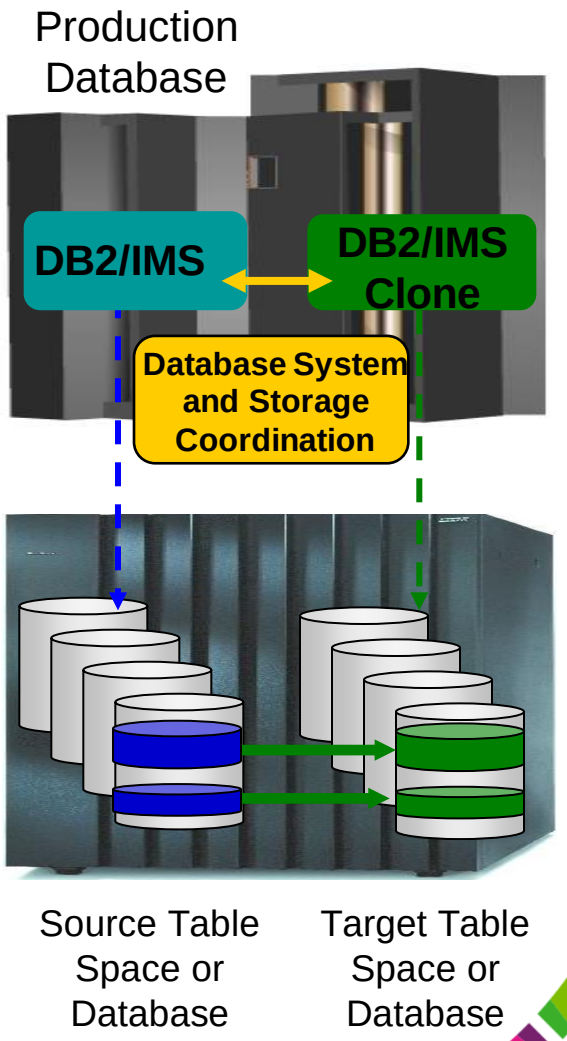
Refreshing Applications

Application Components

- Transactions
- Programs
- Database Definitions
- Data

IMS or DB2 Cloning Tool
Database or Tablespace Refresh Automation

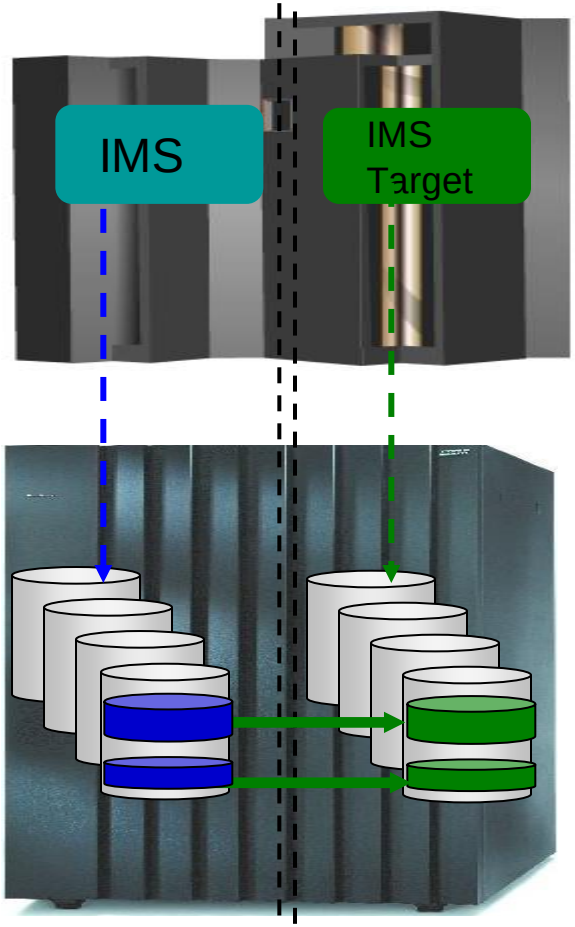
- **Performs automated DB2 table and index space or IMS database refresh operations**
  - DB2 RI relationships, LOBS, and Identity columns
  - XML on DB2 V9 or greater
  - IMS logically related
  - IMS DB support (FF, HALDB, DEDB)
- **Verifies source target database compatibility**
- **DB2/IMS data copied using storage-based dataset fast-replication**
  - Data can be cloned while online or offline
  - Slow copy mechanism can be used
- **Performs object ID translations and target DB2 system meta-data**
- Updates DBRC information for target IMS databases



IMS Database Refresh Steps

Production IMS
'Source'

Target IMS



1. Define target IMS databases if they do not exist
2. Database Selection
3. Compatibility Check
4. Stop Source and Target IMS databases
5. Data Set Copy Process
6. Start Source IMS databases
7. Update DBRC for Target Databases
8. Start Target Databases

Additional Features

- **Shared ISPF user interface**
  - Allows DBAs, System Programmers to setup environments and controls
  - Non-technical users can generate job steps to perform system cloning or tablespace and database refresh operations
- **Dynamically define new tablespace or databases**
  - DDL or IMS ACB, RECON, MDA copied from source
- **Fuzzy copy with log apply**
  - No outage to source tablespaces or databases
  - Target tablespaces and databases brought to a consistent state
- **Data masking**
  - Allows columns (DB2) or fields in a segment (IMS) to be scrambled
  - Performed during tablespace or database refresh

Futures

ICM Future: Intelligent Search for Cloning Support

```
Description . :

Search . . CLONING

  / System          Prompt    Description
- _ IMS
  - _ ICDQ
      _ DFSCGDQ1   *Edit
        _ IMSPLEX=PLDDQ,                    /* IMSPLEX NAME (CSLPLDDQ)
      ------------------------------------------------------------------
      _ DFSPBDQ1
        _ CSLG=DQ1,           CSL global member suffix (DFSCGxxx)
        _ SHAREDQ=DQ1,        Shared Msg Q PROCLIB member suffix (DFSSQx
        _ APPLID1=,           VTAM applid of active IMS system
        _ APPLID2=,           VTAM applid of XRF alternate system
        _ APPLID3=,           VTAM applid of RSR tracking system
        _ DBRCNM=ICDQDBRC,    DBRC procedure name in IMS proclib
        _ DLINM=ICDQDLIS,     DL/I PROCLIB member name
        _ PRDR=ICDQRDR,       IMSRDR PROCLIB member name
      ------------------------------------------------------------------
  - _ IDDQ
      _ DFSCGDQ1
        _ IMSPLEX=PLDDQ,
      ----------------------------
      _ DFSPBDQ1
        _ CSLG=DQ1,           CSL global member suffix (DFSCGxxx)
        _ SHAREDQ=DQ1,        Shared Msg Q PROCLIB member suffix (DFSSQx
        _ DBRCNM=IDDQDBRC,    DBRC procedure name in IMS proclib
        _ DLINM=IDDQDLIS,     DL/I PROCLIB member name
        _ PRDR=IDDQRDR,       IMSRDR PROCLIB member name
```

Shows all parameters that need to be changed in the cloned system

Helps clone CSL address spaces as well

Provisioning IMS Services

- **Create new IMS from a single UI**
  - One-time setup for new IMS System
    - Define parmlib members
      - IMS Connect, Shared Queues, CSL, DBRCNM, DLINM, PRDR, etc.
    - Create new IMS.JOBS members
    - Create new JES PROC members
  - SAF rules
  - Copy data with minimal impact to source environment
- **Create new application from a single UI**
  - Application components
    - Transactions, programs, databases, security
  - Copy, mask, subset data

Summary

- **IMS Configuration Manager provides a guided approach for:**
  - Creating an inventory of your environment
  - Identifying areas of improvement
  - Validating parameters
  - Introducing resource changes in a version-agnostic process
- **IMS Cloning Tool can provided quick, repeatable solutions for:**
  - Refreshing entire IMS environment
  - Refreshing or creating databases or applications
- **Good test management practices are:**
  - Difficult to implement
  - Difficult to maintain
  - Invaluable to companies

More Info:

- **IBM DB2 and IMS Tools website:**
  www.ibm.com/software/data/db2imstools/

- **James Martin:**
  james_martin@fundi.com.au

- **Ron Bisceglia:**
  RBisceglia@rocketsoftware.com

Thank You