



## Data Management Tools

# IMS Cloning Tool Smooths the IMS migration path!

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# Migrating to IMS 12?

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**Do you want to avoid surprises and delays in the upgrade process?**

**IBM's IMS Cloning tool can help by offering multiple levels of testing environments that can be created with minimum skilled resources, minimum time and no interruption to your production systems. Creating exact copies of production quickly for high quality testing reduces the risk of impacting critical applications during the migration process.**



# Agenda

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**Problems and Concerns**

**Test environments needed for success**

**Test environments created with IMS Cloning Tool**

**IMS Cloning Tool**

**Step by Step test environment creations**



# Problems and Concerns

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- **Upgrading to a new IMS version is a high impact effort.**
  - An issue could be visible system wide or company wide
- **Sandbox environments used to initially test IMS version release software is rarely kept in sync with production.**
  - This is due to resources issues of time, money, space, manpower, and availability of required skills.
- **There is only one Sandbox but many production IMS configurations.**
- **It is difficult to measure the impact or savings that implementing new features of the new IMS without a production like environment.**



# We Need an Exact Copy of Each Environment to Test

## ■ **The Apply Process**

- Applying the new release of IMS
- Applying Vendor and Home Grown software upgrades needed to support the new release
- Activating new functionality

## ■ **Application and Database testing**

- Systems with a history of having issues during an upgrade
- Business critical systems
- Testing new functionality

## ■ **New functionality**

- Load level testing
- Performance statistics to push out new functionality



# Test Environments Created with IMS Cloning Tool

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- **IMS System Skeleton clone**
  - Clones an IMS system without cloning any data
  - Without requiring a system generation
  
- **IMS Database Refresh clone**
  - Refreshes specific databases
  
- **IMS Full System clone**
  - Clones a complete IMS system including all its databases
  - ***Less than 30 minutes average when using Fast Replication***



# IMS System Skeleton Clone

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## ■ IMS System Skeleton clone

- Clones an IMS system **without cloning any data**
- The replicated system is accessible and is usable in lieu of the original system **without requiring a system generation**
- Contains all of the database and application definitions
- Creates an IMS system to test the apply process



# IMS System Skeleton Clone

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## ■ The Apply Process

- Install prerequisite software and maintenance
  - Check your tools
  - Related products
- Apply coexistence Maintenance to other IMS systems
- Evaluate IMS Exit Routines
  - RECON I/O
  - Reassemble all exit routines which use IMS Macros (recommended)
- Install IMS 12
  - SMPE, CBPDO, ServerPac, or a Home Grown process





# IMS System Skeleton Clone

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## ■ The Apply Process cont.

- System Definition
  - Copy the GENDECKS for use with the cloned system
  - Edit your Stage 1 GENDECKS
- Upgrade your RECONS
- Run ACBGEN
- Review the cloned PROCLIB
- Can you bring your newly versioned IMS UP?
  - Are you missing any modules or exits?
  - Did your RECON upgrade correctly?
  - Did the Vendor and Home Grown software generate any errors?
  - Did you skip something?



# IMS System Skeleton Clone

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## ■ Activating New Functionality

- Dynamic Buffer Pools
- Dynamic Resource Definitions (DRD)
  - IMPORT..OPTION UPDATE
  - IMS Repository
- Member Online Change NAMEONLY Option
- Migration to Striping and Buffers in 64-bit Storage
- Extended Address Volume (EAV) for Non-VSAM Data Sets
- RECON - changing the MINVERS
- IMS 11 SPE User Exit Enhancements (APAR PM04456/PTF UK67199)
  - Now included in IMS 12



# IMS System Skeleton Clone

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- **Want to try something different?**
  - Change your apply process?
  - Test an existing configuration that is different?
  - Try a brand new configuration?
  - What is the impact of not upgrading a Vendor's software?
  - Need to manually clean up a RECON?
  
- **Just Re-Clone the System Skeleton and start over.**
  - No back out needed
  - One job
  - Repeatable
  - Automation cleans up between cloning cycles



# IMS System Skeleton Clone

## Plus IMS Database Refresh Clone

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### ■ **IMS Database Refresh clone**

- Refreshes specific databases
- The act of replicating the data, making the replica accessible, and then using the replica in lieu of the original data
- Copies by data set
- If you refresh into a System Skeleton Clone
  - All the database and application definitions will exist
  - All the ACB's, PSBs, and DBDs will exist
  - MDA and RECON will be conditioned



# IMS System Skeleton Clone

## Plus IMS Database Refresh Clone

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### ■ Application and Database Testing

- Run the IVP validation steps
- Test IMS Exit Routines
- Test Home Grown Exit Routines
- Test Security
- Test Systems that are vital to multiple applications
  - Common Table systems
- Test Systems with a history of having issues during past upgrades
- Test Business Critical systems



# IMS System Skeleton Clone Plus IMS Database Refresh Clone

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## ■ Test new functionality

- Full Function Databases
  - Dynamic Database Buffering
  - Extended Address Volume (EAV) for Non-VSAM Data Sets
- Fast Path (DEDB) Databases
  - Buffer Manager 64 bit Enhancements
  - Secondary Index Processing
- Further test your TM enhancements
- Test your system enhancements
  - Log Archiving for Non-Recoverable Databases
  - IMS 11 SPE User Exit Enhancements (APAR PM04456/PTF UK67199) \* Now included in IMS 12



# Full System Clone

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## ■ IMS Full System clone

- Clones a complete IMS system including all its databases
- The act of replicating the data, making the replica accessible, and then using the replica in lieu of the original data **without requiring a system generation**
- ***Less than 30 minutes average when using Fast Replication***



# Full System Clone

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- **Provides Exact Copy of a Production Environment**
  - Performance testing before and after upgrade
  - A complete dry run of the installation Process
  - All Vendor Software
  - All Home Grown Custom Software
  - Complete Application testing
  - Complete new function tests
  - This may be your only option to fix some bugs





# Full System Clone

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## ■ Load testing and performance testing

- zAAP/zIIP Accounting Log Records
  - Distinguish between CP (Central Processor) and zAAP/zIIP times
- Logging Enhancements
  - Striping – improved logging throughput
  - Moved above 2 GB boundaries – ECSA saves
- Fast Path (DEBD) databases
  - 64 Bit manager enhancements
  - Dynamic Pool compression
  - Use of secondary Indexes for processing
- CPU usage and through put improvements
  - QCF (Queue Control Facility)
  - IMS Performance Analyzer



# Advantages of Cloning Tool Created Environments

- **It creates an Exact Copy**
  - Avoid surprises
- **Fast**
  - No interruptions to your production
  - *Less than 30 minutes average for a full clone when using Fast Replication*
- **Easily Repeatable**
  - One Batch Job
  - Automation includes clean up features between cloning cycles
- **Flexible**
  - Easily controlled - parameter and command driven
- **Disposable**
  - If anything fails or you want to try something different just re-clone the environment



# IMS Cloning Tool

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## ■ Unique Features of IMS Cloning Tool

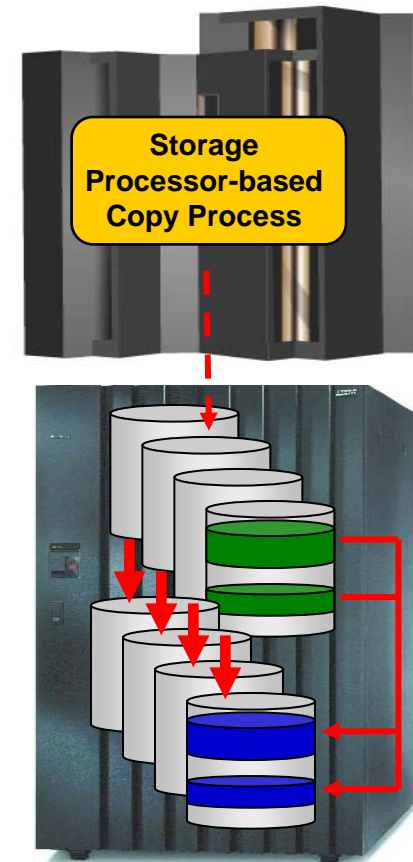
- Leverages Storage-based Fast Replication facilities to clone data
- Performs rapid volume reconditioning and data set renaming on cloned system volumes to solve the data access challenges
- Adjusts target IMS to accommodate and accept the cloned data



# IMS Cloning Tool

## What is Storage-based Fast Replication?

- An **instant** copy of a volume/data set at a specific point in time
  - Builds a bitmap to describe the source volume
  - After the bitmap has been created, the source and target volume data can be used immediately
- **Data movement (CPU and I/O) offloaded to storage processor**
  - Frees up resources on host processor
  - No host CPU or I/O costs
- **Consistency Groups**
  - Group of volumes copied at exactly the same point in time while maintaining the order of dependent writes



# IMS Cloning Tool

## Fast Replication Data Copy Options

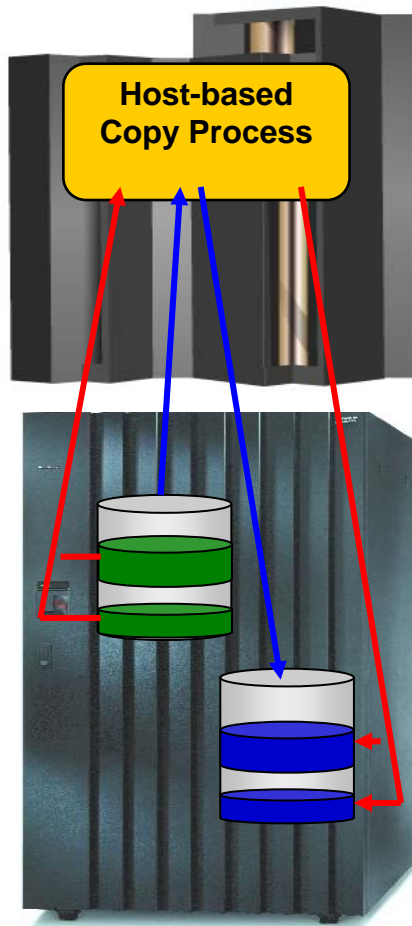
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- **Volume based fast replication options for IMS system cloning**
  - FlashCopy (IBM,EMC,HDS)
  - SnapShot (IBM,STK)
  - TimeFinder/Clone Volume Snap or Snap (EMC)
  - Mirror processes
    - PPRC (IBM,EMC,HDS)
    - TimeFinder/Mirror, SRDF (EMC)
    - ShadowImage HUR (HDS)
- **Data set based fast replication options for IMS database refresh**
  - Data Set FlashCopy (IBM,EMC,HDS)
  - Data set SnapShot (IBM,STK)
  - TimeFinder/Clone Data set Snap (EMC)



# IMS Cloning Tool

## Do I have to Use Storage-based Fast Replication?



- **IMS Cloning Tool works with Host-based copy options**

- Consider the availability requirements of the source system
- Consider the amount of data being copied

# IMS Cloning Tool - Challenges to Data Access on the Same or Shared LPAR

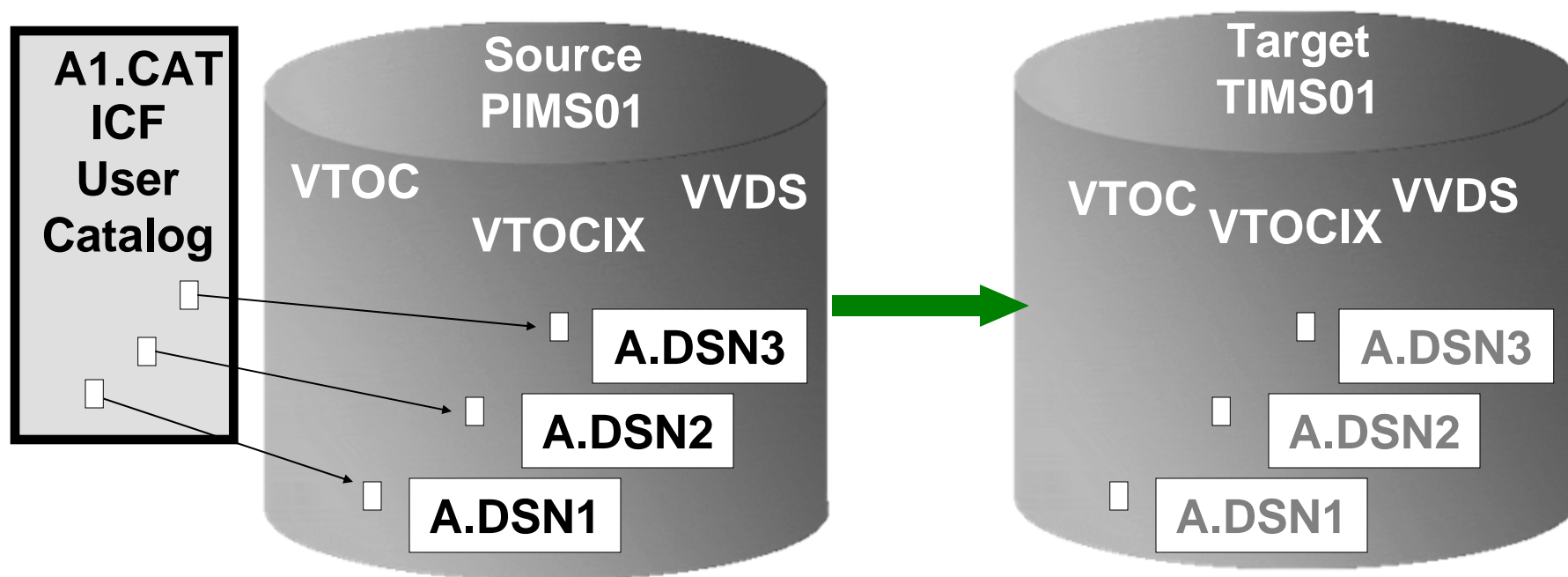
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- **IMS system cloning is best done using volume replication**
- **Volume data is replicated fast and easy but...**
  - How do you access the cloned data?
- **Inherent Problems:**
  - VOLSERS may have the same volume names as the source
  - Volume VTOC, VTOCIX and VVDS would reference the source VOLSERS
  - Data set names are the same on source and target volumes



# IMS Cloning Tool - Challenges to Data Access

## Data Set Name and Cataloging Issues



1. Data sets on the volume are copied, but keep their original name
2. 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





# IMS Cloning Tool - Provides Data Access On the Same or Shared LPAR

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## ■ Solution

- IMS Cloning Tool performs rapid volume reconditioning and data set renaming on cloned system volumes to solve the data access challenges
- Provides access to data sets on target volumes
  - Renames the VTOC, VTOCIX, and VVDS to match the target volume
  - Renames and catalogs all data sets to a new HLQ
  - Adjusts target IMS system to accommodate and accept the cloned data
- Solution to enable the use of the data sets on the target volumes on the same image
  - No more complicated cloning
  - No more requirement for a separate image



# Adjusts Target IMS To Accommodate and Accept the Cloned Data

- **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
- **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 (MVS Dynamic Allocation) members for databases or system data sets, are updated to reflect the new data set names. Updates include:**
  - The RECON data sets
  - Online Log data sets (OLDS)
  - Write-ahead data sets (WADS)
- **If IMS data sharing is involved, each additional IMS data sharing member is updated**



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# Step by Step Creation of Test Environments Using IMS Cloning Tool



# Cloning IMS System Skeleton

## Test New Releases of IMS

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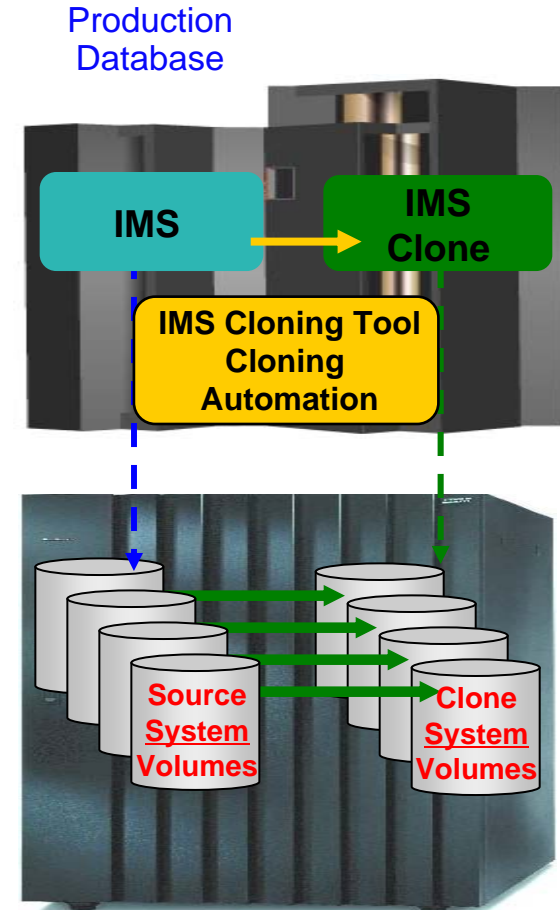
- **Quickly create an IMS Skeleton (system only, no data) for sandbox testing**
  - IMS Cloning Tool for fast creation of IMS system skeleton
  - Apply IMS 12
  - Start your newly upgraded IMS
- **Copy applications that were problematic in the past into the skeleton environment and test**
- **Copy critical applications into the skeleton environment and test**
- **Test IMS 12 new features – example the new Fast Path Secondary index functions**
- **Load vendor products / home grown software and test**
- **Exact copy of production testing**
- **Load testing and performance testing**
- **Easily and quickly repeat clone of skeleton as you roll out the new version of software to environments with different configurations**
  - Prevents environmental issues not found in the original testing.



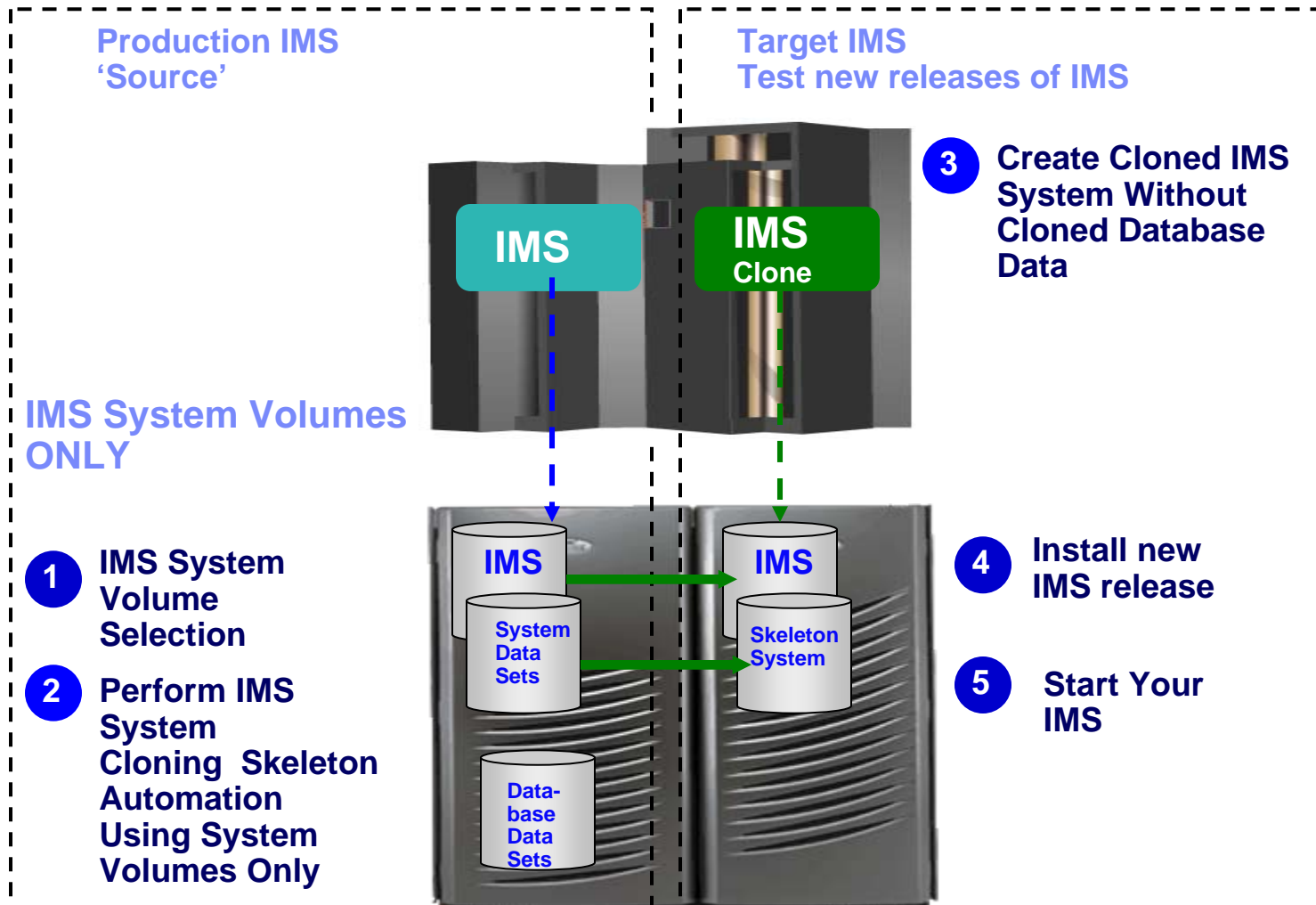
# Clone IMS Systems Using IMS Cloning Tool

## IMS System Skeleton Cloning (**Databases not included**)

- **Performs IMS system skeleton cloning automation**
  - System, no databases
  - Takes an existing IMS system (complete installation and system generation process completed) and creates a new, or cloned, IMS system from it without having to repeat the entire installation and system generation processes
  - Simplifies IMS cloning processes
  - Reduces cloning time and administration costs
- **Leverages fast replication facilities to clone data**
- **Performs rapid volume reconditioning and data set renaming on cloned system 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 IMS to accommodate and accept the cloned data**
  - IMS RECONS, PROCLIB, JOBS, JCL, MDA members



# Create an IMS Cloned System Skeleton



# Cloning IMS System Skeleton

## Test New Releases of IMS

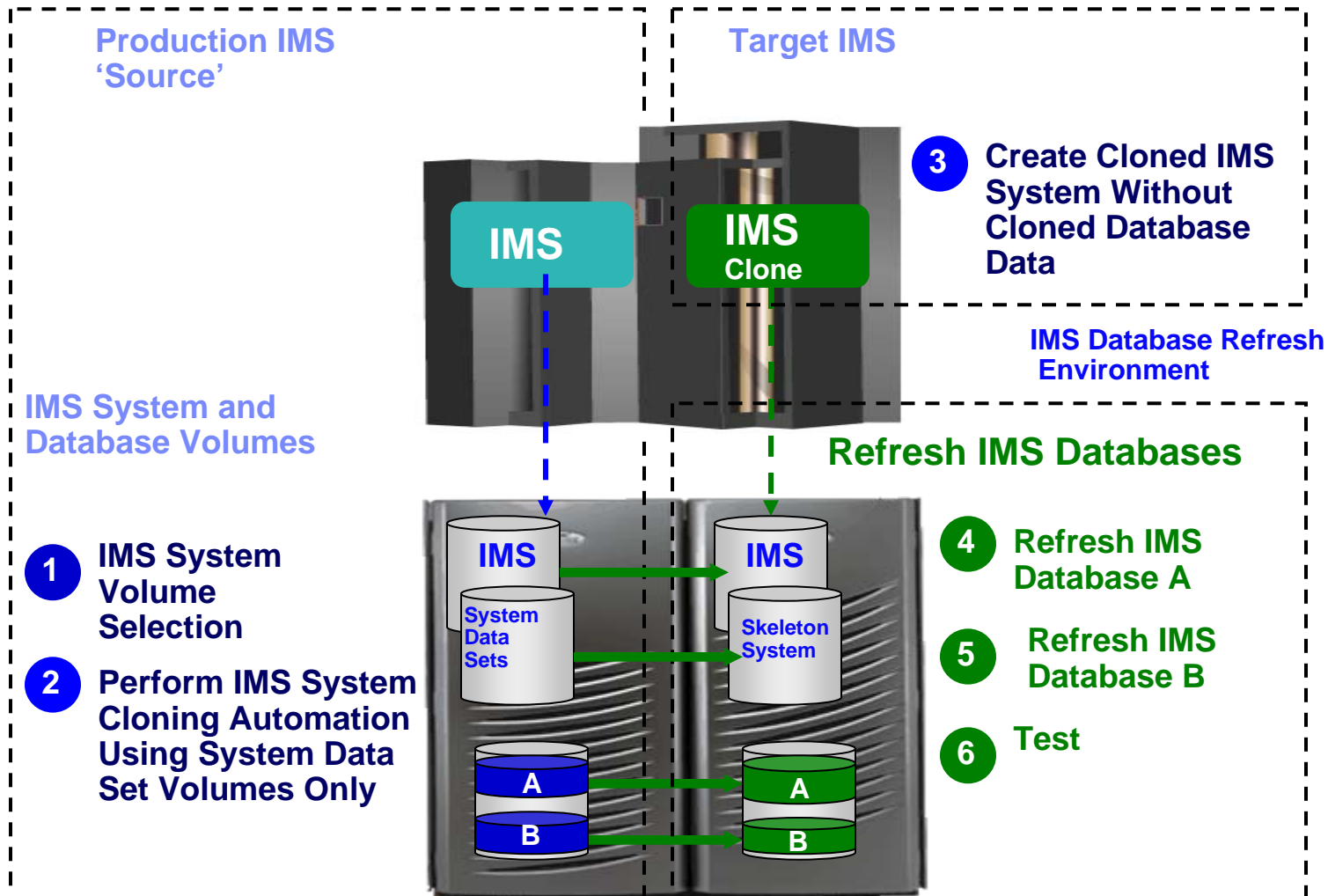
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- **Quickly create an IMS Skeleton (system only, no data) for sandbox testing**
  - IMS Cloning Tool fast creation of IMS system skeleton
  - Apply IMS 12
  - Start your newly upgraded IMS
- **Copy applications that were problematic in the past into the skeleton environment and test**
- **Copy critical applications into the skeleton environment and test**
- **Test IMS 12 new features – example the new Fast Path Secondary index functions**
- **Load vendor products / home grown software and test**
- **Exact copy of production testing**
- **Load testing and performance testing**
- **Easily and quickly repeat clone of skeleton as you roll out the new version of software to environments with different configurations**
  - Prevents environmental issues not found in the original testing.



# IMS Cloned System Skeleton

## Copy Databases for Application Testing

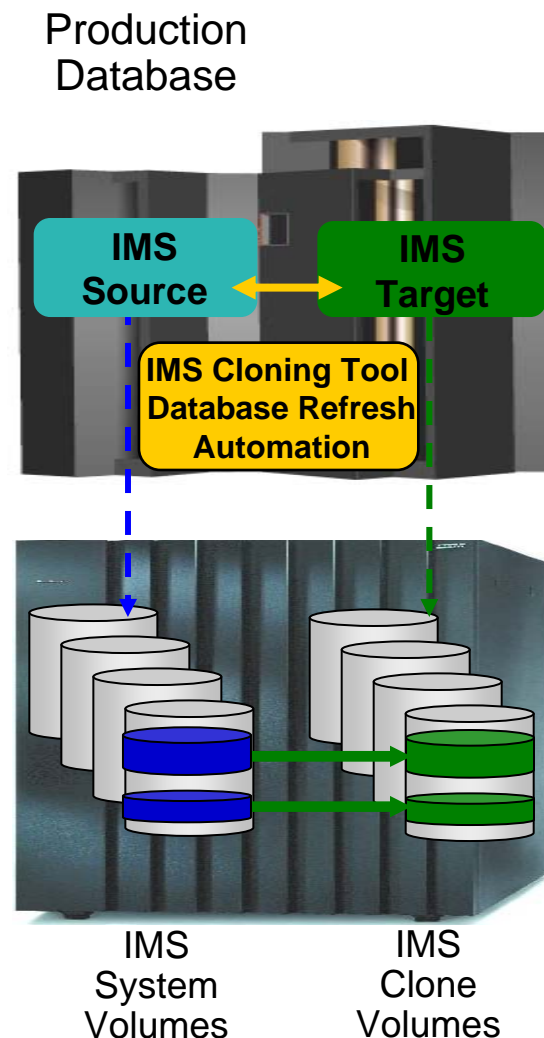




# Refresh IMS Databases Using IMS Cloning Tool

## Database Refresh Automation

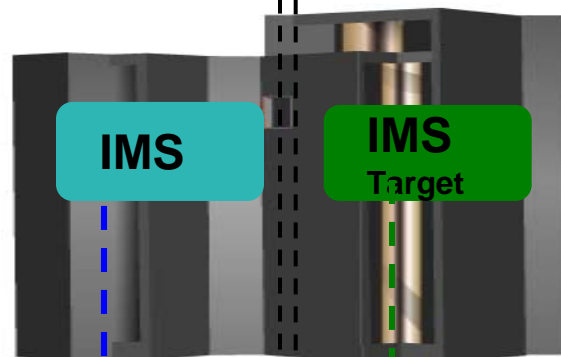
- **Performs automated IMS database refresh operations**
  - Fast refresh of IMS databases
  - IMS DB support (FF, HALDB, DEDB)
- **Verifies source and target database compatibility**
- **IMS data copied using storage-based data set fast-replication**
  - Target takes up the same amount of space as the source
- **Performs target system meta-data management**
  - Updates DBRC information for target databases



# Refresh IMS Databases Using IMS Cloning Tool

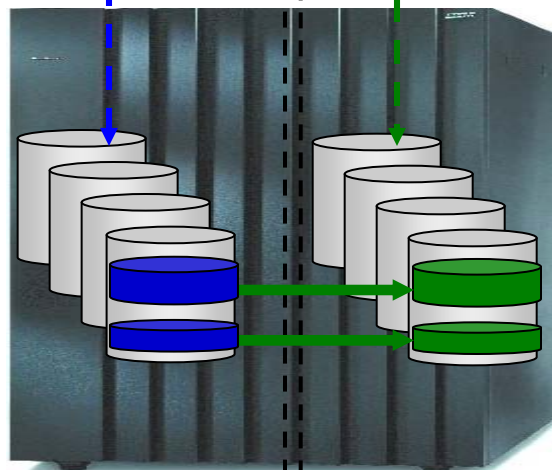
Production IMS  
'Source'

Target IMS



## Source Job

- 2 Database Selection
- 3 Compatibility Check
- 4 Stop Source and Target IMS databases
- 5 Data Set Copy Process
- 6 Start Source IMS databases



- 1 Create target IMS databases if they do not exist

## Target Job

- 7 Update DBRC for Target Databases
- 8 Start Target Databases

# Cloning IMS System Skeleton

## Test New Releases of IMS

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- **Quickly create an IMS Skeleton (system only, no data) for sandbox testing**
  - IMS Cloning Tool fast creation of IMS system skeleton
  - Install IMS V12
  - Run IVP testing
- **Copy applications that were problematic in the past into the skeleton environment and test**
- **Copy critical applications into the skeleton environment and test**
- **Test IMS 12 new features – example the new Fast Path Secondary index functions**
- **Load vendor products / home grown software and test**
- **Exact copy of production testing**
- **Load testing and performance testing**
- **Easily and quickly repeat clone of skeleton as you roll out the new version of software to environments with different configurations**
  - Prevents environmental issues not found in the original testing.



# IMS System Cloning Automation

## When a Full System Clone is Needed (Databases Included)

- **Performs IMS system cloning automation**

- Takes an existing IMS system (complete installation and system generation process completed) and creates a new, or cloned, IMS system from it without having to repeat the entire installation and system generation processes
- Simplifies IMS cloning processes
- Reduces cloning time and administration costs

- **Leverages fast replication facilities to clone data**

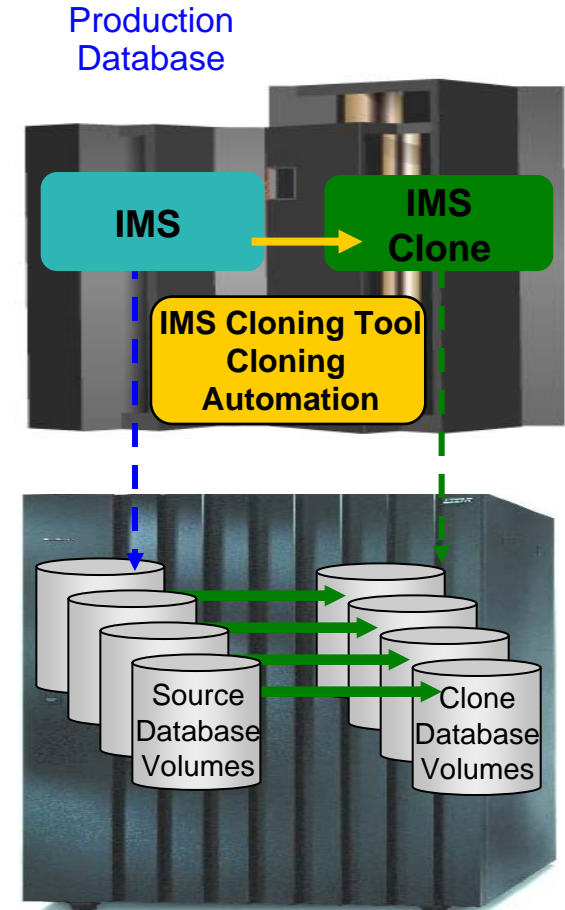
- Data can be cloned while online or offline

- **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 IMS to accommodate and accept the cloned data**

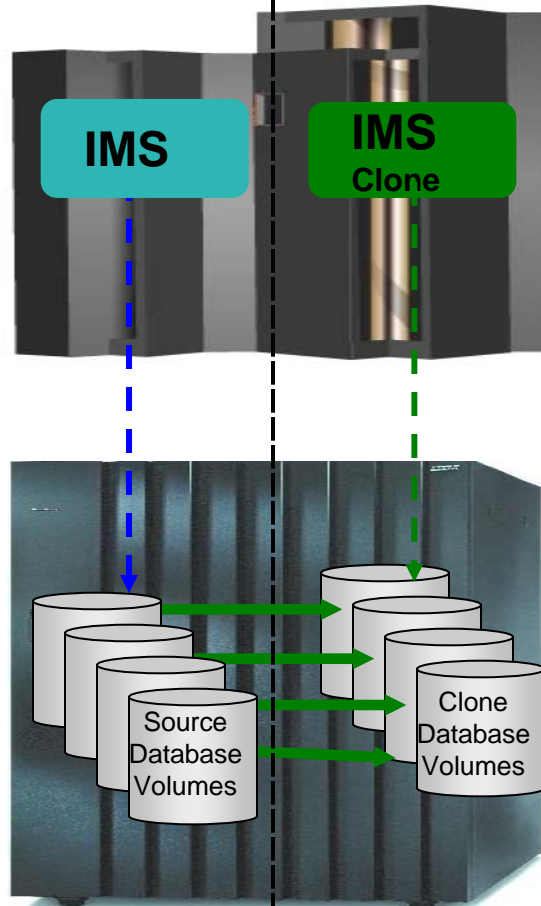
- IMS RECONS, PROCLIB, JOBS, JCL, MDA members



# IMS System Cloning Steps

Production IMS  
'Source'

Target IMS



- 1 IMS volume selection
- 2 A. Log Suspend  
B. Consistency Group
- 3 Volume copy
- 4 Log Resume if 2A

- 5 Volume Recondition
- 6 Data set rename
- 7 Update cloned IMS systems data
- 8 Start cloned IMS
- 9 Upgrade IMS

# IMS Cloning Tool Benefits

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- **IMS Cloning Tool simplifies and automates database administration tasks**
  - Integrates and coordinates database and storage activities
- **Promote high availability solutions**
  - IMS Cloning Tool clones IMS systems fast and effectively
  - IMS Cloning Tool provides fast and effective refresh operations
- **Integrates storage-based fast replication**
  - Provides fast and non-intrusive cloning operations
- **Offloads copy to the storage processor**
  - Reduces host CPU and I/O resource utilization



# IMS Cloning Tool Smooths Your Migration Path

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- **Create exact copies of production environments for the highest quality testing**
- **IMS System Skeleton clone**
  - Test your apply process
  - Test activating new functionality
- **IMS Database Refresh clone**
  - Buffering and Logging enhancements
  - Focused testing on problematic or critical business applications
- **IMS Full System clone**
  - Gather performance metrics and load testing

***Less than 30 minutes average when using Fast Replication***

- **The process will be easy, flexible and repeatable!**



Thank  
YOU

