

## IMS Tools Red Note

# Using IMS Cloning Tool to Help Migrate to New Releases of IMS



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# 1 Executive Summary

IMS is the preferred database management system for many enterprise applications that require high performance and high availability. These critical applications depend on IMS databases that respond quickly and are always available. Migrating to a new release of IMS is required to stay current with technology, but how can you reduce your risk of impacting these critical applications during the migration process.

Testing with an exact clone of production IMS can reduce this risk, and can help your organization smooth the migration path. However, because cloning usually requires downtime and is a lengthy, resource-intensive and manual process, production data is not refreshed often.

IBM IMS Cloning Tool automates, simplifies, and speeds up the cloning process without affecting production IMS application performance or availability. IMS Cloning Tool can create an exact clone of your production IMS system and its databases quickly and easily to ensure that testing is performed using current data - thus lowering your risk of affecting sensitive IMS business applications when you go live.

IMS Cloning Tool also provides automation to refresh individual databases when that is all that is required.

It can use storage-based fast-replication to copy data fast and effectively while preserving host CPU and I/O resources.

# 2 Cloning IMS Systems

IMS Cloning Tool is the foundation for cloning production IMS systems and its databases. It provides automation to clone IMS data and to perform meta-data management functions, allowing the data to be used by a cloned IMS system on the same or another shared disk System z logical partition (LPAR). It supports both data sharing and non-data sharing IMS environments.

IMS Cloning Tool leverages storage-based fast-replication to copy the IMS data. Fast-replication allows database data to be replicated instantaneously reducing copy time. The copy is offloaded to the storage processor saving host CPU and I/O resources.

IMS Cloning Tool provides the automation required to use the replicated data in a target IMS system. It performs volume reconditioning and data set renaming operations to allow the replicated data to be used by a cloned IMS system on the same or another shared disk LPAR.



Figure 1 depicts the processing steps that IMS Cloning Tool uses to clone an IMS system and its databases. The steps shown in blue are performed on the production IMS system; steps shown in green are performed on the cloned data.

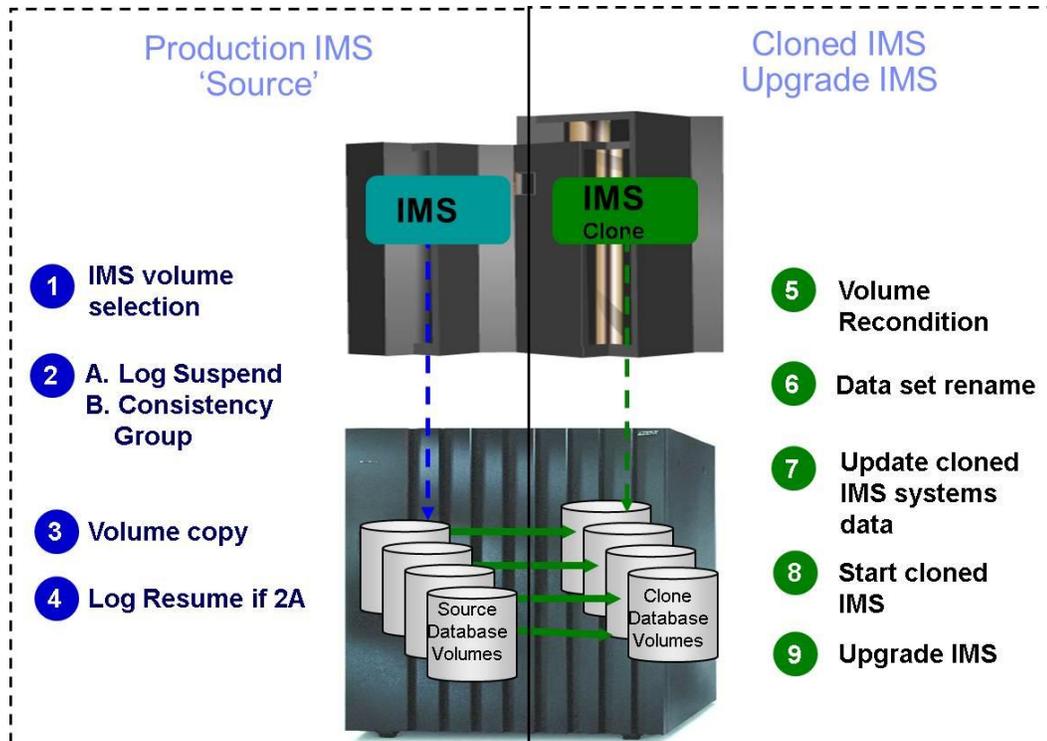


Figure 1 IMS Cloning Tool Processing Steps Used to Clone an IMS System

1. The storage volumes that make up the production IMS system and associated databases are identified by using specific VOLSER IDs, VOLSER masks, or SMS storage groups.
2. To achieve data consistency while IMS is up, there are two options:
  - a. Option 1, IMS Cloning Tool internally suspends the IMS log updates for the milliseconds it takes to perform the copy. This process is called, "IMS SUSPEND" and ensures all production volume data is consistent.
  - b. Option 2, uses storage-based consistency function whereby all the volumes in a consistency group are frozen at the same time for the milliseconds it takes to perform the copy.
3. IMS Cloning Tool invokes DFSMSdss Copy to issue IBM FlashCopy or SnapShot commands to copy the data and backup up the ICF catalogs that point to the data sets on the volumes being copied. When cloning IMS systems that reside on EMC storage, an appropriate storage-based fast-replication process is performed before the IMS Cloning Tool cloning automation is invoked, and a list of copied storage volumes is passed to IMS Cloning Tool for use in later processing steps.



4. If option 2A were selected above, IMS Cloning Tool internally resumes the IMS log updates immediately after the copy is performed (which takes seconds or less). This process is called, “IMS RESUME”.
5. If the target volumes are not already online, the volume internal identifier of each target volume is re-labeled so they can be brought online to the same z/OS system, or a different z/OS system, without volume label conflicts.
6. The target volumes VTOC and VVDS are renamed to match the target VOLSER names. The data sets on the cloned volumes are renamed and re-cataloged to a new high level qualifier. Data sets are renamed to eliminate duplicate data set names from a z/OS catalog perspective and to allow the new data set names to be integrated into the cloned IMS system. The cloned and renamed IMS data sets can then be used on the same LPAR, integrated into a different IMS system using the new data set names.
7. The cloned IMS system is updated to reflect the new data set names, VOLSERS, IMSID, etc. The cloned IMS system updates include:
  - a. RECON 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.
  - b. Optionally, the following RECON records are updated: image copy records, change accumulation records, System Log Data Set (SLDS) records, and Recovery Log Data Set (RLDS) records if they were on volumes that were cloned.
  - c. IMS.PROCLIB, IMS.JOBS, and user JCL library members are updated with the new values for IMSID, VOLSERS, and data set names.
  - d. MDA (MVS Dynamic Allocation) members for databases or system data sets, such as the RECON, Online Log Data Sets (OLDS), or Write-Ahead Data Sets (WADS) are updated to reflect the new data set names.
  - e. If IMS data sharing is involved, each additional IMS data sharing member is updated.
8. The cloned IMS system is started and made available to users.
9. Upgrade the cloned IMS system to the new IMS release you wish to test with. If any IMS issues are uncovered due to the upgrade, simply correct the errors during business hours, without fear of an emergency back off at some early morning hour. Apply any necessary IMS release patches and continue testing. Migrate the new release of IMS to your production IMS with confidence!



### 3 Refreshing IMS Databases

When testing a new release of IMS, a full clone may not be required each time. IMS Cloning Tool also provides the ability to refresh specific IMS databases from a production IMS system. Having the ability to refresh specific databases from a production IMS system can save time and resources over having to clone a complete IMS system.

IMS Cloning Tool provides facilities to refresh databases within or across IMS systems. The target IMS database definition must exist on the target IMS system before databases can be refreshed. IMS Cloning Tool assures the compatibility of the database definitions on the source and target IMS systems prior to initiating the data replication process. IMS Cloning Tool can refresh IMS databases while they are stopped or while they are running to create fuzzy copies.

IMS Cloning Tool can use storage-based data set level fast-replication to replicate production IMS data to a target IMS system. Production IMS data set names are changed on the refreshed copy during the data set fast-replication process to associate them to a target IMS system. Target IMS meta-data is updated to reflect the refreshed databases. Refreshing IMS databases using storage-based fast-replication takes only seconds to replicate the data and less than a minute to complete the database refresh process.

Figure 2 depicts the steps IMS Cloning Tool uses to refresh databases from a production IMS system to an IMS application environment.

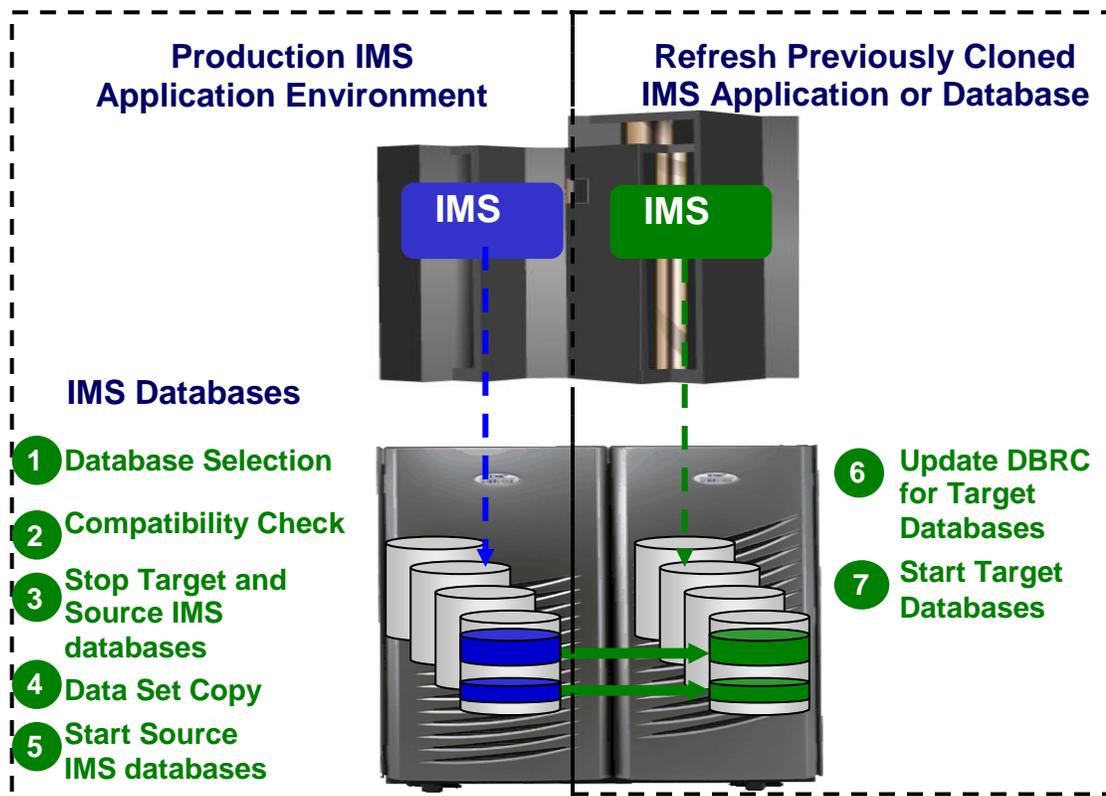


Figure 2 IMS Cloning Tool Processing Steps to Refresh an IMS Database.



1. The databases to be refreshed are selected on the source IMS system by database name or database mask. IMS Cloning Tool determines all indexes associated with the databases to be refreshed and it determines all associated data set names for the specified databases.
2. Checks are performed to ensure that the characteristics of the source and target IMS databases are compatible. Some characteristics that are checked include database type, access method, number of segments, data set groups, blocksize, randomizer parameters, number of partitions, partition selection routine, and KEYSTRNG.
3. An IMS DBR command is issued to stop the selected target databases and indexes, then the source databases and indexes to create a consistency point for the source databases. Optionally, the source objects can be copied while they are running to create a fuzzy copy. Care must be taken when using the fuzzy copy option as transactional integrity is not guaranteed on the cloned copy.
4. Data sets representing the databases to be refreshed are copied. For IMS systems using FlashCopy or SnapShot, IMS Cloning Tool will invoke these data set copy facilities from the IMS Cloning Tool process. For IMS systems using EMC TimeFinder or any other copy mechanism, IMS Cloning Tool optionally produces files identifying the source and target data sets so that users can create their own data set fast-replication job streams.
5. The source IMS databases are started, unless a fuzzy copy was specified in step three.
6. If the databases are registered to Database Recovery Control (DBRC), IMS Cloning Tool updates the target IMS RECONS to prevent invalid recovery processes and sets the image copy recommended flag on for the refreshed databases and indexes. For HALDBs IMS Cloning Tool will update the partition and reorg numbers to match the source databases.
7. Target IMS databases are started and made available.

## 4 Summary

Testing new IMS releases with an exact clone of production IMS can help your organization smooth the IMS migration path and reduce your risk of impacting critical applications.

IMS Cloning Tool can create an exact clone of your production IMS fast and effectively. Testing IMS migrations using current data lowers the risk of affecting sensitive IMS business applications when you go live.



## 5 Resources

Visit IMS Cloning Tool on the web:

<http://www-01.ibm.com/software/data/db2imstools/imstools/ims-cloning-tool-zos/>

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