Highlights

- Create consistent copies of IMS databases without impacting application availability

- Automate the process of creating and refreshing IMS test systems

- Supports Storage-Aware Fast Replication including IBM FlashCopy, EMC TimeFinder Clone, and Hitachi Flash-Copy Emulation

- Supports Coordinated IMS and DB2 Cloning with the DB2 Cloning Tool (5655-N15)

- Mask sensitive data when refreshing IMS and DB2 databases

- Program Number: 5655-U91

IMS Cloning Tool

Clone full IMS Subsystems and Refresh IMS Database Data

IMS™ is IBM's premier transaction and hierarchical database management system. IMS was designed for high availability, superior performance, growth and capacity, and full database integrity. The ability to operate and manage this highly complex IMS system and database environment determines the Total Cost of Operation (TCO). The IBM® IMS Tools lowers TCO by equipping IMS system programmers and IMS database administrators (DBAs) with the facilities they need to effectively monitor and manage this mission-critical environment. The IBM IMS Tools provide automation, validation, and auditing of all database and transaction management activities.

The *IMS Cloning Tool* automates the process of cloning entire IMS subsystems or individual databases without affecting IMS application performance or availability. The *IMS Cloning Tool* allows cloned IMS systems to be used on multiple shared disk LPARs. The tool leverages Storage-Aware Fast Replication technology to copy full IMS systems and IMS data. The replication is nearly instantaneous, reducing copy time, and saving host-CPU and I/O resources by offloading the copy process from the Host to the Storage processors. The *IMS Cloning Tool* can work with the *DB2 Cloning Tool (5655-N15)* to support Coordinated IMS and DB2 Cloning allowing IMS and DB2 data to be consistent to a specific point in time.

IMS Cloning Tool

The *IMS Cloning Tool* simplifies the process of creating IMS test environments and refreshing database systems. The tool can clone a full IMS subsystem or a full IMS datasharing environment. It can also clone an IMS system without cloning any of the IMS databases.

For business critical applications, test environments are mandatory to reduce development time and improve application reliability. Generally, it takes multiple skilled resources to create a test environment including IMS System Programmers, IMS Database Administrators, IMS Application Programmers, and IMS Quality Assurance Engineers.

Figure 1: IMS Cloning Tool Full System Copy

Complex IMS applications need production data to ensure correctness before changes are rolled out to the production system. In many cases, the test data must be masked to protect personal and sensitive data and to meet regulatory requirements. The IMS Cloning Tool meets all of these requirements and reduces the time and skills required to create clones of production environments for testing.

Cloning IMS Systems and Databases

The *IMS Cloning Tool* product reduces the time needed to create IMS test systems with real production data. The replicated IMS system is immediately available without having to perform an IMS system generation. The cloning process includes volume reconditioning and dataset renaming to resolve data access issues on the target volumes as shown in Figure 1.
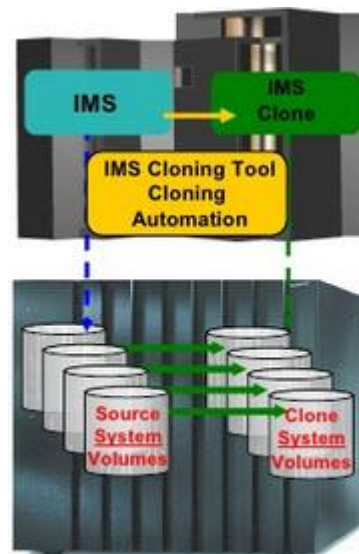
Automated Volume Reconditioning

For volume reconditioning, the *IMS Cloning Tool* ensures the target volumes have different volume serial (VOLSER) numbers and external labels from the source volumes. The tool renames the Volume Table of Contents (VTOC), the VTOC Index (VTOCIX), and the VSAM Volume Data Set (VVDS) to match the cloned target volumes. It also renames and catalogs all of the cloned data sets using a new High Level Qualifier (HLQ).

IMS System Reconditioning

From an IMS application standpoint, the IMS Cloning Tool adjusts the IMS target system to accept the cloned data. There are many IMS system components that require knowledge of specific data set names. In an IMS datasharing environment, the *IMS Cloning Tool* ensures that each sharing member is updated accordingly.

The DBRC RECON data set must be reconditioned using the target system data set names, new subsystem ID's, and new VOLSERs. This is especially true for the image copies, Change Acumulation data sets, archived logs (SLDS and RLDS) that are tracked in the DBRC RECON data set.

The IMS PROCLIB members that will be used for the cloned IMS system must reflect the cloned data set names, volumes, and IMS IDs. The *IMS Cloning Tool* modifies all of these members and JCL execution jobs automatically to ensure they point to the correct target IMS system.

The Dynamic Allocation (MDA) member must also change to reflect the new target system data set names for the DBRC RECON data set, the Online Log Data Set (OLDS), and the Write-Ahead Data Set (WADS) to ensure the cloned IMS system is pointing to the correct data sets.

Refreshing IMS Databases

Once an IMS system is cloned to the target system, the databases can be updated as shown in Figure 2. A major database upgrade or change to the IMS system parameters is often a good reason to refresh a test environment with new database data.

The *IMS Cloning Tool* supports Full Function, HALDB, and IMS Fast Path DEDB databases. In fact, a fresh database can be very useful when migrating Full Function databases to High Available Large Database (HALDB) databases. The *IMS Cloning Tool* updates the DBRC RECON, the Primary and Secondary Indexes, and the Indirect List Data Set (ILDS) for HALDB databases.
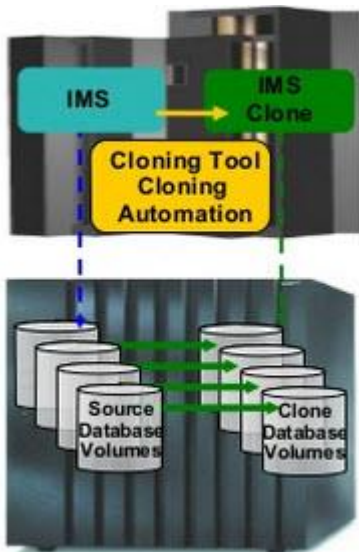
Figure 2: IMS Cloning Tool Database Refresh

"Non-Fuzzy" and "Fuzzy with Log Apply" Refresh

An IMS database refresh can be "Non-Fuzzy" or "Fuzzy with Log Apply". A "Non-Fuzzy" refresh requires the database be taken offline or made Read-Only to ensure transaction consistency. Using the IMS Database Quiesce command that was introduced in IMS V11, a "Non-Fuzzy" copy can be created after IMS internally quiesces transactions updating the specific databases

involved in the database refresh. The IMS Cloning Tool drives the IMS Database Quiesce command if the function is available in the IMS environment. A "Fuzzy" refresh is created while the databases are still online. After the refresh is performed, all updates in the log data sets are applied to the refreshed target databases and indexes until they reach a state of transaction consistency as determined by the *IMS Cloning Tool*.

Coordinated IMS and DB2 Cloning

The *IMS Cloning Tool* works seamlessly with the *DB2 Cloning Tool* to create Coordinated IMS and DB2 Cloned System and Database replicas. After volume conditioning, the *DB2 Recovery Expert* conditions the DB2 Catalog, the Boot Strap Data Set (BSDS), and the active and archived log data sets for the target system. The process is shown in Figure 3.
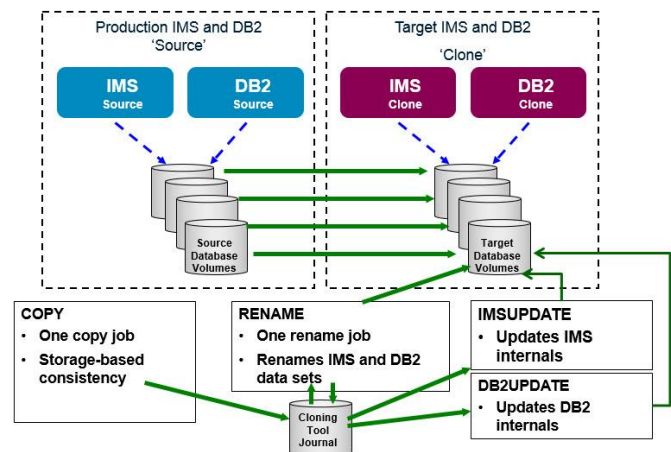

Figure 3: Coordinated IMS and DB2 Clone Replication

Masking Sensitive and Private Data

The *IMS Cloning Tool* and *DB2 Cloning Tool* both provide the ability to mask sensitive or private data. There are no restrictions on what data can be masked. For instance, compressed segments, key fields, and logically-related segments are all capable of being masked. When masking is used, the data is unloaded to a temporary data set, decompressed if necessary, masked, and then reloaded into the target databases. This process ensures that production data is unavailable for only a small fraction of time.

There are many data masking rules available to the user to ensure maximum data obscurity. The tools can use static transformations, pattern matching, random substitutions, and even a user-defined implementation enacted through a user exit, to mask the database data. The tools can also alter date and time information.

Alternatively, the *IMS Cloning Tool* and *DB2 Cloning Tool* work seamlessly with the *IBM Optim* products allowing the scrubbing and masking to occur outside the control of the cloning tools as shown in Figure 4.
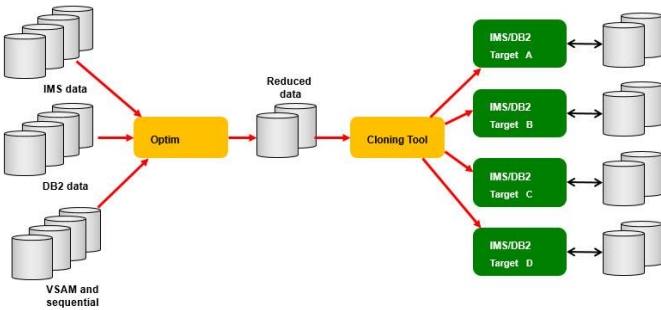

Figure 4: IMS Cloning Tool with IBM Optim Masking

Figure 7: IMS Cloning Tool Database Refresh IISPF Screen

IMS and DB2 Shared ISPF Interface

The *IMS Cloning Tool* and *DB2 Cloning Tool* share an ISPF user interface which simplifies the cloning process tremendously. The home screen is shown in Figure 5, the screen to create the IMS system clone is shown in Figure 6, and the screen to refresh the IMS database data is shown in Figure 7.
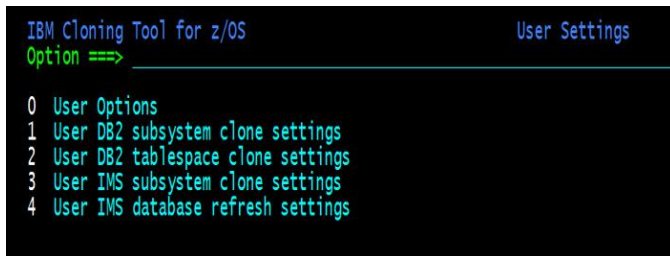
Figure 5: IMS and DB2 Cloning Tool ISPF Interface
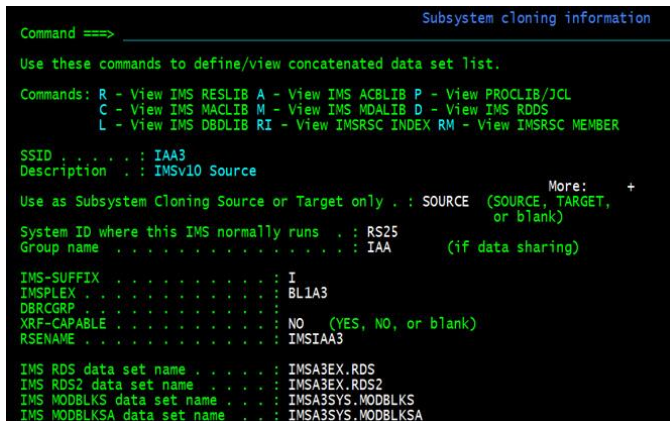
Figure 6: IMS Cloning Tool System Clone ISPF Screen

Storage-Aware Fast Replication

The *IMS Cloning Tool* supports storage-aware fast replication from IBM, EMC, and Hitachi. These storage processors perform data set and volume copying much faster than Host-based copy operations. The Host-based copy operation, as shown in Figure 8, uses the host CPU and I/O resources to manage the copy process. On the other hand, Fast Replication, also shown in Figure 8, uses the storage processor instead of the Host processor to perform the data set or volume copy operation and this provides a considerable savings toward the Total Cost of Operations (TCO).
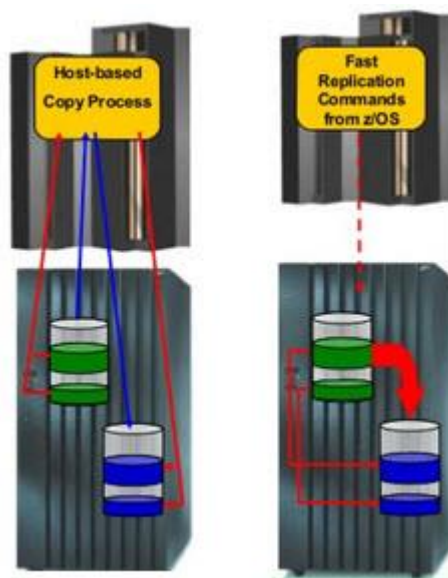

Figure 8: IMS Cloning Tool Host-Based Copy and Storage-Based Copy

With fast replication, the logical copy of the data is completed in just a few seconds, while the actual physical copy is performed in the background and it doesn't impact application availability. This distinguishes Fast Replication from Host-based replication. Since Fast Replication is data independent, it works equally when the clone is created for IMS and DB2 systems and databases. On average, an IMS or DB2 Clone of a production environment can be created and fully validated in under 30 minutes.

For more information

To learn more about the IBM IMS Tools product line, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/software/data/db2imstools/products/ims-tools.html