



VCR and FTR

Simplify and automate DB2 for z/OS system cloning and data refresh operations while minimizing DB2 down time. Fast and effective DB2 system clones and data refresh operations while using less CPU and I/O resources.

Mainstar Volume Clone and Rename (VCR) and its selectable feature Fast Table Space Refresh for DB2 (FTR) are storage-aware DB2 system cloning and data refresh solutions that use storage processor fast-replication facilities to clone DB2 systems and refresh table and index space data fast and effectively. VCR and FTR simplify, automate, and speed up DB2 system cloning and data refresh operations. VCR and FTR use less CPU, I/O, and storage resources than traditional methods while maintaining high availability of production data. VCR can also clone non-DB2 data.

VCR and FTR simplify and automate the storage management functions for DBAs so they can leverage storage-based fast-replication without having to create or use storage specific commands, scripts, or JCL. VCR and FTR provide simulation capability to perform all of the normal functions except the actual initiation of the copies, so DBAs can see the results before actually running the clone or refresh operation.

VCR facilitates DB2 system clone operations. It reduces downtime by leveraging storage-based fast-replication to copy DB2 systems in seconds. VCR re-labels the target volume identifiers so they can be brought online to the same, or to a shared z/OS system without volume label conflicts. The data sets on the cloned volumes are renamed and re-cataloged to a new high level qualifier to eliminate duplicate data set names from a z/OS catalog perspective. VCR DB2 system cloning automation updates the cloned DB2 meta-data with the new data set names and volsers so they can be integrated into the cloned DB2 system. VCR provides support for complex applications like SAP and PeopleSoft where all of the application's data must be copied as a unit to create a cloned DB2 system.

VCR's selectable feature, FTR, facilitates DB2 table and index space refresh operations. FTR can be used to refresh precisely what is needed when a full DB2 system clone is not required. It performs DB2 table and index space refresh operations using storage-based fast replication facilities to copy DB2 data sets in seconds. It validates table space compatibility and performs automatic object ID translation from source to target. FTR can copy table and index spaces within the same DB2 system or to a different DB2 system.

Storage-aware Data Management Solutions

VCR and FTR are storage-aware DB2 system cloning and data refresh solutions. They use storage-based fast-replication facilities to clone DB2 systems and refresh table and index space data fast while maintaining high availability of production data. VCR performs DB2 system cloning operations by invoking appropriate volume-based fast-replication facilities in the storage system through DFSMSdss or by invoking appropriate storage processor APIs. FTR performs DB2 table and index space refreshes by invoking appropriate data set fast-replication facilities in the storage system through DFSMSdss or appropriate storage processor APIs. Leveraging storage-based fast-replication to copy data significantly reduces host CPU and I/O utilization costs and allows CPU upgrades to be deferred.

Copy Blades

Copy blades provide storage processor integration and extensibility to support heterogeneous storage platforms and fast-replication features. VCR and FTR support IBM, EMC, and HDS storage systems and fast-replication facilities using integrated copy blades. VCR and FTR volume and data set copy blades include:

- ▶ DFSMSdss Copy Blade - Allows data to be copied using DFSMSdss. DFSMSdss is used to invoke FlashCopy or FlashCopy-compatible products on IBM, EMC, and HDS storage processors. It also supports Incremental FlashCopy, Space Efficient FlashCopy, Consistency Group FlashCopy, and SnapShot fast replication methods.
- ▶ EMC TimeFinder Copy Blade - Provides TimeFinder/Clone Mainframe Volume Snap and TimeFinder/Clone Mainframe Data Set Snap facilities, and EMC Enginuity Consistency Assist support

When cloning DB2 systems using copy methods that are not mentioned above, then an appropriate storage-based fast-replication or slower copy process must be performed before the VCR DB2 system cloning automation is invoked. A list of copied storage volumes is passed to VCR for use in the DB2 system cloning process.

When refreshing DB2 table and index spaces using copy methods that are not referenced above then, an appropriate data set storage-based fast-replication or slower copy process is performed after the FTR source job is invoked. The FTR source job determines the list of data sets to be copied and verifies refresh compatibility. The list of data sets is passed to the skeleton JCL to automate the copy process.

ISPF Panels

ISPF panels provide an easy to use interface to allow the user to create DB2 system cloning or table space refresh jobs easily using interactive panels if desired.

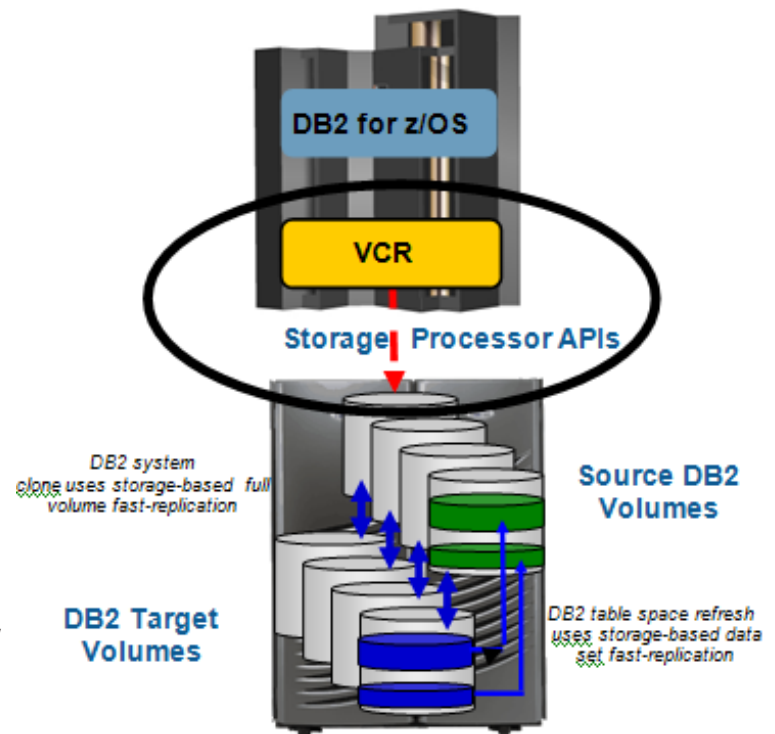


Figure 1 VCR and FTR are storage-aware data management solutions that use DFSMSdss and storage processor APIs to create DB2 system clones

DB2 System Clone Automation

Cloning DB2 systems allows production data to be used for testing, reporting, data warehouse loading, database utility processing, or to offload other processing tasks. Offloading these types of activities to a cloned DB2 copy reduces production I/O contention and allows processing activities on a static copy of the data.

VCR automates the cloning of DB2 subsystems when the source subsystem is online, when using consistency functionality, or when DB2 is stopped and started. VCR clones DB2 data regardless of data sharing status. When cloning a DB2 system data-sharing group you can either retain the same number of DB2 data-sharing members, reduce the number of DB2 data-sharing members or go from data sharing to non-data sharing.

Flexible Volume Copy Options

VCR simplifies volume copy operations, minimizes setup time, and reduces errors by allowing source and target volumes to be selected using volser masks, using SMS storage groups, or using appropriate combinations to eliminate the requirement for individual volume specifications. This feature ensures that data spanning multiple volumes are processed together inclusively so all data is copied.

Automatic Volume Pairing

VCR automatically pairs the volumes by storage vendor requirements, SMS and non-SMS status, and by device size.

Validity Checking to Ensure Rename Success

VCR validates that all related data has been copied during the data set rename operation by comparing ICF catalog entries to the VTOC entries on the copied volumes. Rename with simulation should be run in advance to reduce the risk of missing a volume. VCR verifies that all components and associations of VSAM spheres, all segments of multi-volume data sets, and all active generations of a GDG base are contained within the list of source volumes. In addition, it validates that all data set aliases match the rename mask.

Some data structures used during the data set rename process such as PATH entries and GDG base records exist in the ICF catalog. VCR creates a backup of the source ICF catalog to reflect the status of the source volume data sets at the time the copy was created. Alternatively, the source ICF catalogs can be read using the target volumes if they were included in the copy.

Fast Rename Process

VCR has a very fast renaming process. VCR renames target volume labels, VTOC, VTOC index, and VVDS, and the data sets so that the copied target volumes can be online and be used on the same or shared system.

Extended Rename Capability

VCR can rename more than the high-level qualifier. It can change one or more data set name qualifiers and it can add or eliminate data set name qualifiers.

SMS Options Available During the Rename Process

VCR provides extensive SMS class assignments for target data sets renamed during the cloning process. SMS class information can be specified for renamed data sets by:

- ▶ re-entering the SMS ACS routine to assign new SMS classes based on the target data set names, instead of the source data set names.
- ▶ accepting the SMS values copied from the source volume's data set names.
- ▶ assigning specific data classes, management classes, or storage classes.

Rename Rerun without Losing the Data Copy

Target volume data sets are renamed based on the RENAME masks specified. A RENAME SAFE option allows the RENAME step to be rerun in case rename masks are incorrectly specified without losing the point-in-time copy. Rename SAFE backs up the volume meta-data and restores it during a rerun. Running a RENAME with the SIMULATE command will also find any incorrectly specified data set name masks.

DB2 Meta-data Management

VCR changes the target DB2 system meta-data for the BSDS, directory, and DB2 catalog to reflect the target DB2 SSID, data set names, and target volumes.

Remove ICF Catalog Entries from Previous DB2 System Cloning Operations

Assuming each DB2 system clone process is repetitive, each DB2 system cloning operation will leave orphaned target data sets in the target ICF catalog the next time the volume copies are performed. Orphaned data sets are created when ICF catalog entries from the previous cloning operation exist but the next volume copy process renders these ICF catalog entries invalid. VCR identifies all data sets that were cataloged in the previous data copy process and removes target ICF catalog entries that were created during its execution while leaving all other catalog entries intact.

DB2 Table and Index Space Refresh Automation

Refreshing DB2 data allows production data to be used for testing, quality assurance, reporting, data warehouse loading, database utility processing, or other production offload tasks.

Table Space Selection Using a LISTDEF-like Interface

Data selection can be provided using an interface similar to the IBM LISTDEF facility to reduce the learning curve for database administrators. FTR allows data selection by individual table and index spaces, entire databases, and partitioned table and index spaces. It can automatically include all indexes for selected table spaces. FTR supports include and exclude functions, name masking, referential integrity, clone tables, LOBS, DB2 extents and V9 XML. FTR does DB2 catalog research to determine the source and target data sets and the source and target object compatibility to ensure successful data refresh operations.

Object ID Translation

FTR performs automated object ID translation for object IDs that differ in the source and target systems. Automated object ID translations simplify refresh operations by eliminating catalog research and manual translation efforts. FTR automatically creates the XLATE parameters.

Flexible Data Refresh Options

FTR can refresh table and index space data within or across DB2 systems. FTR can copy to the same or different name object types. DB2 objects types supported are database, tablespace, table, index, index space and creator. FTR supports updates for identity columns by automatically building the ALTER TABLE SQL to update the DB2 Catalog.

Target DB2 Location

FTR can connect to the target DB2 whether the target DB2 system is local or remote. The connection to the target DB2 subsystem may use Call Attach Facility, DDF and TCPIP, or just TCPIP. The user can let FTR determine which connection type to use or specify the connection type explicitly.

Data Masking

FTR provides options to mask one or more columns during the table space refresh process. Data masking provides data security anonymity. Data changes are made during the OBID translation process and are based on masking rules that are enabled during the data copy process. All referential integrity columns will have the same masking functions applied to them. Many types of data masking functions are provided such as static, mask, pattern, random, etc. Example field masking changes include social security and credit card numbers, names, addresses, etc.

Validate through Simulation

Both VCR and FTR provide simulation facilities that allow all normal DB2 system cloning and table and index space refresh commands to be simulated before their actual execution.

VCR Simulation Validation

- ▶ Verifies command syntax, matches source to target volumes, and displays DSS COPY FULL commands, without initiating the copy operations.
- ▶ Performs masking comparisons to both ICF catalog and volume records to detect incomplete renaming of VSAM spheres, and verifies multi-volume data sets are contained in the volume list.
- ▶ For DB2, report exactly what would be modified if you were actually running the update.

FTR Simulation Validation

- ▶ Verifies command syntax, processes LISTDEF statements, reads source and target DB2 catalogs, determines data set names.
- ▶ Verifies source and target object compatibility for data copy purposes.

- ▶ Generates object ID translation commands.
- ▶ Invokes the data copy process using TYPRUN=NORUN and prints a report showing paired source and target datasets.

Integration with Other Database Management Tools

DB2 systems can be cloned using a system level backup as input. The following forms of system level backups can be used as input to the DB2 systems cloning process.

- ▶ Mainstar Database Backup and Recovery for DB2 generated system-level backup
- ▶ IBM Recovery Expert generated system-level backup
- ▶ IBM DB2 BACKUP SYSTEM generated system-level backup

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Visit www.mainstar.com for technical articles and additional information on how VCR, FTR, and Mainstar's other innovative data access solutions can help you. To arrange a personal briefing or a free trial, contact us at product_info@mainstar.com.