

# T-REX DETAILS

Access  
Method  
Services/  
Extended

T-REX is a mainframe utility that will analyze, diagnose, report, backup, and repair VSAM clusters and ICF (Integrated Catalog Facility) components in the z/OS and OS/390 environments. T-REX can also synchronize your Tape Management System with ICF catalogs. The efficient allocation and operation of IMS, CICS, DB2, SMP/E, and VSAM user data sets rely on IBM's Access Method Services (IDCAMS) commands. VSAM objects have been, and are presently, a critical part of today's complex computing environment. Keyed VSAM objects with broken indexes, missing catalog entries, data sets cataloged to incorrect volumes, and/or missing data sets (catalog entries without corresponding physical data sets) all contribute to production delays, system downtime, and complicate disaster recovery. The objective of T-REX is to provide a comprehensive package of utilities that addresses these concerns in a powerful but "user friendly" way. Typical systems programmers today neither have time nor the specific training to monitor and respond to periodic application and catalog problems. IBM's IDCAMS utilities address some problems but fall far short of the dynamic functionality that is often needed in today's complex computing environment. T-REX complements the VSAM and catalog management commands in IBM's IDCAMS utility. It provides new functionality dedicated to maintaining 24/7 catalog availability, disaster recovery, enhanced VSAM support for application data sets, and management of ICF catalog components as well as enhances the existing IDCAMS functionality. The TMC support provides T-REX users with a central point of control to synchronize their Tape Management Systems with their ICF catalogs. Diagnostic and repair logic validate and resolve relational inconsistencies from the TMC to the ICF catalog and from the catalog to the TMC.

Access Method Services/Extended consists of the following commands: EXPORT, IMPORT, DRIMPORT, DUMP, REBUILD, REORG, DIAGNOSE, EXAMINE, ICFRU, DELETE, PRINT, MODIFY, ZAP, LISTCAT, LISTHSM, INTEGRITYCHECK, ANALYZE, REFORMAT, REPRO, REPORT, AUDIT, TAPEAUDIT, TAPEREPOR and DISPLAY. T-REX provides commands to analyze and correct the structural integrity of VSAM clusters and the ICF environment. The product can recover catalog entries if one or more components are restored to an earlier version. Tools are provided to view and manipulate VSAM clusters and catalogs.

T-REX multi-tasks most of its functions. This allows parallel processing of tasks which reduces elapsed time and increases throughput. Neither IDCAMS nor any other competing Access Method Services or Catalog Administration product was designed with this approach from inception. T-REX is not only unmatched in its speed, but it is also the only product to DYNAMICALLY update performance parameters. No user intervention is required for T-REX to perform at its optimal capabilities. No other product will automatically adjust and grow as your IBM hardware configuration is upgraded or changed. T-REX will scan your current environment and set its values appropriately. This means that if your DR site has a different processor, there is no need to adjust T-REX JCL. The product will automatically determine the current hardware setup and adjust T-REX internal performance parameters.

T-REX also aids in the drive toward continuous availability with BCS REORG. The REORG can be performed IN-PLACE or through DELETE/DEFINE. You do not need to pause online systems or stop batch processing to reorganize a user catalog. The catalog can be shared and OPEN to any number of systems within your SYSPLEX. T-REX ensures complete data integrity during the REORG process. With dynamic re-definition, the T-REX REORG command allows you to

change catalog attributes like IMBED, REPLICATE, or CISIZE. Catalogs can be moved to a new volume while the catalog is OPEN and allocated to CAS on any number of connected systems.

Time is critical during disaster recovery testing and T-REX can dynamically re-define, restore, and initialize ICF catalogs and VVDSs concurrently. T-REX allows you to selectively IMPORT specific BCS records by data set name, record type, volume, and devicetype. Options are also available to initialize catalogs with empty generation data group (GDG) bases. Some shops restore the entire catalog environment and spend hours cleaning up catalog discrepancies after restoring a subset of their applications. The "selective restore/initialization" facilities in T-REX eliminate this tedious task. "Catalog scrubbing" should become a thing of the past. Should your disaster recovery plans call for catalog scrubbing, the T-REX high-speed SCRUB command will quickly synchronize your catalogs with your DASD environment. No other product is faster.

In the event of a DASD hardware failure, recovery of the volume is usually accomplished by restoring the latest backup of the device. Restoration "back-levels" all existing data sets and catalogs that physically reside on the device. A back-leveled catalog not only affects data sets on the current volume but may also potentially affect many other volumes in the shop. Updates to the catalog since the backup was taken should be reapplied to ensure that data sets are accessible. Access Method Services/Extended ICFRU command provides support for applying SMF updates to a BCS from SMF data collected on multiple systems.

T-REX also allows the user to adjust the timestamp in catalog records by CPUID to allow for differences in clock settings. The output produced by SMF forward recovery is a new "up-leveled" version of the catalog. Diagnostics are available to validate the updated BCS before committing to the new copy.

IDCAMS provides a facility called LISTCAT to select and display catalog entries and their relationships. IBM utilizes SVC26 to obtain catalog information. This process is extremely slow. Access Method Services/Extended LISTCAT facility processes the BCS as a simple VSAM cluster.



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This is the most efficient way to obtain catalog information. This approach is very successful in reducing the elapsed time for catalog queries vs. IBM's LISTCAT. T-REX provides the user with approximately 30 additional selection keywords to select data set entries, some based on criteria which may cause potential problems such as over-allocation of data set space, excessive CI and CA splits, and data sets in multiple extents. Additional keywords, above and beyond the ones provided via IDCAMS, are useful keywords that can be frequently used to better manage your catalog and data set environment. The T-REX LISTCAT process can also be used to generate IDCAMS DEFINE and/or DELETE control cards for each selected entry. This feature combines powerful selection criteria with control card generation to provide an extremely flexible benefit.

The LISTHSM command allows you to display the contents of the DFSMSHsm BCDS (Backup Control Data Set), MCDS (Migration Control Data Set), and OCDS (Offline Control Data Set). Selection of records may be made by record type, key, range, or specific bit settings. You may also display logically related records that meet specified selection criteria.

Backup integrity is paramount when recovering keyed VSAM data sets and catalogs. IDCAMS, DFSMSdss, DFSMSHsm, and other third party vendors extract records through the object's index. If the index is broken, these utilities may give a successful completion code while obtaining an incomplete backup (missing records). T-REX bypasses the index and uses VSAM record management and proprietary algorithms to selectively backup the object. This algorithm is a vast improvement over other backup facilities, and it is the fastest way to obtain a complete backup. The T-REX EXPORT command provides security against index corruption while reducing the size of the backup file, the total number of output I/Os, and total elapsed time all while stressing the importance of backup integrity. The user has the option of implementing simultaneous, concurrent backups against different catalogs, VVDSs, and keyed clusters or single threading the process. Concurrent multitasking facilities are also available when reconstructing these components. The user may elect to restore certain records from the backup, modify existing records for disaster recovery, or reconstruct the entire component. The T-REX EXPORT command should be used for daily backups of user catalogs, VVDSs, and critical data sets. If the OPEN macro fails for a keyed cluster, catalog, or VVDS, the T-REX EXPORT command has the ability to formulate and execute its own channel programs to create a real-time backup of the damaged component.

The applications staff will find the T-REX DUMP and RESTORE commands invaluable as a tool for backup, recovery, and migration of VSAM clusters. Related alternate indexes and paths are automatically selected and processed. Entries can be renamed or have many of their physical characteristics modified when restored. IBM does a very good job of detecting mismatches between the BCS, VTOC, and the VVDS. However, they provide almost no support to automate the correction of problems. T-REX DIAGNOSE command provides a dynamic multitasking invocation of IDCAMS diagnose to

detect standard problems. Multitasking support for the invocation of IDCAMS EXAMINE command is also available for keyed VSAM clusters and catalogs. T-REX also provides the functionality to correct the discrepancies with the INTEGRITYCHECK command. AUTOFIX functionality dynamically corrects problems as they are detected. Optionally, IDCAMS control cards can be generated to correct discrepancies at a later time. Keep in mind that IDCAMS control cards does not address all possible discrepancies, and AUTOFIX may be the only way to correct some problems. INTEGRITYCHECK also provides a cross-reference of related catalog dependencies to aid in catalog recovery. Additional features include usercatalog alias validation and resynchronization, VVDS space map validation, and alias reorganization.

The T-REX AUDIT command provides a comprehensive BCS to tape management / tape management to BCS catalog validation. T-REX will identify "cataloged" data sets that reside on tape and are unknown to your Tape Management System. The TMC is cross checked with the system catalog to determine the disconnected tape catalog entries. Additionally, T-REX can identify entries known to your Tape Management System that are uncataloged in the associated BCS. In this case, the TMC is cross checked with the system catalogs to determine the uncataloged tape data sets.

The TAPEAUDIT command is used to gather and display information pertaining to uncataloged data sets residing on tape, tape data set catalog entries that no longer reside on tape, tape volume stored in robotic/virtual tape libraries and in vault locations and SMS managed tape data sets. Additional tape reporting is included with the TAPEREPOR command which details Tape Media Utilization, Tape Media Detail, Tape Media Status and Billing Summary.

T-REX produces additional reports by gathering and displaying catalog and/or DASD space information. VTOC information, as well as information for volumes, data sets and catalogs can be selected. Output information can optionally be sorted to display the results in a custom format.

IBM provides the ability to print hex and character representations of cluster and catalog records. IDCAMS selection criteria are very limited while T-REX provides a more "robust" selection. The T-REX PRINT command allows the selection and printing of records based on key, generic key (including wildcard selection), RBA (relative byte address), FROMADDRESS/TOADDRESS, and control interval. Modification of selected records is also accomplished via an "AMASPZAP-like" interface through the ZAP command. These T-REX facilities support all VSAM cluster types as well as ICF catalog components.

Due to the powerful nature of the various T-REX capabilities, you may restrict access to specific commands using the System Authorization Facility. Access can be managed based on command name or access intent.

