BCV6 - Copying DB2 Data "in-flight"

Today's business environment is demanding greater performance and reliability from IT systems. Progress and development of your IT systems impact day to day reliability and availability of operational systems. It is imperative that the best tools and processes are applied to minimize risk and increase overall business productivity. The BCV6 product offers significant benefits to business using DB2 database systems.

BCV6 provides for extraordinarily fast migration and copying of DB2 databases or tables. The tool copies both, data and structure (DDL), within the same DB2 subsystem or to another. By using a unique solution, BCV6 provides a point of consistency of the objects copied while copying from or within a system in actual operation. Thus BCV6 eliminates the need to quiesce or stop the databases or tablespaces to be copied in order to get relational consistent results by the copy process. For this purpose, BCV6 records timestamp and log RBA at begin and end of the copy process and locates the nearest checkpoint after the end-of-copy timestamp. The user may as well generate a quiesce point after the end of the copy process or specify a certain PIT (point in time) to be used. In either case the target tablespaces are updated via DB2 log data accordingly.

BCV6 contains BCV5

BCV6 contains all functions of BCV5 and one additional function. This additional function allows to copy active DB2 objects in a consistent manner. All panel types of the ISPF interface and all window types of the workstation interface are alike in both products. There are only two fields which are not for valid BCV5, these are the fields controlling the additional function of BCV6. This manual describes both products, BCV5 and BCV6, it is clearly marked, if something is not available or doesn't make sense for BCV5.

Overview

BCV6 provides for fast, efficient and comfortable copying of DB2 data. Compared with other methods based on UNLOAD/RELOAD or DSN1COPY, BCV6 works ten times faster. Thereby it requires only 10% of the resources consumed by conventional procedures, measured in CPU-Time or SRU. To put it in a nutshell: BCV6 saves 90% of the copy time and 90% of the computer resources.

BCV6 is capable to copy or migrate DATABASES, TABLES, and INDICES, as well as the corresponding RUNSTATS rows, and related objects like GRANTS, BINDS, VIEWS, TRIGGER, FUNCTIONS. There are some restrictions with the latter. Thus BCV6 copies "DB2 data", that means, it cares about both, the data definition stored in DB2's catalog and the data itself, i.e. the pagesets of table- and indexspaces. BCV6 is able to copy directly from tablespaces or to copy from image copies. It handles all kind of tablespace without user intervention, including LOBs. Instead of deploying a number of tools for the various steps to migrate a set of databases, a BCV6 user just selects the objects to be copied and specifies renaming rules. BCV6 then generates self-acting the jobs to

· extract the object definitions from the catalogue of the source system,
· transfer the definitions to the target system, rename the objects as specified, and apply them at the target DB2 system (CREATE, or DROP and CREATE) or,
· compare the source definitions with already existing target objects for compatibility,
· copy all involved pagesets from source to target DB2 system,
· translate object-ids, if requested,
· adapt RBA or LRSN.

BCV6 comes with it's own internal copy programs based either on "DIV" (data in virtual) or "LDS CIs" (control intervals). These programs are capable to translate object-ids, although they are very fast. However BCV6 deploys as well advanced copy services like Flashcopy Version 2 or Snapshot, if the user has these hardware based functions available. This way the copy process may further be accelerated, in particular the source objects might become sooner available.

Copying DB2 data with BCV6 requires to define a BCV6 TASK. This is accomplished either with BCV6' easy to handle ISPF interface or with it's unique workstation interface. Once defined a BCV6 TASK may be repeatedly executed at any time as an integrated and automated process, controlled by BCV6, through a scheduler, or manually.

Thus BCV6 saves not only computer resources and copy time, first of all it helps to save the most valuable resource. Highly qualified manpower should be dedicated to supervision and administration rather than to the attendance of cumbersome tools.

BCV5

All functions and attributes described so far apply as well for BCV5. BCV6 adds one important feature, the ability to copy "in-flight". As fast as BCV5 might copy, there still will be a copy time, and in order to copy consistent data the tablespaces to be copied must be quiesced during the copy. If this is not feasible, because the application does not even allow a short discontinuance, then BCV6 is probably the solution. BCV6 allows, that the source objects, the objects to be copied, are continuously available for update during the copy process. This is accomplished by dint of the DB2 log. BCV6 checks the DB2 log for updates on the involved objects during the copy process and corrects the affected tablespaces in a final step with the logged changes. BCV5 can also copy unstopped objects, but the result may not be consistent, due to parallel write operations during the copy. Users who are still able to stop the objects for the copy operation may well live with BCV5.

The Classic Tools

DB2's COPY utility is designed to provide backups for recovery. It is less adapted to the task of delivering data to other applications, databases or subsystems. Conventional procedures for the movement of DB2 data are usually based on DB2's internal utilities UNLOAD/LOAD and DSN1COPY.
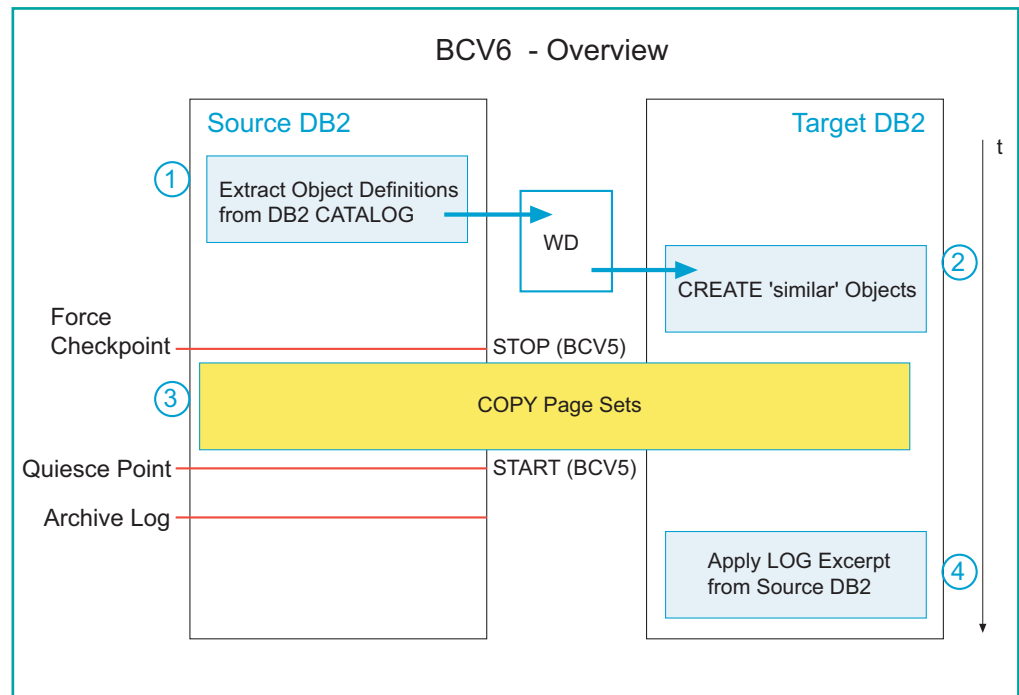
Reduction of copy time by 90%

UNLOAD/LOAD based procedures are rather slow and consume a reasonable amount of computer resources. They are particular improper for copying bulk data.

DSN1COPY works faster, but procedures to deploy it require even more manual preparation and set-up work then those for unload and load.

Neither DSN1COPY nor UNLOAD/LOAD care about data definition, it is the user's responsibility to create or modify the target objects as required.

BCV6 - Overview

Source DB2

① Extract Object Definitions from DB2 CATALOG

WD

Target DB2

② CREATE 'similar' Objects

Force Checkpoint — STOP (BCV5)

③ COPY Page Sets

Quiesce Point — START (BCV5)

Archive Log

④ Apply LOG Excerpt from Source DB2

t

Concept of this product

This product is intended to be a tool for DB2 data movement under z/OS. The main design goals were to offer

- an integrated process for "copying", in the way that the user only specifies what is to be copied and whereto, and the tool then cares about all aspects of that task;
- a product which is fast enough to copy bulk data in a shortest amount of time, and efficient enough in the sense of saving computer resources during copying;
- a tool which is easy to handle and to adapt to varying environments.

The product is equipped with two user interfaces. One is based on ISPF the other is a workstation program written in JAVA. Both allow to define copy tasks, edit the specifications of tasks, and allow to submit tasks.

To define a copy task a user basically specifies

- the involved DB2 subsystems, the source system and the target system (which may be the same).
- the objects, i. e. the databases or tables to be copied,
- the renaming rules to be applied for the objects to be copied,
- whether the task shall recreate the indexes at the target side,
- whether the internal OBJECT IDs (OBIDS) should be translated,
- whether the related RUNSTATS data should also be transferred to the catalog of the target system,
- whether other related objects like GRANTS, BINDS, VIEWS etc. should be transferred as well.
- whether the source objects shall be stopped during the

copy process or
- whether the fuzzy copies shall be adjusted to Qiesce Point via the log of the source DB2 (BCV6 only).

Once a task is defined it may be executed at any time under the control of the product itself or under control of a scheduler or manually stage by stage.

The Stages

For each execution of a COPY TASK the product generates a number of jobs. Executed in the right order, see Figure "BCV6 Workflow", they accomplish roughly the following:

- Stage 1 retrieves the definition of the objects to be copied from the catalog of the source DB2 system and writes this information into an intermediate storage, see WD - WORK DATASET.
- Stage 2 creates the 'same' objects in the target DB2 subsystem. These are usual, or standard DB2 CREATES. The objects created may have, according to the renaming rules the user specified for this task, other name attributes than the original objects of the source DB2 system.
- Stage 3 transfers the data, i. e. it copies the tablespaces and optionally as well the indexspaces from the source location to the target destination. Before the copy process begins, there is either a STOP comand issued or a FORCE CHECKPOINT command. With BCV5 only the STOP command is available. If required, the copy program will do OBID translation. When the copy process is finished, either a quiesce point is set and the active log is archived or the stopped objects will be restarted. With BCV5 only the restart is available. BCV6 will search the active logs for updates to the objects copied during the copy process. The changes

Waste of Resources avoided

found will then be used in Stage 4 to synchronize the affected tablespaces to the QUIESCE POINT set before or to a user specified timestamp or RBA.

Where BCV can help:

- When test data are to be refreshed at regular intervals
- When the schooling department needs further schooling zones
- When the programming team requires a new base for the development
- When development teams have to be provided regularly with data
- When an additional information system for peak workload times is required
- When after LOAD the Runstat-Utility requires too much time
- When copy and migration requests are very time consuming.
- When the Batch Window is too small.
- When due to the length of the copy time, copies are only possible during a few weekends.
- When a status has to be recreated with Image Copies.
- When integration or performance test series are pending and repeatedly large amounts of data have to be copied.
- When complex selections have to be moved regularly
- When DSN1COPY is simply not the appropriate tool
- When the selection of objects to be copied, the transport of data or the alignment of DDL have to be integrated in one process.
- When Flashcopy2 or Snapshot have easily to be used for DB2-migration works.
- When the requirement of the source system availability is rising, and the Quiesce and Stop timeframe must be shortened.
- When the costs for migration and copy processes have become too high.

Enterprise Systems Associates, Inc.

Central Florida Research Park
12565 Research Parkway, Suite 300
Orlando, Florida 32826, Phone: 1-866-GO-4-ESAI
or 1-866-464-3724
info@ESAiGroup.com, sales@ESAiGroup.com
http://www.ESAIGroup.com

International

ESAi de Mexico
San Antonio 319-104, esq. Revolucion
San Pedro de los Pinos
Mexico City, D.F. CP 03800
Telephone: +52-55 63 94 20

Brasil
ESAi / ECCOX
Av. Dr. Cardoso de Melo, 1460-3 Andar
Vila Olimpia, Sao Paulo SP
CEP 04548-005 BRASIL
Telephone: +55 11 3047 4542

BCV6
Fast Copies in Continuous Operation

UBS Product Line	....
BCV5	DB2 Fast Copy
BCV6	DB2 In-flight Fast Copy
TUC	DB2 Total Utility Control
BPA4DB2	DB2 Buffer Pool Analyzer
XM4DB2	DB2 Production Health Check
BCV4	DB2 System Cloning

UBS
HAINER

UNTERNEHMENSBERATUNG
SOFTWARE SERVICE GMBH

Am Zickmantel 16 · D-36341 Frischborn
Tel. + 49 (0) 66 41/65 51-0 · Fax + 49 (0) 66 41/65 51-11
info@ubs-hainer.com · http://www.ubs-hainer.com

www.ubs-hainer.com/bcv5