Treehouse SOFTWARE

Data Integrity Between Different Database Worlds (DL/I, DB2)

BRUNATA Hürth is a corporation with 450 employees and approximately 700 freelancers, acting as meter readers, mechanics, and representatives. As an independent member of the BRUNATAMETRONA group, BRUNATA is responsible for the consumption-based settlement of heating costs and water consumption costs for landlords and tenants. In addition, BRUNATA develops systems and manufactures devices to register the consumption of energy and water in residential and business buildings.

BRUNATA Hürth has defined the goal, to migrate all production data currently stored in hierarchical DL/I databases to relational DB2 databases. During the timeframe when both systems are running in parallel, the databases must be synchronized. That is the operational area for tcVISION.

BRUNATA uses an IBM z/890 running z/VM 3.1 and VSE/ESA 2.3. The production data is still stored in DL/I databases. In 2001 BRUNATA started a migration project from DL/I to DB2. For details about the migration project refer user story "Change data into information".

Lothar Stein, CIO of BRUNATA, says: "We tried very hard to develop the new DB2 based application. It was our goal to consequently use the benefits that DB2 offers. We knew that we only could achieve this by using a new data model. A new data model forced us to think about ways how to synchronize both databases during the transition time." tcACCESS helped in the creation of the new data model. Furthermore, tcACCESS was used to load the new DB2 tables directly from the DL/I databases. Another B.O.S. product, tcEXPRESS, is also used at BRUNATA. Stein: "tcEXPRESS was a better and inexpensive alternative to DB2/Connect from IBM. We use it in our client/server applications to access DB2/UDB- and DB2/VMdatabases." The migration project was tackled and today most parts of the new application has been developed. Lothar Stein: "We not only developed the new application but also spent time to develop programs to take over the data changes. These take-over programs expect an input file that contains compressed information about all DL/I segments that have been changed." A problem however still remained and had to be solved: Should the changes be logged to the take-over file by the old DL/I programs or was there a better solution? Lothar Stein: "All of our application are developed in CPG. It would have been possible to develop a subroutine that could be called by the program responsible for the change to DL/I and pass change related information to that subroutine. The problem I was facing however was of a broader spectrum. In addition to our own applications, we use other software packages and tools that apply modifications to our DL/I databases. How could we keep track of these changes?"

Lothar Stein and some of his staff members came to visit a tcVISION roadshow in Spring of 2005. Stein was convinced by the data synchronization concepts presented. A meeting was then scheduled, and BRUNATA presented their synchronization requirements and as a result of the meeting an implementation concept was developed. Lothar Stein: "We talked directly to the developers of tcVISION and we were looking for a solution that matched our requirements with the then current development stage of tcVISION.

The key factor was to guarantee that all changes applied to DL/I during our online- and batch-window had to be captured and should be written to the take-over file in the format that we expect. The result of our discussions was to use a daily Batch-Compare procedure. We planned to start the implementation in September of 2005."

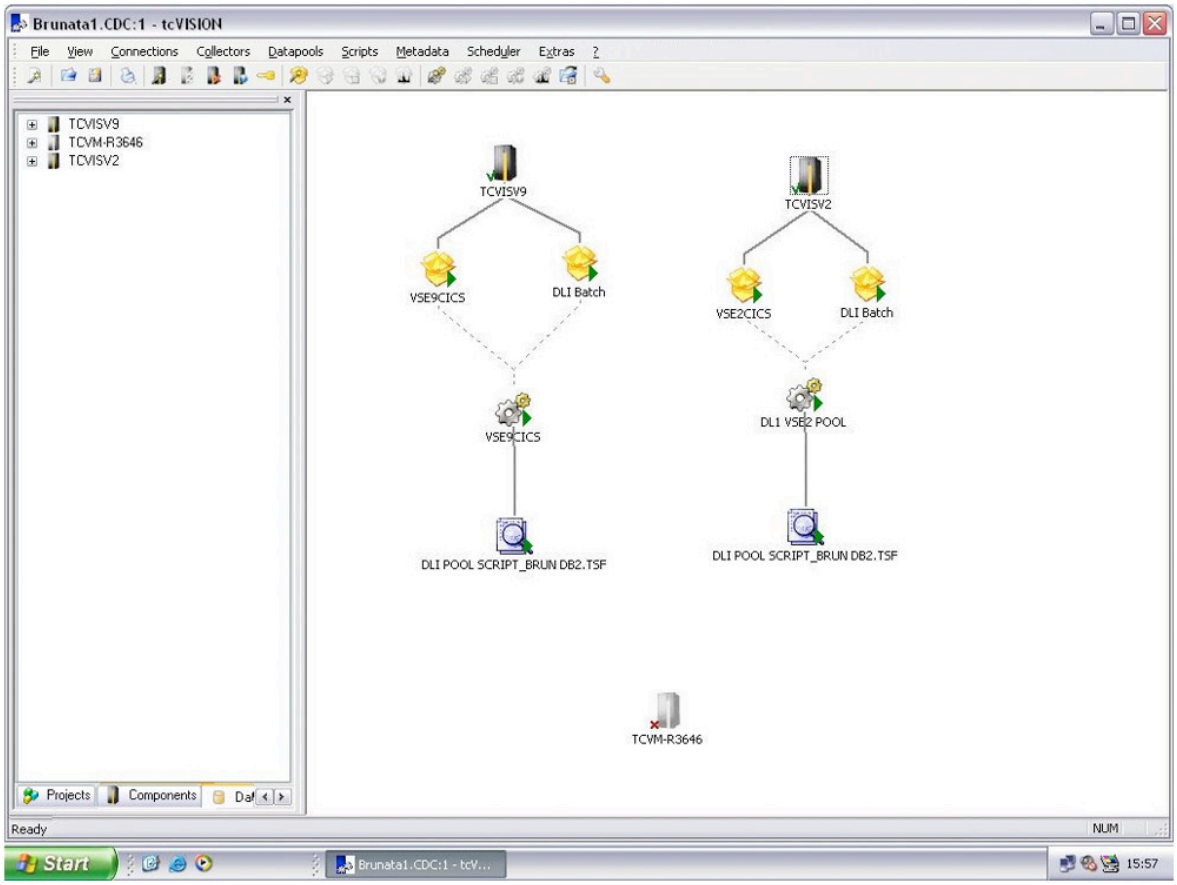
Little roadblocks had to be removed when the installation took place in September. Stein: "We didn't consider the fact that a Batch-Compare processing requires ascending keys. Unfortunately some of our major DL/I databases are HDAM and the segments are in random sequence. But this was not a problem. A SORT capability was implemented into the tcVISION scripts. For performance reasons, a high speed assembler programs to read the DL/I databases was also provided."

The biggest problem BRUNATA was facing was the amount of 200 million DL/I segments that had to be processed every day. The databases had to be compared with the tcVISION snapshots of the previous day to capture the changes. The daily time window that was available was not large enough for this type of processing. Lothar Stein: "We were now facing a situation where we had to make a decision. What to do next? B.O.S. acted like a real partner. They went in conclave and returned with a solution that captured all DL/I changes in realtime." The new version of tcVISION captured all changes performed in CICS and in batch. The software was installed and thoroughly tested. Stein: "Our major concern was performance. We had to find out whether there was an impact on the performance of our online system and batch processing because now another piece of software was running in parallel to our applications. Our daily online- and batch-processing could not be impacted. We ran several tests and the results were very satisfying. The impact on the performance was very little and insignificant to us. We made the decision to use a DL/I database for our take-over file. This would give us the full CICS recovery mechanisms for this important resource." The first production implementations however revealed a major weak point of this solution. Lothar Stein: "During the time tcVISION was writing the captured changes into the DL/I database, we couldn't access the database from another partition to perform the take-over. We changed the database definition so that we could perform a read access but then we realized the knockout-criteria. All changes applied to the database since the last checkpoint were not available for the take-over application. Another change of the definition to allow a checkpoint after each write would have caused more than 150,000 VSE consol messages. We again had to ask ourselves whether this was the end of the project. But it was B.O.S. again that solved the problem and came up with a solution that is now successfully in production for several months." tcVISION now uses a DB2 table instead of the DL/I database as the take-over media. This table contains a row for every change that has been performed in DL/I. This includes online- and batch-changes. The DB2 database is realtime, because tcVISION performs a COMMIT WORK after every change. B.O.S. even provided a solution for the situation when DB2 would not be available: In this case automatically a VSAM KSDS is used.

Lothar Stein: "We are very happy with the implementation. It has fully proved its value. Every 30 minutes our scheduling system starts the takeover procedure and all changes are implemented into our new DB2 application. The rows in the take-over file that have been processed get a “processed”-indicator. Of course we can change the time interval to any other interval if our business requires this."

In April 2006 the implementation went into production. tcVISION processes between 180,000 and 220,000 DL/I updates every day. This includes UPDATEs, INSERTs and DELETEs. There have been even days where more than 500,000 changes have been processed with no problem at all.

Lothar Stein: "The concept gives us the maximum possible safety. It can easily be enhanced and adapted. The cooperation with B.O.S. was exemplary. We never came to a point where we lost faith and we never got off our planned way. B.O.S. continued to be the partner we know since 2001: Competent and full of energy and engagement that always excited and impressed us. It is of importance that all wheels work together and function in concert. The picture will change when our last and strategic application, the billing system, has been migrated. For a remaining period where DL/I still will be available all DB2 changes must be synchronized to DL/I. Guess how we’re going to do this: tcVISION will be the key to success for that project."



The tcVISION Control Board provides a display of the synchronization environment. The control screen shows the test environment (TCVISV9) and the Production-VSE (TCVISV2). Both systems have an identical tcVISION implementation. In each VSE system 2 tcVISION collectors are defined. Collector "VSExCICS" collects all changes that have been performed against DL/I from the Online system.

Collektor "DLI Batch" collects all changes applied by the Batch-applications. The collected changes are transferred into a common pool (DLI VSE2 POOL or VSE9CICS). Pool-script DLI POOL SCRIPT_BRUN DB2.TSF processes the changes and stores them in the format into the DB2 database or the VSAM-KSDS. The take-over application then processes this data every 30 minutes.

Contact Treehouse Today!

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