H2R – Hierarchical To Relational

H2R (Hierarchical To Relational) is a data and program migration tool that allows you to move your IMS/DB (or DL/I) data structures, to a relational database system (i.e. Oracle, UDB, DB2, etc.). It provides a transparent gateway to maintain data stored on the new relational organization, while accessing them in the “traditional” way.

Key Features Highlight

- Move from IMS/DB (DL/I) to RDBMS
- Automated and customizable relational structure generation
- Automated data migration
- User programs unchanged
- Equal or better performances
- User friendly management tools
- Cross-platform environment
- More security and integrity granted by modern RDBMS
- More…

Data Migration

H2R is equipped with a DL/I Data Structure Analyzer, which collects all necessary information from PSB and DBD sources, to perform the automated data migration.

Once information have been obtained, H2R generates both an IMS program to be launched on mainframe to export existing data from IMS/DB, and a set of import programs for the new RDBMS.

These programs handle all differences between source and target DBs, like: data coding, field type, redefines, dirty fields, etc.

If necessary, import programs allow you to maintain some fields unchanged (that’s to say in EBCDIC) when moving from an EBCDIC to an ASCII environment, thus maintaining the same processing sequence. Conversion of data coding for these fields will take place dynamically, during run-time access.

Relational Environment Definition

Starting from information gathered by the Data Structure Analyzer, H2R automatically generates whatever is necessary to create tables, indexes and constrains.

Information collected by Data Structure Analyzer are stored in a set of tables, and they can be easily accessed by H2R run-time system, and by user processes which wants to check them.

Performances & Integration

Although the data structure and architecture are completely different between IMS/DB – hierarchical – and Oracle or DB/2 UDB – relational –, performances of migrated applications are normally equal or better than before.
Relational organization allows you to perform faster and easier searches (which before were difficult or impossible with IMS/DB and DL/I); in a small percentage of cases (usually less than 5% of programs), some specific types of data browsing may result to be slower on the new RDBMS environment.

The IMS Pointer Structure allows you to know immediately if a child segment exists or not, without having to perform any specific access on the DB. In the RDBMS, the splitting of data among different tables inhibits such a possibility, causing sometimes slower accesses.

Specific indexes creation, together with the opportunity of performing direct reading operations, allow you to efficiently overcome this problem. Transformation of hierarchical data into relational structures simplifies the resolution of logical structures, whose browsing may be performed directly through dedicated indexes.

The possibility to mix in the program both traditional accesses (i.e. CALL “CBLTDLI”) and direct SQL commands (EXEC SQL), permits to enhance performances and/or simplify data accesses.

Once migrated, programs may be easily maintained and enhanced: new functionalities can be added to take full advantage of the RDBMS features, integrating existing data with new tables and data-sources, and performing more powerful inquiries and updates using SQL language.

Data hosted in the RDBMS are immediately accessible not only for legacy applications, but they are now at disposal for all modern systems and technologies, such J2EE, .NET, etc.

Independently from the performed accesses, H2R guarantees full data integrity through the usage of TABLE CONSTRAINT feature, provided by RDBMS.

The Transparent Gateway

Two different modules, with specific aims, are provided to leave unchanged the user interface:

- standard entry points: this modules, having the same name as the IBM DB/DC standard entry point (CBLTDLI, PLITDLI), handle the parameters list prepared by the user program, and normalize it for the H2R kernel calls
- High Level Program Interface – HLPI – : this module automatically transforms all EXEC DLI statements into the corresponding Call-Level request, as expected by the standard entry point module.

After the completion of each data base access, a return code indicating a positive acknowledgement or the type of a detected error, is returned to the requestor. Return codes, supplied by the relational data base system, are translated and made compatible with the original IMS/DB ones., and passed back to the user program, in the same way and at the same location.

Also DL/I scheduling and terminating concepts are reproduced. Batch program execution is performed under the control of a utility program, with the same name as the original one (i.e. DFSRC00), in order to let programs run with the same parameters list.
Management Tools

Recovery, backup, re-organization, performance optimization by tables partitioning or other routines, are provided by the target RDBMS (i.e. Oracle or DB/2 UDB).

Some specific utilities are provided together with the product in order to facilitate data accesses through the IMS logic and to collect measurement and statistics about types and number of DB accesses.

Modularity and Scalability

To the purpose of directly managing the accesses to each IMS DB, H2R makes use of one COBOL/SQL program for each physical, logical and index IMS database.

All these modules are automatically pre-generated during the off-line conversion step, using DBD, PSB and segment layout information collected by the Data Structure Analyzer, and dynamically loaded at run-time.

All these COBOL/SQL programs can be enhanced to speed up the performance, using customer’s provided information which are not available in the data definition, or to diagnose and fix problems, without affecting all other databases.

XIMS Compatibility Toolkit

In addition to CICS applications, IMS DB/DC applications can be also moved easily and without any risk to UNIX and Linux, by the XIMS Compatibility Toolkit.

XIMS lets original IMS/DC programs to run unchanged under control of the XCICS Transaction Server, taking full advantage of its well-proven architecture, which ensures both high performance and stability. Transaction integrity, security and data recovery are granted by XCICS TS itself.

With XIMS, IMS/DC (and DB) application may be moved to XCICS TS without any change in the programs or format sources.

The subsystem named XIMS Transparent Gateway, enables online programs to perform any input/output command in the same way as before. It provides support for input and output data formatting, terminal communication, passing control to another program and for all other possible functions.

Original IMS format files (FMT) are automatically translated into standard BMS modules, while XIMS provides automatic and dynamic conversion between MSG segments and BMS data structures.
Dialog with terminals flows as before, without any change in user programs and in the layout of the screen.

Programmers will be able to maintain and develop applications in the way they know: using IMS/DC calls and writing FMT files.

Whereas necessary, XIMS requires about consistency/rollback functions to XCICS and DB system. Together with H2R, XIMS provides a complete solution to re-host existing IMS/DB & DC applications.

Multi-platform

To give users the possibility to choice among different environments, H2R has been coded in the 2 languages available on the most common platforms: C language and COBOL.

Migration tools, which run only once during the conversion phase, have been developed using C language, and they may run both on UNIX and Linux servers.

All I/O run-time and data access routines have been coded in COBOL II: for these reason, H2R may run indifferently on UNIX, Linux or mainframe environments.

H2R is available for the following platforms:

- Linux
- HP-UX
- Solaris
- AIX
- OS/390

XIMS Compatibility Toolkit is available for all platforms supported by XFRAME.

Further information

For further information on the XFRAME products, please visit our main website http://www.hite.it; go directly to the XFRAME support page http://www.hite.it/support.html to access the whole XFRAME on line documentation.

For specific questions, please mail to downsizing@hite.it.