



- **H2R is a unique data and application migration tool that allows hierarchical IMS/DB or DL/I data structures to be easily moved to a relational database system such as; Oracle or IBM UDB.**

H2R utilizes robust migration and run-time facilities, along with a high-performance transparent gateway providing the ability to maintain data in a relational organization, while offering flawless integration to legacy applications. H2R is an optional component of XFRAME® by HTWC. XFRAME offers the most complete solution set on the market for migrating and rehosting mainframe workloads on open systems such as; Unix, Linux and Windows.

### Performance & Integration

H2R offers a new level of flexibility in resolving issues with legacy data access and is specifically designed for use in mission critical, enterprise environments. For many companies, critical business information is stored in hierarchical formats based on legacy mainframe technology. Access to this information is often hindered by an inability to integrate the data with newer technologies and applications.

H2R was designed to overcome this issue by unlocking new system capabilities and maintaining full access to the existing legacy applications. Database performance is a critical issue and new solutions should not introduce new bottlenecks. With the powerful migration and run-time capabilities of H2R, you will expect database performance that will be equal or exceed that of the legacy environment. Relational organization allows for faster and easier searches,

which are difficult or impossible with IMS/DB and DL/I data structures. In addition, the ability to mix both traditional access methods and direct SQL commands enhances the performance and simplifies data retrieval.

In the small number of cases where certain types of IMS data structures can lead to slower browsing in the relational environment, H2R has been designed to efficiently address the issue through specific index creation and direct reading operations. Once it is migrated, programs can easily be maintained and enhanced. new functionalities can be added to take full advantage of relational database features and existing data can be integrated with new tables and data sources from a more powerful inquiry. Also, updates can be performed using SQL commands. Data hosted in the new relational database are now immediately accessible to both legacy applications, all modern systems and technologies such as, J2EE and .NET.

### H2R Key Features Highlights

- 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

## ▶ H2R is equipped with a powerful DL/I Data Structure Analyzer to perform the automated data migration.

The Data Structure Analyzer collects all the necessary information from PSB and DBD sources, allowing H2R to generate a mainframe-side application to export existing IMS/DB data and a set of import programs for the relational database.

These programs resolve differences between source and target databases such as; data coding, field type, redefines, dirty fields and more. If necessary, import programs allow you to retain specified fields when moving from an EBCDIC to an ASCII environment, maintaining the same processing sequence. In this case, conversion of data coding for these fields will take place dynamically during the run-time access.

Using information gathered by the Data Structure Analyzer, H2R automatically generates what is needed to create tables, indexes and constrains. This information is stored in a set of tables allowing easy access by the H2R run-time system, along with any additional user processes. H2R makes use of one COBOL/SQL program for each physical, logical and index IMS database. All these modules are automatically generated during the off-line conversion process by using the information collected from the Data Structure Analyzer and dynamically loaded at the run-time. This modular approach provides the ability to optimize system performance by incorporating information, which is not available in the data definition or to diagnose and fix problems without affecting other databases.

### The Transparent Gateway

A key component of H2R is the high-performance transparent gateway, which allows the legacy applications to effortlessly access the data in relational structures.

Similar to the XFRAME solution set, H2R was designed to minimize application code changes and prevent disruptions in ongoing businesses.

Two different modules are provided to ensure that no changes are required to the existing applications or the end-user interfaces. Below are the modules. Standard Entry Points: This module accepts the same commands used by the IMS DB/DC standard entry points (CBLTDLI, PLITDLI), manages the parameters list prepared by user programs and normalizes it for H2R kernel calls. High Level Program Interface (HLPI): This module automatically transforms all EXEC DLI statements into the corresponding call-level requests as expected by the standard entry point module. After the completion of each database access, a return code indicating a positive acknowledgement or the type of a detected error is returned to the requestor. Return codes that are supplied by the relational data base system are translated and made compatible with the original IMS/DB system, then passed back to the user program in the same way and at the same location.

DL/I scheduling and terminating concepts are also efficiently reproduced. Batch application execution is performed under the control of an utility program, using the same name as the original application and allowing programs to run with the same list of parameters.

Recovery, backup, reorganization and performance optimization by tables partitioning or other routines are all provided by the target relational database. Specific utilities are provided with H2R to facilitate data access through IMS command logic and to collect database access statistics.

### More Features

- ▶ Program source unchanged CBLTDLI & PLITDLI interfaces
- ▶ EXEC DLI interface Compatible DB operation codes (i.e. GE, GN, etc.)
- ▶ Compatible return codes
- ▶ Possibility to mix IMS/DB access with direct SQL command
- ▶ Data integrity
- ▶ Data available for new technologies (i.e. J2EE, .NET)
- ▶ Management through RDBMS tools
- ▶ Dedicated program access
- ▶ Flexible tuning and debugging

- ▶ **H2R is designed as an optional module for XFRAME by HTWC.** XFRAME is a robust mainframe rehosting environment built to handle any size mainframe workload, both online and batch.

A core component of XFRAME is the high-performance XCICS Transaction Server built to run CICS mainframe applications on Unix, Linux and Windows. In addition to CICS applications, IMS/DC applications can be easily migrated using the XIMS Compatibility Toolkit.

The XIMS toolkit allows the original IMS/DC and DB programs to run unchanged under the control of the XCICS Transaction Server takes full advantage of its proven architecture, which ensures both high performance and stability. Transaction integrity, security and data recovery are managed directly by XCICS engine. With XIMS, IMS/DC and DB application can be moved to XCICS without any changes in the program coding or format sources.

The XIMS transparent gateway enables online programs to perform the same input/output commands that were performed on the legacy system. It provides support for input and output data formatting, terminal communication, passing control to another program and most other 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 terminal flows remains the same in the user programs or in the screen layout. Programmers can continue to maintain and develop applications in familiar ways using IMS/DC calls and writing FMT files. Together with H2R, the XCICS Transaction Server and the XIMS Compatibility Toolkit provides a complete solution for rehosting IMS/DB and DC applications on open systems. All of these features combined makes XFRAME by HTWC the most complete mainframe rehosting solution on the market.

## Multiple Platform Capability and Flexibility

To provide as much flexibility as possible, H2R has been coded into two languages that are available on the most common platforms, which are C programming language and COBOL. Migration tools which run only once during the conversion phase have been developed using the C language and they can run on Unix, Linux or Windows servers. All I/O run-time and data access routines have been coded in COBOL II.

H2R is available for the following platforms:

- Linux
- HP-UX
- Solaris
- AIX
- z/OS
- Windows

The XIMS Compatibility Toolkit is available for all platforms supported by the XFRAME mainframe rehosting solution.

## XFRAME Platform Availability

XFRAME runs on the most popular Unix systems as shown below.

- Solaris (SPARC)
- HP-UX (PARISC & Itanium)
- AIX (POWER)

Linux, RedHat, Suse and others are on the following architectures

- i386 (Intel Pentium/Xeon)
- s390 (31bit z/Linux)
- s390x (64bit z/Linux)

Microsoft Windows Server 2003 is on the following architecture.

- i386 (Intel Pentium/Xeon)

### XIMS Features Highlights

- ▶ Rehost IMS/DC applications to UNIX/Linux/Windows
- ▶ Runs on the top of well-proven XCICS Transaction Server
- ▶ Program source code runs unchanged
- ▶ Full support for Formats and Messages

- **HTWC is one of the top leading European rehosting, software conversion and application management solutions companies.**

## Overview of HTWC

HTWC focuses on large organizations and is a valid aid in all those problem solving processes related to enterprise systems.

In particular, HTWC deals with all matters related to the integration and modernization of legacy environments. HTWC has specialized in Mainframe rehosting and software management solutions since 1987.

Currently, HTWC labs develop products for rehosting analysis, migration, conversion and reengineering of legacy software. The integration of these products guarantees a reliable, flexible and cost effective solution for our customers.

## Further Information

For further information on the XFRAME® products, please visit our website at [www.htwc.com](http://www.htwc.com) or for specific questions, please contact us directly at [info@htwc.com](mailto:info@htwc.com).

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