



## **MANAGEMENT OVERVIEW**

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**A GUIDE TO THE BENEFITS OF USING  
APPLICATION RE-ENGINEERING**

# **Application Re-engineering with X-Analysis**

The Application Re-engineering tool set extends to the Analysis & Documentation tool set. It offers all the features provided by the X-Analysis Professional. Databorough's Application Re-engineering is an advanced tool set and it provides productivity tools for IBM i and DB2 Application Re-engineering projects.

## **Benefits**

The Application Re-engineering tool set offers following benefits:

- Automated DDS to SQL Database Conversion
- Copies production data into new database
- Database modernization without recompile any of the existing programs
- Automated generation of ORM objects for Hibernate
- Creates stateless CRUD Service Programs for each table

And many more...

The Application Re-engineering tool set is essential for all the IBM i shops which are evaluating productivity tools for DB2 Application Re-engineering. This tool set offers the following three features:

- Automated DDS to SQL conversion
- Generate Relational Mapping Objects
- Database Service Programs

## Automated DDS to SQL Conversion

Historically the System i applications have used Data Description Specifications (DDS) to define physical files and associated logical files or access paths. Whilst the files created can of course be accessed using SQL syntax from programs or via JDBC/ODBC the actual definitions bear no relation to SQL. What the process of the Application Re-engineering does is to replace the DDS definitions with SQL create scripts that build tables and indexes. The X-Analysis has a complete cross-reference of all files and fields and their relationships and can build the table creation scripts together with the required indexes to optimize the system, your existing programs all still work after this process and without any re-compilation or alteration.

By using the Application Re-engineering tool set to do this automatically, no existing programs need be recompiled or impacted in any way. With the data copying facilities built in to the tool, the transition can be seamless. From this point onwards legacy programs can continue to use native I/O techniques to use externalized SQL I/O.

```

.....A.....T.Name+++++RLen+TDpB.....Functions+++++
***** Beginning of data *****
R RCUSF
A      CNAME          34A      TEXT('Company')
A      DSDCDE         2A       TEXT('Distributor')
A      STATUS         1A       TEXT('Status')
A      TELNO          17A      TEXT('Phone')
A      EXTN           6A       TEXT('Extn.')
A      LCTDAT         6S 0     TEXT('Last Contact Date')
A      APDATE         6S 0     TEXT('Next Contact Date')
A      USERNM         34A      TEXT('Contact')
A      SALUT          34A      TEXT('Salutation')
A      JTITLE         34A      TEXT('Job Title')

```

Illustration 1: DDS Screen

Openness and Standards compliance using Industry standard SQL means that many different tools and applications on multiple platforms can easily access and use your modernized database

Seq No	*...+... 1	...+... 2	...+... 3	...+... 4	...+... 5	...+... 6	...+...
0001.00	--	Generate SQL					
0002.00	--	Version:		V6R1M0	080215		
0003.00	--	Generated on:		01/07/10	12:03:51		
0004.00	--	Relational Database:					
0005.00	--	Standards Option:		DB2	i5/OS		
0006.00							
0007.00		CREATE TABLE XAN4CDXAD1.CONTACTS_CNTACS (					
0008.00		CUS_NO_ FOR COLUMN CUSNO DECIMAL(5, 0) NOT NULL DEFAULT 0 ,					
0011.00		CONTACT FOR COLUMN USERNM CHAR(34) CCSID 37 NOT NULL DEFAULT '' ,					
0012.00		PRODUCT_CODE FOR COLUMN PRPCDE CHAR(2) CCSID 37 NOT NULL DEFAULT ' ' ,					
0013.00		PHONE FOR COLUMN TELNO CHAR(17) CCSID 37 NOT NULL DEFAULT '' ,					
0014.00		FAX_NO_ FOR COLUMN FAXNO CHAR(15) CCSID 37 NOT NULL DEFAULT '' ,					
0015.00		EMAIL CHAR(40) CCSID 37 NOT NULL DEFAULT '' ,					
0016.00		LAST_DATE FOR COLUMN LCTDAT NUMERIC(6, 0) NOT NULL DEFAULT 0 ,					
0018.00		NEXT_DATE FOR COLUMN AUPDATE NUMERIC(6, 0) NOT NULL DEFAULT 0 ,					
0020.00		SALESPERSON FOR COLUMN SINIT CHAR(3) CCSID 37 NOT NULL DEFAULT ''					
0021.00		STATUS CHAR(1) CCSID 37 NOT NULL DEFAULT '' )					
0022.00		RCDFMT RCNTAC ;					
0023.00							
0024.00		LABEL ON TABLE XAN4CDXAD1.CONTACTS_CNTACS					

*Illustration 2: DDS Converted into SQL*

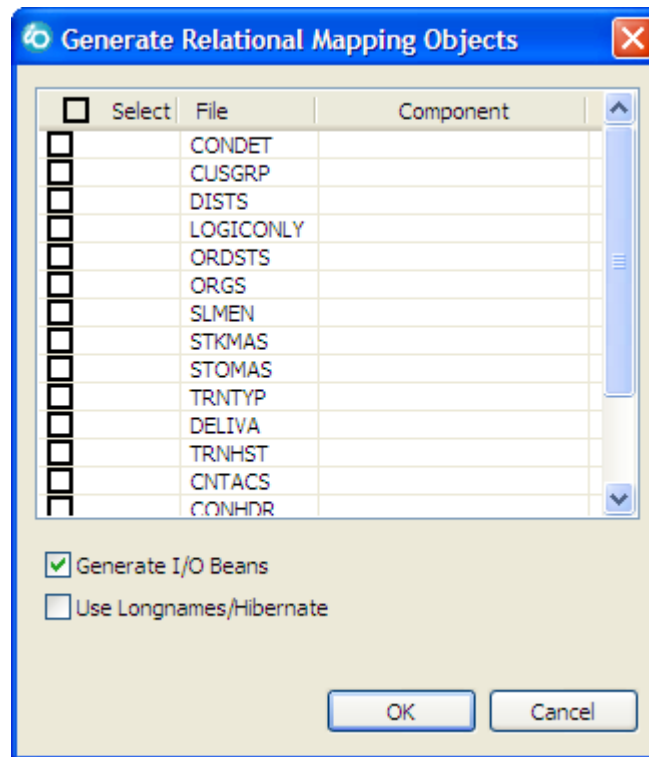
## **Generate Relational Mapping Objects**

Modern OO type development does not mean that relational databases need be abandoned. Indeed, it would be a fairly unwise strategy for a company to throw away its database and the information stored in it, for the sake of OO development. Java is an Object Oriented or OO language. System i databases are relational. Though Java Database Connectivity or, JDBC provides an easy method for accessing relational databases, it is basically a low level API providing only a thin layer of abstraction. Thus complex I/O and data requirements typical of System i applications quickly become very complicated to develop and maintain. JDBC is sufficient for small and medium projects, but is not that well suited for enterprise level applications. Therefore what is required is a framework that can act as a mediator between an OO design and a relational database.

Object Relational Mapping (ORM) frameworks are such mediators. The most widely used ORM framework for Java is Hibernate. Hibernate ([www.hibernate.org](http://www.hibernate.org)) is a free and open source Java package originated and backed by JBoss and Red Hat that makes it easier for Java developers to work with relational databases as it handles what's known as the persistence layer i.e. the bit that actually reads and writes data to the database. Hibernate has been downloaded at least 3 million times and has gained widespread usage so there is now plenty of literature and resources available for it. Hibernate allows Java developers to treat the database as a set of objects like any other object they use, thus dramatically simplifying the code they need to write. For large complicated databases, typical of system i applications, this is naturally a big advantage. It is this, which makes Hibernate one of the most popular; if not the most popular persistence frameworks used for enterprise Java applications today.

As a framework Hibernate naturally requires set up and configuration, and the more information that can be supplied in the configuration, the more effectively it can be utilized in development and production. Though DDL Schema can be imported directly into Hibernate, DDL that describes only the tables and fields of the physical database is only part of the ORM requirement. Relational or foreign key information

is obviously the next critical requirement for the Hibernate ORM to work effectively. With the help of the Application Re-engineering tool set the entire legacy relational model derived by the X-Analysis can be imported directly into Hibernate, thus producing an instant Object relational Map or ORM of the entire legacy application database.



*Illustration 3: ORM generation*

## ***Generate Database Service Programs***

With the help of Application Re-engineering tool set one can generate entire set of CRUD RPG stateless I/O modules to be used as web services for any web or SOA type development.

[CRUD - Create, Read, Update, Delete - a tongue in cheek acronym coined to cover the key table operations any system has have]

The Generate Database Service Programs module generates Service Programs for the specified database files based on the template specified. The pre-defined templates are:

- ZSTEMPLATE - this will generate an SQL CRUD service program
- ZXTEMPLATE - this will generate an SQL extended READ service program
- ZRTEMPLATE - this will generate an RPGLE CRUD service program

```

ZRCNTACS
HKeywords+++++
H* CNTACS SERVICE PROGRAM
H* -----
H* Author:  DATABOROUGH LTD.
H* Version: Date: 01.07.2010 Time: 12:50:56
H* -----
H debug(*yes) copyright('Databorough Ltd. 2008')
H nomain

F*****
F* Files
F*****
Fcntl4  uf a e      k disk  usrpn

D*****
D* Definitions
D*****
D zrecord      e ds      extname(cntacs)

```

*Illustration 4: Example of ZRTEMPLATE*

```

ZXCNTACS
HKeywords+++++
***** Beginning of data *****
H* -----
H* CNTACS SERVICE PROGRAM
H* -----
H* Author:  DATABOROUGH LTD.
H* Version: Date: 01.07.2010 Time: 12:50:43
H* -----
H debug(*yes) copyright('Databorough Ltd. 2008')
H nomain

D*****
D* Definitions
D*****
D zrecord      e ds      extname(cntacs)
D zrecordsql   e ds      extname(cntacs)
D              prefix(sql)
D zrecordcpy   e ds      extname(cntacs)

```

*Illustration 5: Example of ZXTEMPLATE*

```

ZSCNTACS
HKeywords+++++
***** Beginning of data *****
H* -----
H* CNTACS SERVICE PROGRAM
H* -----
H* Author:  DATABOROUGH LTD.
H* Version: Date: 01.07.2010 Time: 12:50:32
H* -----
H debug(*yes) copyright('Databorough Ltd. 2008')
H nomain

D*****
D* Definitions
D*****
D zrecord      e ds      extname(cntacs)
D zrecordsql   e ds      extname(cntacs)
D              prefix(sql)
D zrecordcpy   e ds      extname(cntacs)

```

*Illustration 6: Example of ZSTEMPLATE*

## Highlights

- Simple to use - Eclipse based plug in
- Real time documentation - Comprehensive, accurate and current documentation of an application
- Ease of maintenance - Improves quality , productivity and reduces risk for any maintenance IT Project
- Export to various tools viz. PDF/MSWord, MS Visio and Spreadsheet (not dependent on the MS Office)
- Database modernization without recompile any of the existing programs
- Automated generation of ORM objects for Hibernate (Java Bean and XML files)
- Creates Service Programs (stateless CRUD) for each new table

Experience the fully loaded X-Analysis with 30 days trial copy of the software.  
For any information regarding the X-Analysis please visit our web site:

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