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# Data Warehousing and Business Intelligence solutions with EDW

## 1 Premise

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Once upon a time we had the problem of collecting large amounts of data about specific aspects of the real world in electronic form. Now the focus has shifted towards effectively querying such large amounts of data, correlating them, extracting synthetic information from them, in short making it so that the data is useful in a company's decision-making processes. In order to do that, it is required that the data is integrated, made homogeneous, validated for correctness and quality, transformed in many ways, and this is what a Business Intelligence (BI) infrastructure in general, and a Data Warehouse (DW) in particular, help to do.

Being able to extract significant information from heterogeneous databases is important to improve a company's decision-making processes. A good BI infrastructure helps in decision making in many areas: business management, profitability analysis, risk and asset management, marketing and more.

## 2 Requirements for an effective BI system

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An effective BI infrastructure is made up of many pieces; here we concentrate on the technology side – although we'd like to underline it's not the only important part – and list some requirements for it. These are the requirements that brought to the creation of EDW, a tool that helps in rolling out a BI infrastructure.

- ◆ Need to collect data from heterogeneous sources and integrate everything in the DW; this implies the need to transform, validate and correlate data as required.
- ◆ Need to improve and certify the quality of the data collected, by applying rules for data consolidation, normalization and de-normalization, encoding, decoding and re-encoding.
- ◆ Immediate availability of the data collected, an quick response to queries. This is achieved by a smart design of the DW schema, which employs different design criteria from those used for transactional (OLTP) databases.
- ◆ Flexibility in following changes to the company's organization and changes in processes and information flows.
- ◆ Knowledge about the specific business areas: a tool, as flexible and sophisticated as it can be, becomes useless if you don't know how to use it well.

## 3 EDW and Data Warehousing

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EDW (recursive acronym for "Edw is a Data Warehouse") is an array of software tools for building information-oriented applications, with an emphasis on Data Warehouse (DW), Extract/Transform/Load (ETL) and Business Intelligence (BI) features. EDW's goal is to allow to rapidly build these kinds of applications, while leaving room for customization even for non-developers. Thus, even the final user can customize the application, if and as required.



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EDW aims for a market segment in the BI tools area that has not been covered so far. Among high-end, sophisticated but often too costly and too complex tools, and low-end, inexpensive and simple products that are often poor in features or flexibility, EDW offers a good range of features, high customizability, no frills, effectiveness and low TCO. All this because:

- ◆ EDW is a modular system: you can buy and use just what you need, and optionally add new features as they are needed or as they are developed.
- ◆ EDW is a continuously evolving project, that grows and acquires strength through precious contributions from the different situations in which it is employed.
- ◆ EDW comes with the skills of Ethea and its partners in different business areas. We can provide the tools and we can also tell you how to use them well, in order to gain real advantages from the beginning.

EDW can be used in different application areas, and in different ways. Ethea offers EDW to a market that mainly consists of three kinds of actors:

- ◆ Companies in need of BI solutions, or simply companies with the data and the need to take decisions, but who don't know yet how to use the data to help the decision-making process. In this case we use our own tools and skills to build a shrink-wrapped solution for you.
- ◆ Companies that intend to develop their own BI applications by putting together a set of basic building blocks that EDW features, or customize solutions already developed by Ethea. In this case we provide the tools, the documentation and the skills. We can teach you how to use EDW at its best, and we can improve and extend EDW according to your suggestions and needs.
- ◆ Those wanting to develop BI solutions to market in particular business areas. In this case we can provide the development tools, the documentation and our skills, or we can find other kinds of common paths (joint development, sharing or transferring rights to use the product, etc.).

## 4 The features

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We can group the features of EDW applications into the following functional categories:

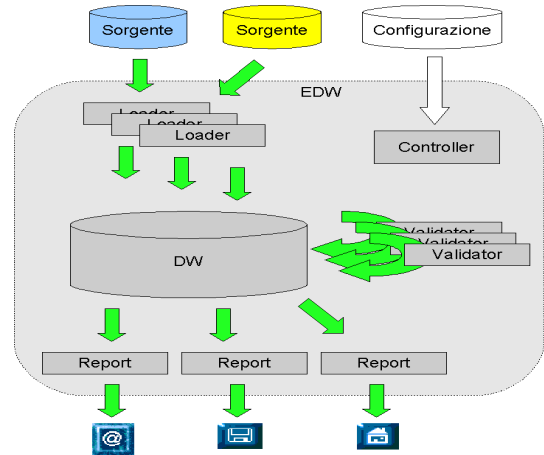
- ◆ **ETL:** extracting, consolidating, cleaning, converting, importing data from a number of heterogeneous sources into the DW (or any database).
- ◆ **Data browsing:** exploring the tables of the DW (or any database) with advanced features such as customizable searches/filters, lookups and master/detail structures), following a model that can be created automatically and quickly from the database schema.
- ◆ **Data editing:** inserting, modifying and deleting data, with customizable (possibly complex) business rules to enforce data integrity.
- ◆ **Reporting:** EDW integrates several different reporting engines (including but not limited to the great open source OpenOffice.org suite, or XML/XSL:FO technology, or ReportBuilder) to create both simple and complex reports that can be exported in many different file formats and/or sent/published in different ways.
- ◆ **Multi-dimensional analysis:** creating interactive analysis "cubes" with advanced features such as slicing, drill-down, rotations, projection, analysis, charting, ability to extract the data in different formats and produce reports.

The extremely modular nature of EDW allows the developer to compose and tune the different features in a fine way, according to the needs of the particular application. This will also allow us to add new advanced BI features which are currently under study.

The following sections describe in more detail the functional areas.

## 4.1 ETL

Once a DW is designed, it is necessary to feed it with data useful to answer the questions that will be sent to it. Such data has often variable structure and often comes from different sources; the data needs to be manipulated, correlated, normalized, validated and certified. The ETL tools built into EDW allow to gather data from a variety of sources (such as relational databases, text files, XML files, web sites, files produced by office applications, and so on) and manipulate it in many ways. Furthermore, the modular nature of EDW makes it so that the range of supported types of sources and the ways in which the data is manipulated can be continuously extended: if anything's missing now, we can easily add it in.



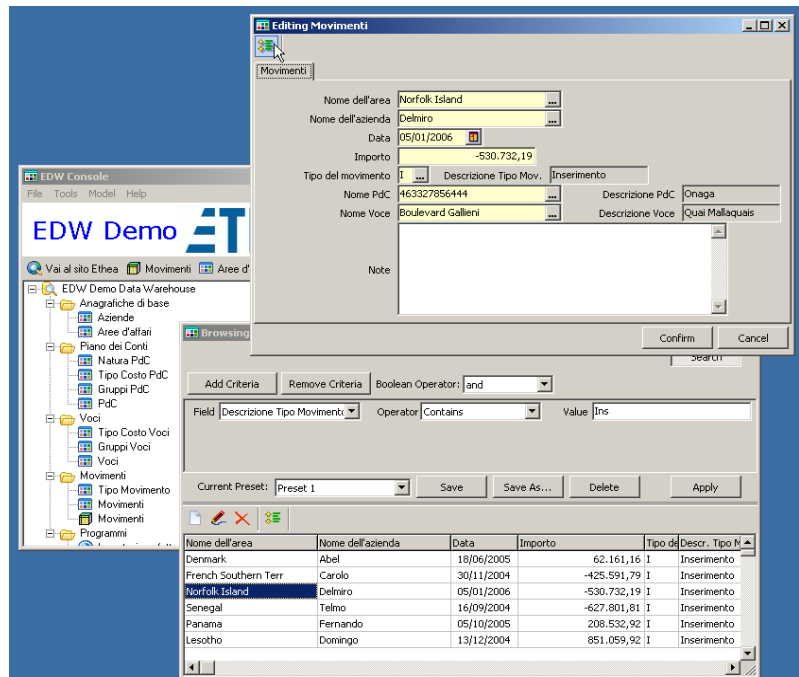
How the ETL tools in EDW work

## 4.2 Data browsing

You can browse the entire DW (or any database) by means of an interactive, sophisticated user interface. This interface is part of the EDWConsole application, and it can be easily customized and extended at will to follow the evolution of the database schema, without the need to change the application itself. When the DW grows (new tables, new fields, new rules), EDWConsole grows with it.

## 4.3 Data editing

As an ideal complement to its data browsing features, EDWConsole offers data editing abilities to manually input in the DW the data that don't come through the ETL processes, or to massage the data in custom ways. The user interface is sophisticated and can be finely tuned; it can be evolved to follow the underlying database structure and it allows to enforce custom business rules, which are often expressed declaratively without the need to code them in.

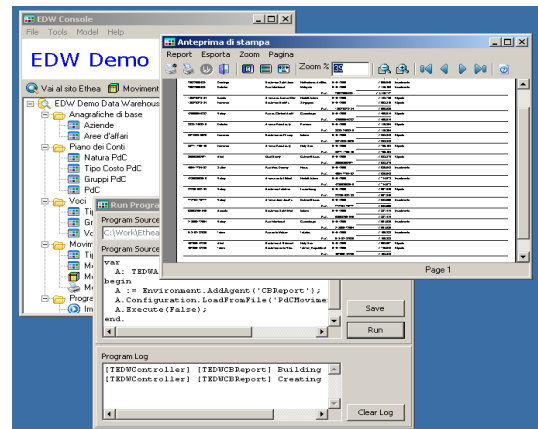


Data browsing and data editing in EDWConsole



## 4.4 Reporting

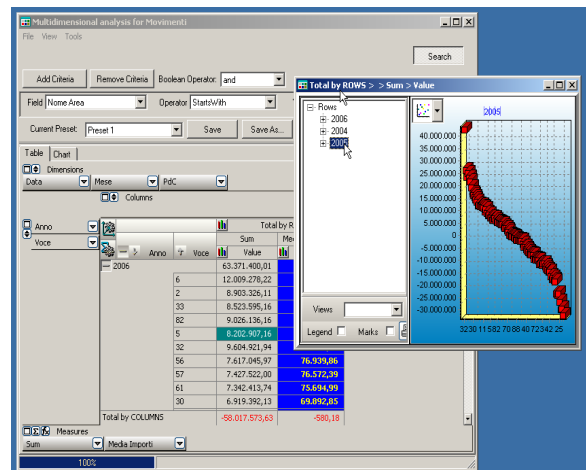
A complete database is only useful if you can extract important information from it; EDW can produce simple or complex reports in universal file formats such as text, PDF, XML, Microsoft Office or Open Document, either for human consumption or for integration with other systems. Even the final user can add new reports or customize the existing ones, and the process of producing reports (as everything in EDW) can be automated and scheduled at given dates and times. The reports can be produced as local files, or printed, transferred through the Internet, sent as e-mail attachments, published on the web, and so on. This is another area in which the modular nature of EDW comes handy.



Print preview in EDWConsole

## 4.5 Multi-dimensional analysis

A basic BI feature is certainly multi-dimensional analysis, which allows the user to compare different aspects of a business area in a number of ways, through a flexible and intuitive user interface, and produce reports and charts. Such a tool is called "multi-dimensional cube", or hyper-cube. EDW includes a market leader multi-dimensional analysis engine that features slicing, drill-down, wrapping, forecasting and other advanced analysis tools. This engine is fully integrated into EDWConsole, and (as with everything else in EDW) you can configure and customize it in many ways through external configuration files.



Multi-dimensional analysis in EDWConsole

## 5 Technology

EDW works with different database engines. The applications we have created with EDW so far work with Firebird and Microsoft SQL Server (as well as any database supported through Microsoft's ADO technology), and others will be added shortly. Adding support for a particular database engine is easy and quick in EDW.

On the development side, EDW is built in Delphi 7, Turbo Delphi for Win32 and Borland Developer Studio 2006. We're considering porting EDW to .NET or other platforms, depending on customers' requests. You can extend EDW at the source code level to achieve a total degree of customization, but you should also know that most of the things needed to build an application with EDW do **not** require Delphi nor expert developer skills.

## 6 Availability

EDW is immediately available, and we have already developed a few applications with it. Contact us ([info@ethea.it](mailto:info@ethea.it)) to request more information, a demo or a trial of EDW, and keep an eye on our web site ([www.ethea.it/eng\\_edw.asp](http://www.ethea.it/eng_edw.asp)) for further news, demos, and technical details.