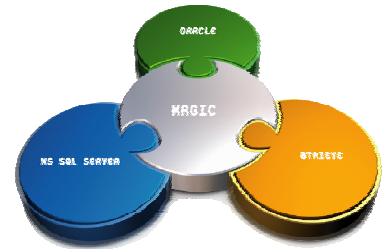


## PAINLESS MULTI-DBMS STRATEGY For Magic e-Developers



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## Challenge: Supporting Multiple DBMS with One Application

Magic developers, or Magicians, are able to rapidly develop complex, scalable enterprise client/server business applications utilizing the powerful Magic development framework. Magic developers are also able to currently deploy their applications with different databases including Oracle and Microsoft SQL Server using Magic's gateways for each of these databases.

Although Magic developers are able to choose a specific database to develop and deploy with, supporting multiple databases poses a special challenge, especially for ISVs who want to support multiple databases in their market segment. To support multiple databases, Magic developers need to maintain multiple CTL files, create tables in each environment and follow different development methods for supporting each database.

Mertech's approach can help alleviate the difficulties associated with supporting multiple back-ends. Supporting multiple back-ends makes good business sense and provides new sources of revenues without significant investment.

## Multiple Database Support Is Good For Business!

A recent study published by Gartner shows that DBMS software sales are continuing to show growth (see figure below) at a healthy rate.. The numbers underscore the importance of the DBMS in the IT infrastructure.

**Total DBMS Software New License Revenue Forecast, Worldwide 2005-2010 (Millions of Dollars)**

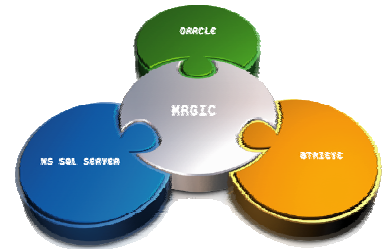
	2005	2006	2007	2008	2009	2010	CAGR (%) 2006-2010
DBMS	10,348.3	10,810.5	11,495.5	12,153.9	12,785.0	13,407.4	5.3

\*Gartner April 2006

Of the \$10 billion dollar market, relational databases from Oracle, Microsoft, IBM and others hold nearly 80% of the market share. This means that an ISV is more and more likely to encounter a relational database already in use at a potential customer site and is more likely to encounter an IT manager who would want applications to work with existing database systems.

This poses a special challenge to ISVs who do not support leading relational DBMS. Rewriting or re-engineering their application based on ISAM databases is a major undertaking. At the same time, ISVs have to find new customers in an increasingly competitive market, retain their existing customer base, and continue developing new product features. Mertech's products address these

challenges faced by ISVs and also by corporate IT departments who face similar challenges. Mertech products enable ISVs and corporate IT departments to quickly adopt a multi-DBMS strategy or switch to another database without the cost of an expensive re-write, without going through the full development life-cycle and without creating a maintenance nightmare by supporting two source bases. For ISVs, Mertech's solution provides an instant access to the large RDBMS market and adds a **“we will support any database you choose” checkbox**. For corporate customers, Mertech's products provide a low cost option to switching to Oracle and MS SQL Server.



## Mertech Provides Seamless Multi-DBMS Option

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Mertech is a global provider of software and services that allows companies to modernize their IT infrastructure, beginning with the database. Mertech's products provide a very compelling value proposition for companies looking to quickly adopt an RDBMS into their IT infrastructure. That value proposition will:

- Alleviate the costs associated with migrating applications working against existing transactional data sources to SQL databases
- Provide developers with a cost-effective, efficient, and platform-independent solution to use their existing applications with MS SQL Server, Oracle and other database servers
- Open doors to new business!

For corporate customers, Mertech's products provide a quick and seamless solution without expensive code re-engineering. For ISVs, Mertech's products offer an efficient way to support a multi-DBMS strategy for their applications.

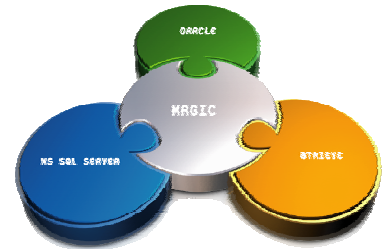
Mertech's BTR2SQL™ product line is designed to replace Btrieve/Pervasive.SQL transaction engines with a relational DBMS (more details on this can be found in a related white paper on our website). The product bundle is comprised of an easy to use GUI migration tool and two database drivers; one for MS SQL Server and the other for Oracle. The drivers use the native APIs, OLEDB for SQL Server and OCI for Oracle to provide the fastest possible access to the respective database servers.

## Dealing With Magic Specific Issues

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In order to support Magic's way of developing software application, Mertech made changes to its products to the best possible integration with Magic. The question is: "what do Magic developers have to do, if anything, to support Mertech's products?"

In this section, we will discuss those issues and present how we solved them.



## Database Migration

The powerful Magic development environment handles all tasks related to storing and creating table structures, allowing the developer to focus on high-level data definition in their applications. This leads to two questions: 1) How to migrate data for sites that already are deployed with Btrieve/Pervasive to SQL Server or Oracle and 2) How will Magic handle table creation/deletion once the data has been migrated using Mertech's drivers?

Mertech provides an easy to use GUI database migration tool that automatically creates tables and indices, and copies records to the newly created table. The tool utilizes the Pervasive data dictionary files (DDFs) for information regarding field types, field names and field size along with index structures. Since Mertech currently doesn't have a straightforward way to extract data definitions directly from Magic, DDF is needed accurate table and index creation. **The DDFs are not needed after all the tables have been migrated to the new database.**

Magic provides an easy way to [generate DDFs](#) from the Magic environment. Once the DDFs are generated, data migration simply requires pointing to these DDFs from [Mertech's migration tool](#) and converting the entire database.

## Dynamic Table Creation/Deletion

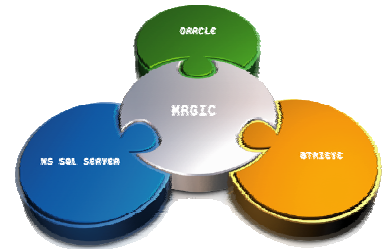
The next issue is creating and deleting tables on the fly during program execution. Magic developers know that when they want a table, it will be created in the database and when they want to delete a table, it will be removed. At the database level, this is handled by the Btrieve/Pervasive engine. For handling table creation on the fly, Mertech requires that an entry for the table structure be present in the DDF file **during data migration**. Mertech stores this information in its own data definition files (called .INT files). When Magic issues a create command, Mertech reads the data definition from the corresponding INT file and creates the empty table on the server based on this definition.

When using DBDEL, the Magic runtime issues a file delete command through the Windows runtime and not through the Btrieve API, which results in these calls not being trappable by Mertech's drivers. Mertech has exposed driver functionality through a B\_DELETE command that allows Magicians to easily remove tables from the SQL backend. So if your program is deleting files on the fly using the OS, then you will need to modify that code and use the B\_DELETE call instead

## Handling Multi-Directory Database Structure

Some applications create same table structures in different directories as a way to differentiate between data of different company or different year. For example, data for CompanyA might be stored in directory \App\CompanyA and for CompanyB in \App\CompanyB.

Mertech provides for an easy way to handle such deployments through the use of an INI file created specifically for Magic. The INI file allows Magic developers to handle multiple directory deployment, to automate SQL logins and to easily handle multiple data directories. The INI contains the necessary information to also deploy tables to different databases and even a different server.



## Dealing with Database Security

Once the tables are migrated to an SQL backend, the application will need to log on to the server before getting access to the tables. Mertech provides an automatic pop-up login dialog that appears when a table is accessed. Once the user id and password has been provided or in the case where Windows Authentication is used, the application will continue on after validation.

Logins can also be automated through the use of INI file where the user id and password is encrypted and stored.

## Automatic Magic to SQL Data Mapping

All Magic data types are automatically mapped to appropriate SQL data types, with flexibility to change some ASCII types through the migration tool.

## Handling Reserved Table/Field Names And Special Characters

All Mertech drivers employ "quoted identifiers" to ensure that reserved words and special characters in tables continue to work without requiring changes. Table names containing invalid characters (such as '?' in Oracle), can be automatically mapped to valid table names.

## Handling Unique Keys

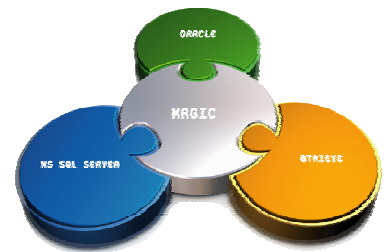
Tables without a unique key pose a problem for Magicians looking to move to an SQL backend. This is because in Pervasive/Btrieve, a record can always be accessed by the record offset which serves as unique identifier for the record. Magic might inherently rely on a unique value to access record. Moving a table without an explicitly declared unique key could lead to problems.

Since Mertech drivers are designed for Pervasive databases, we also provide a way to uniquely find a record through an auto-increment column which gets added to the table during migration.

## Locking and Transactions

If you are using Btrieve/Pervasive engines with Magic, it doesn't matter how you handle transactions and rollback. However in the SQL world, all applications are written with transaction support. The locking mechanism in SQL depends on the "isolation level" of the transaction. In general, one cannot lock a record outside of a transaction in SQL databases, but in Pervasive/Btrieve you can.

Mertech has developed special techniques to allow record locking outside of a transaction. However, it is our recommendation that you turn on transactions when using SQL databases for the best performance.



## Getting Started!

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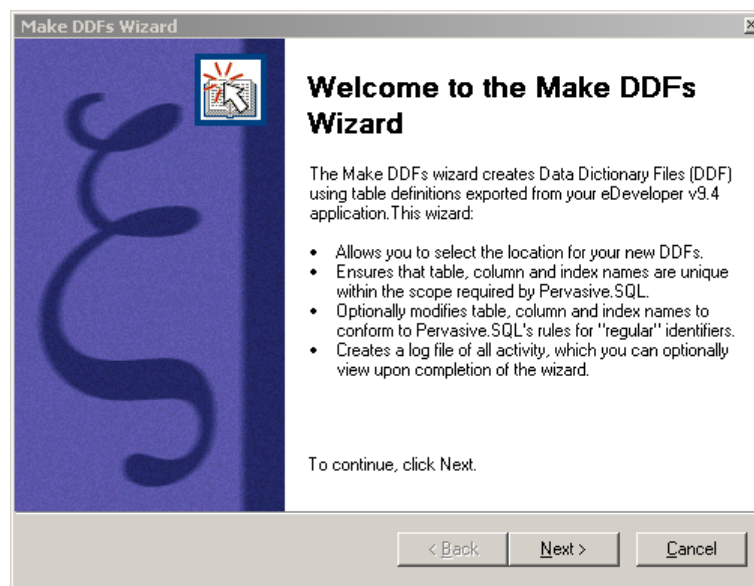
### Preparing your Environment

- a. Install a copy of Mertech's ISDBC Drivers for Magic, selecting the defaults during the installation.
- b. Select a target folder where you plan to store the DDFs (which will contain the table, field and index information used by Btrieve and Mertech's drivers during migration).
- c. If there are old DDFs in the location you have selected, delete them. If you have previously run your application with Mertech's Drivers, restore C:\Program Files\Magic\

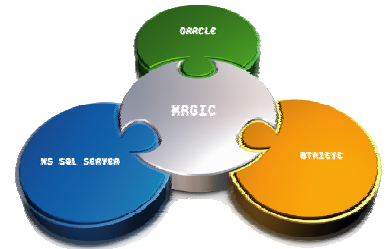
Magic is capable of generating the Btrieve files on the fly during application run so it is common to not deploy all of the possible files. However, the migration process needs to extract some information from the Btrieve file, so it is important that all Btrieve files exist before continuing.

### Generating Pervasive DDFs from Magic Environment

- a. Start Magic eDeveloper and from the **Tools** menu, select **DDF Maker** and **Export Definitions** which launches a step by step wizard. Follow the steps to its completion.

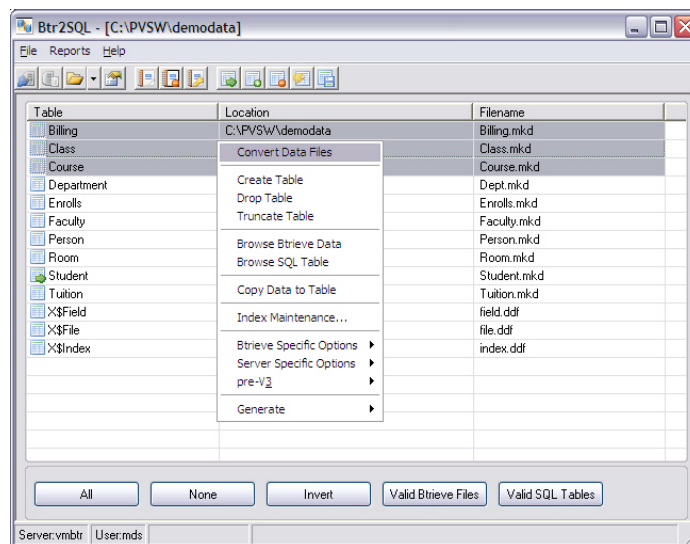


- b. After the wizard finishes, return to the **Tools** menu, select **DDF Maker** and **Make DDFs**. Follow the steps in the wizard that appears, leaving all boxes unchecked.
- c. Exit Magic.



## Migrating Your Existing Data

- a. Start Btr2SQL (installed in the start menu) and login to your MS SQL Server or Oracle database.
- b. A File Open dialog will appear the first time, allowing you to browse to the location where you generated the DDFs.
- c. A dialog shows up displaying all your tables. Press the **All** button to select all of the tables.

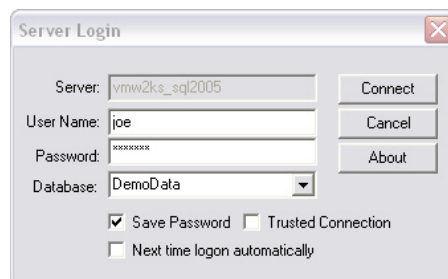


Right click in the list and select **Convert Data Files**.

- d. Review the options in the dialog that comes up and click OK to migrate all tables.
- e. After this is done, exit out from Btr2SQL. Your data has now been copied to the SQL backend.

## Running Your Application

- a. Save a backup copy of C:\Program Files\Magic\\wbtrv32.dll copy Mertech's wbtrv32.dll from C:\Program Files\Mertech Data Systems\DB Drivers\BTR\deploy\wbtrv32\<sql | oracle>\ to C:\ProgramFiles\Magic\



the existing file. All database calls from Magic to Btrieve will now go through Mertech's dll.

- b. Start your Magic application. A login box will appear asking you to connect to your MS SQL Server or Oracle backend. Provide the appropriate connection information.
- c. Click Connect and continue on with running your Magic application.