

Introduction to MySQL on Windows

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Special thanks to Chris Travers, Contributing Author to the Open Source Software Lab

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Background

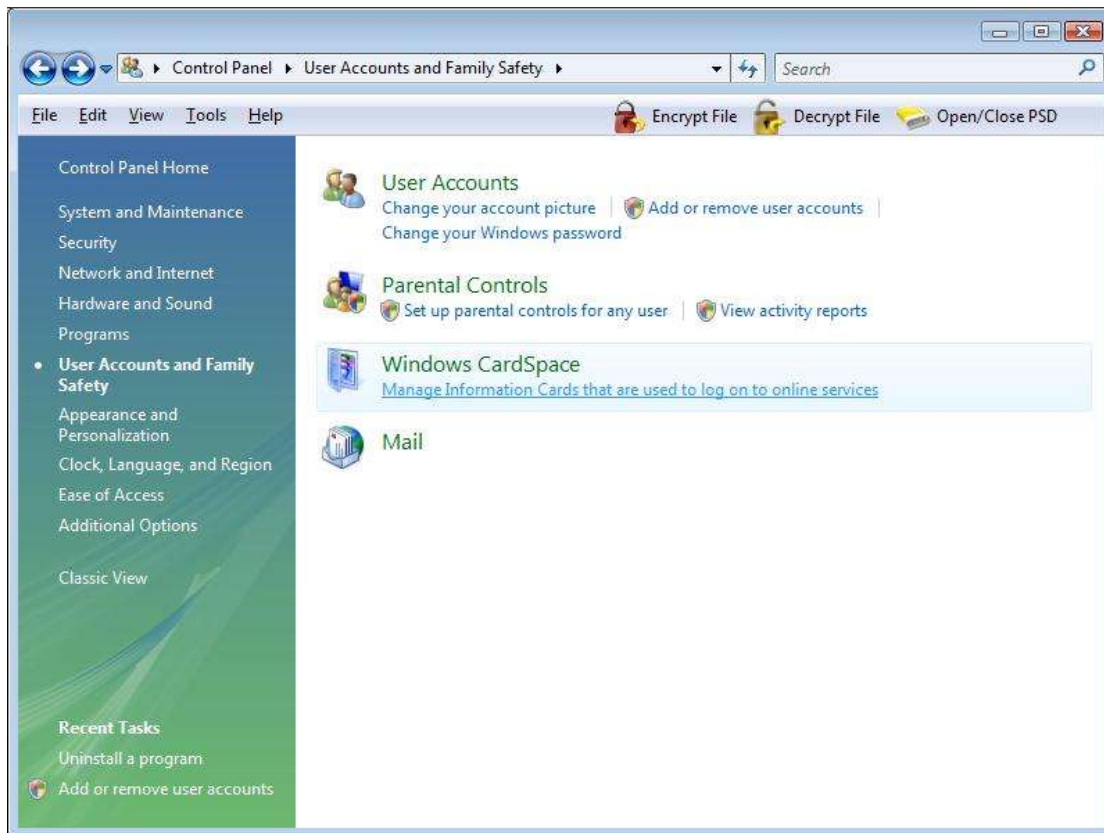
MySQL is an open source relational database management system which is quite popular for light-weight web applications. Over the last few years, the product has also added some features which allow it to be used for larger business tools. This paper will provide an overview of this software on Windows. MySQL does not have as many features as PostgreSQL, and while many of the more advanced features are not as mature. However one would expect it to perform substantially better than PostgreSQL on Windows because of its thread-based architecture (PostgreSQL uses a process-based architecture instead).

Note for Vista Users

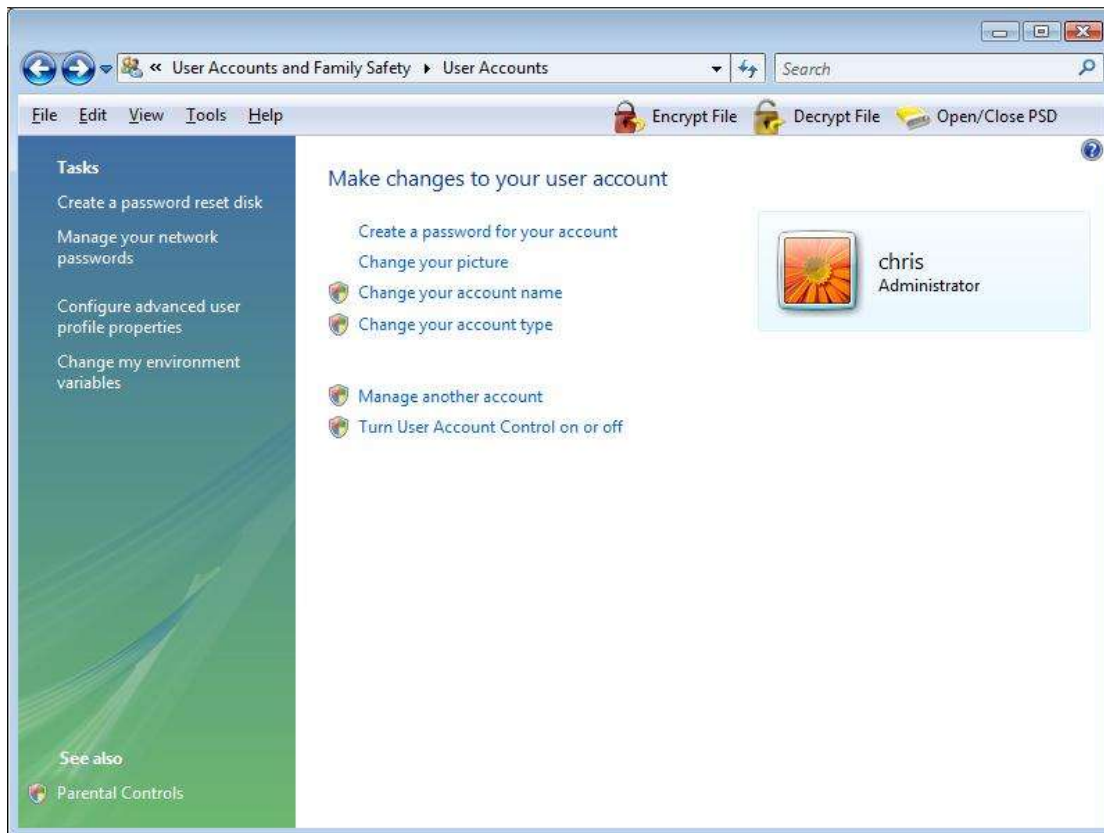
The MySQL installation requires that User Account Control (UAC) is disabled. If you do not do this, the installation will fail when the system tries to start the service, even if the user allows the change. To disable UAC, go to the Control Panel:



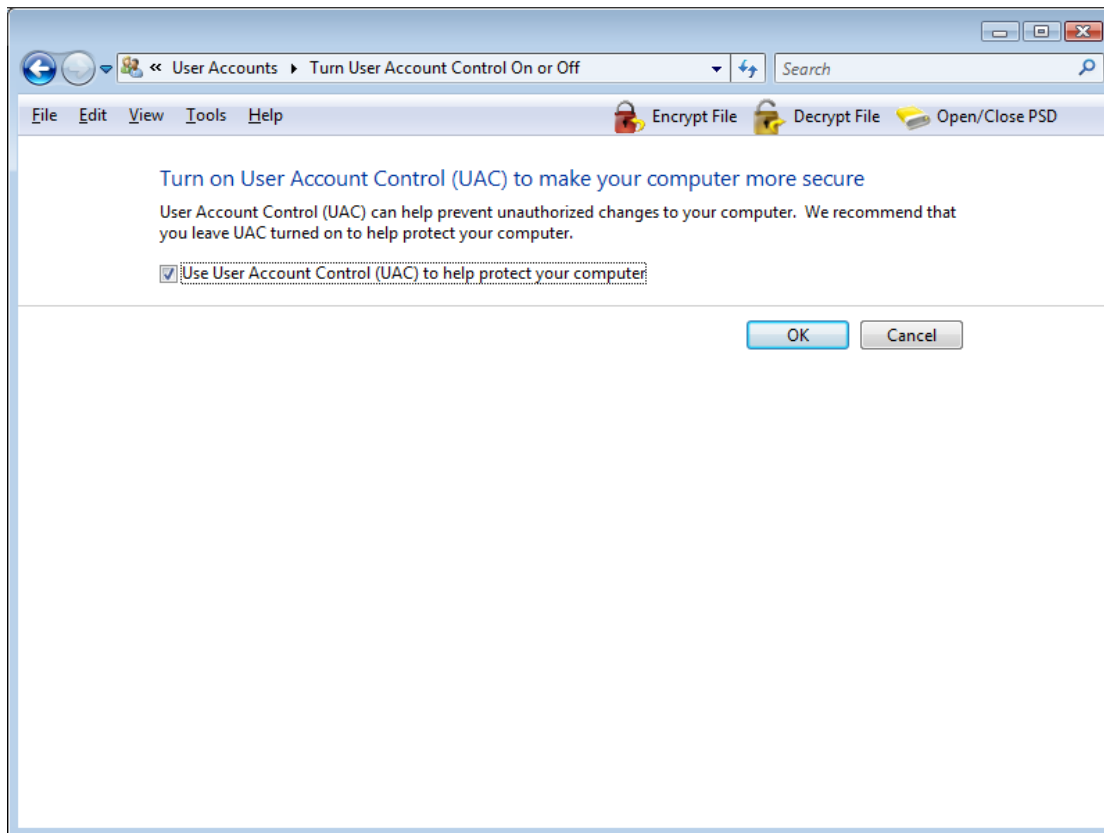
Select **User Accounts and Family Safety**. This brings up the next screen:



From here, click **User Accounts**. This will bring up the following screen:



Select **Turn User Account Control on or off**. If User Account Control is enabled, it will pop up with a dialog asking for permission to continue. Click **Continue** and the User Account Control screen will appear:



Uncheck the box and click **OK**. You will need to restart your computer for the change to take effect.

Once you have finished the installation, you can re-enable UAC and the software will continue to run without issue.

Planning

- ✓ The typical install of MySQL 5.0 on Windows takes about 90MB plus space for data
 - Approximately 60MB for the software
 - Approximately 30MB for the database skeleton
- ✓ The software is installed to C:\Program Files\MySQL by default
- ✓ The data files are installed at C:\Program Files\MySQL\MySQL Server 5.0\data by default. This can be changed using the Server Configuration Wizard (see below).
- ✓ The amount of space required to store a given amount of data depends on the table type used and other factors. InnoDB uses the most storage while archive uses the least.

General guidelines for storage capacity planning are difficult to arrive at because they are dependant on the storage engine used and, in some cases, on the level of concurrency expected in the application.

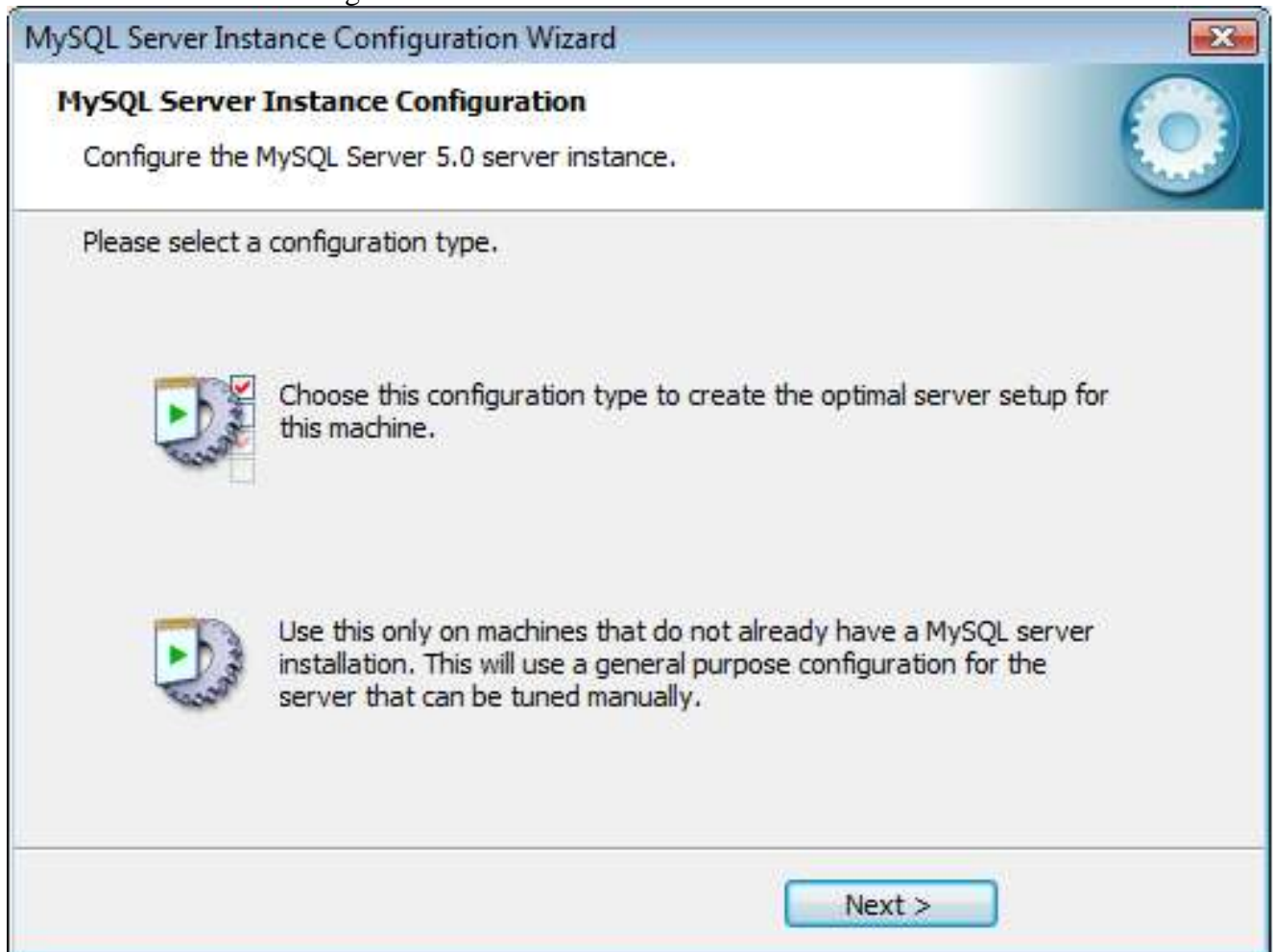
Generally speaking, if you are working with large datasets or expect high concurrency, you will want to consider carefully where you want to put the InnoDB tablespace. If this installation is for a small data set with little concurrency, then this can be left at its default.

Installation and Initial Configuration

The installation process uses a standard Windows installation wizard. Nearly all of the screens are entirely self-explanatory, and no configuration information for the software is entered at this stage.

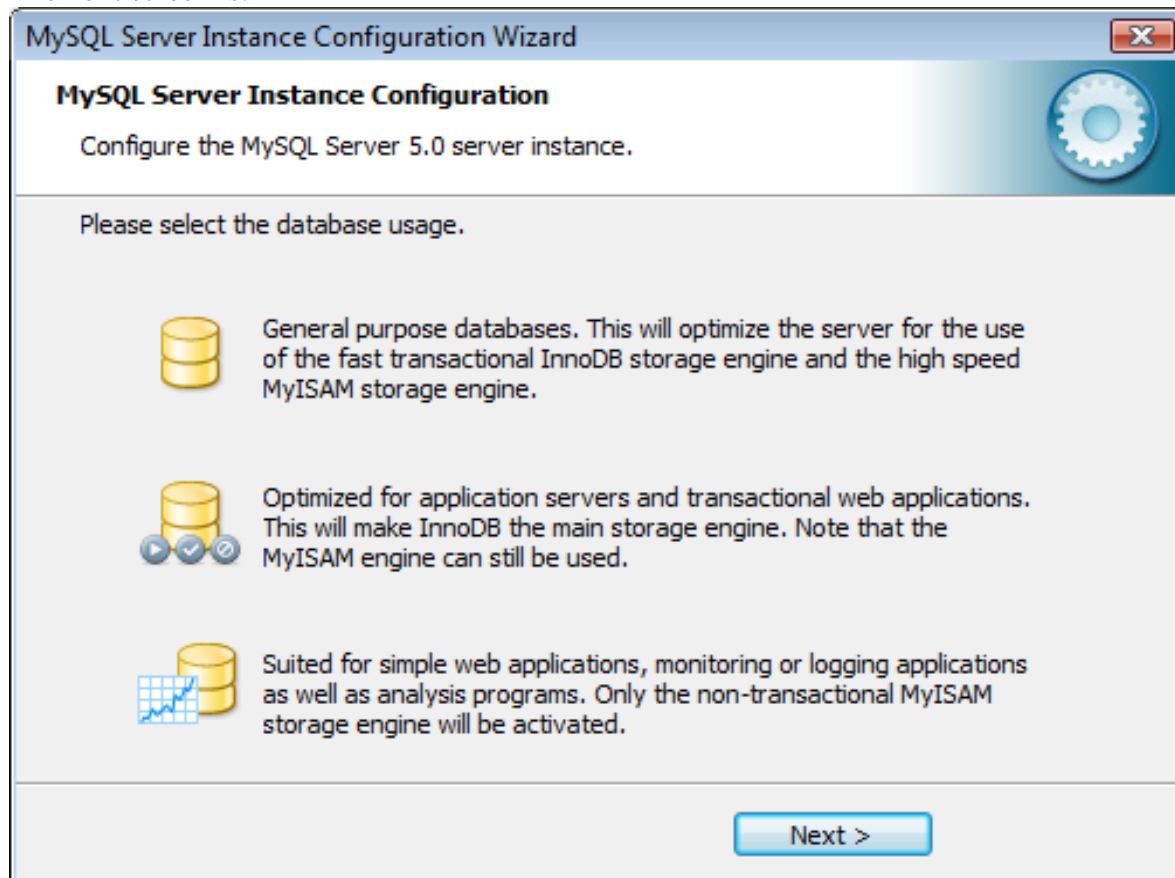
When the software installation completes, a configuration wizard will run which contains the options which require more discussion. Should you decide not to run the wizard at that time, or should you decide to change your configuration later, the configuration wizard is also installed along with the software and can be located in the start menu.

The first screen in the configuration wizard is:



In general, this tutorial focuses on the default option ("**Choose this configuration type...**").

The next screen is:

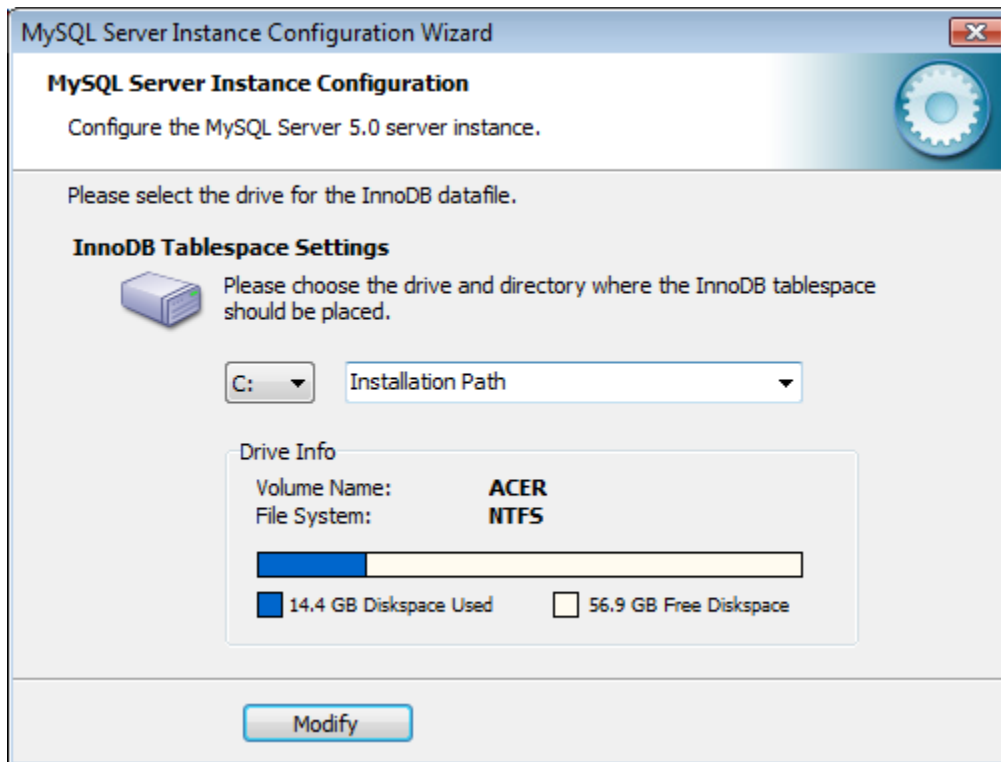


In most cases, you may want to consider this choice somewhat carefully. The main table types supported on Windows are MyISAM and InnoDB. These use fundamentally different techniques for maintaining concurrent data and have different strengths and weaknesses.

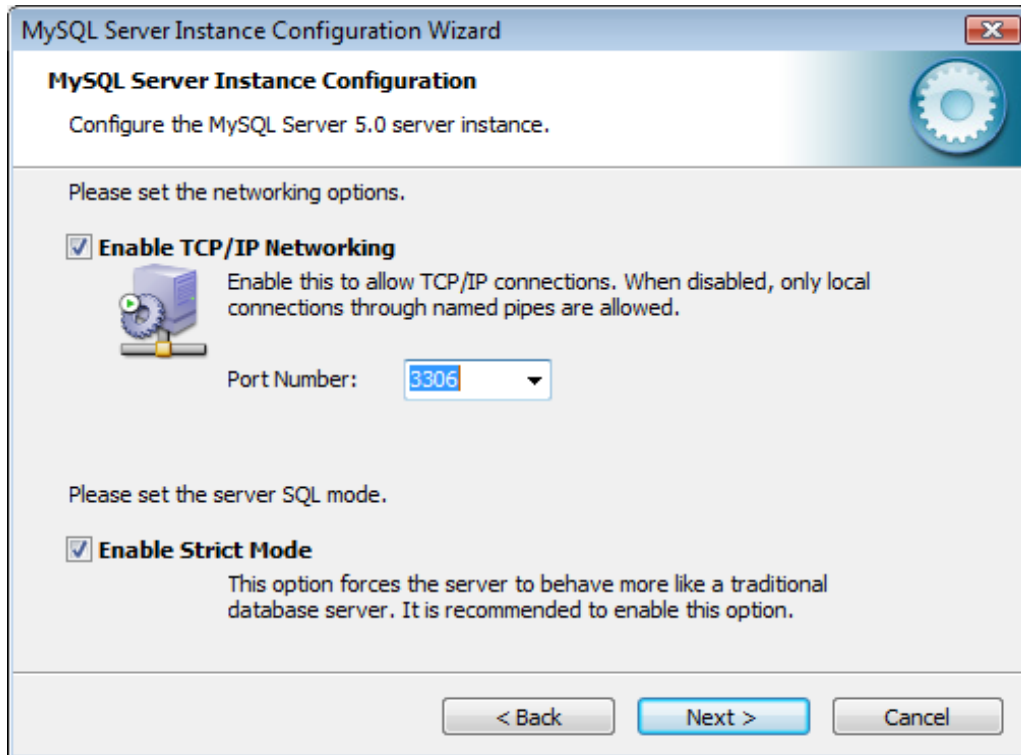
- MyISAM was the first major table type that MySQL supported. It has no transactional rollback capability, and concurrency is controlled using table locks. It is optimized for rapid searches, but trades substantial data integrity controls for this performance gain. Foreign key constraints are not supported on MyISAM tables. For basic content management systems, it is probably the preferred table type.
- InnoDB (licensed now from Oracle), provides a Multi-Version Concurrency Control based storage engine similar in some ways to PostgreSQL. InnoDB is far slower than MyISAM for simple data retrieval, but would be expected to perform better when large numbers of inserts, updates, and selects must happen concurrently. This is because locking is not generally necessary to manage concurrency. However, full text indexing is not supported on this table type.

Other table types exist (Heap, Merge, BDB being a few) but will be covered separately, as they are not generally as widely used as MyISAM and InnoDB.

If InnoDB is available, you will then be asked where you want that engine to store its files. The default is the data directory in the installation directory. Developer systems can leave this at the default. Production servers may do better to move this to a RAID array or similar device.



The next screen of note is:



Strict mode is an important new feature in MySQL 5.0. In prior versions, MySQL tried very hard to commit a transaction without aborting it. Numbers would be truncated silently, and dates like Feb 31, 2007 would be accepted as valid. Because this sort of behavior was causing MySQL to be dismissed from projects requiring a "serious RDBMS," strict mode was added. This feature tightens down the validity checks on entered data but may break older applications.

Note that strict mode can be turned off by users or applications on a per-connection basis so one should not use it as a major protection for data integrity. It is, however, one more protection which may be useful.

The rest of the wizard needs no additional explanation.

A Note on Table Types

MySQL uses an abstraction layer to allow different methods to be used to store data within the same database. Each table type has its own benefits and drawbacks, and using the wrong table type can cause some data integrity controls to silently fail.

The main table types available in MySQL on Windows are (in alphabetical order):

- **ARCHIVE:** This storage engine uses a compressed flat file to store large amounts of information. Indexes are not supported, nor are transactions.
- **BDB:** This storage engine uses the Berkeley Database Engine, developed by Sleepycat Software (recently acquired by Oracle) as a back-end. It does not perform as well as

InnoDB under load, but appears to take up less disk space. It may be worth considering when concurrency is expected to be low but space is at a premium.

- **FEDERATED:** This storage engine allows for management of external data on other MySQL servers. No data is stored in a FEDERATED table itself. There is no transaction support.
- **InnoDB:** This table uses a row-versioning in order to allow for transactional consistency. The back-end for this table was originally developed by Innobase (acquired recently by Oracle). It is licensed under the GPL, and MySQL AB purchases additional licenses for their enterprise customers. It requires more space.
- **MERGE:** This storage engine allows for partitioning of data across MyISAM tables. The MERGE is just the parent table (where no data is actually stored), while identical tables hold the partitions.
- **MEMORY:** This storage engine forces an entire table to be stored entirely in memory and never written to disk. It is therefore not ACID compliant, but is sometimes used as a useful developer tool (sort of an SQL interface to shared memory segments).
- **MyISAM:** This table type uses a flat file to store the data, and auxiliary files for indexes and metadata. Because there are no provisions for keeping data around after it is updated, MyISAM does not support transactional operations. It the oldest table type still supported.

To create a table with a specific table type, you can use the optional ENGINE keyword. For example:

```
create table foo ( bar INT ) ENGINE = InnoDB;
```

Note that currently only the InnoDB and BDB engines are transaction-safe. Furthermore, if an engine is not recognized by the create table statement or is not usable, the system will automatically fall back to MyISAM tables and thus support for foreign key constraints and transaction rollback can be silently lost if one is careless.

Final Thoughts

This paper cannot be a reference manual for database administration or management. However, it is hoped that it provides enough information that a system administrator can install the software base for other programs without running into many common problems.

About the Author

Chris Travers is the owner of Metatron Technology Consulting, a business devoted to helping customers use open source software in mixed environments or otherwise. He has over 8 years experience with MySQL as a database administrator and programmer.

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