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VE Industries has been providing clients with Microsoft infrastructure and technology consulting support since 2003. With a core focus in Microsoft Exchange, Active Directory and Azure cloud computing we pride ourselves on facilitating long-term client relationships that revolve around consistent, personalized and reliable support. As the guidelines for technology infrastructure and information security continue to fluctuate, we are committed to implementing crucial strategic support for our clients.

Comparing the MyISAM and InnoDB database engines for MySQL

by Aaron Wood

Databases are almost always used when building applications, whether they are web applications or native applications. Choosing an appropriate database engine is a critical step in the design and planning stage and should not be overlooked. A database engine (sometimes called a storage engine) is the underlying software in a database management system that takes care of creating, reading, updating, and deleting data. This article will be comparing two engines that are commonly used with MySQL, MyISAM and InnoDB. For those unfamiliar with MySQL, it is an open source relational database management system (RDBMS) developed by Oracle. As of June 2013 it is the most widely used open source RDBMS.

Let's look at MyISAM first and contrast it to InnoDB since it is the default engine for MySQL 5.0 and offers several benefits. When setup correctly and conditions are ideal MyISAM is extremely fast. It also offers full-text indexes which are great for applications that need quick, accurate search functionality. MyISAM tables are also very simple thus being easily learned and understood. You may be thinking to yourself "Why would I want to use anything other than MyISAM? This sounds like the perfect engine!" However, its speed and simplicity comes with a few major drawbacks.

First of all, MyISAM is generally faster with reads while InnoDB is faster with writes. If you have a table that you know will be handling about as many writes as reads then you'll want to use InnoDB. Concurrent writes to a MyISAM table will lock the entire table which means that all other changes to that table are held until the write has been completed and the lock has been released. This is the primary reason for why the InnoDB engine is better at handling writes. If you're trying to perform thousands of writes per second you can imagine what happens to the performance under MyISAM.

Secondly, InnoDB now offers full-text indexes as of MySQL 5.6.4 which makes the argument of using MyISAM based upon this feature moot. It's very possible that you'll want your tables that are utilizing full-text to be MyISAM anyway if they're going to be performing a lot of reads. But for tables that need to be both read and written to in addition to having a full-text index InnoDB is possibly a better alternative.



Lastly, the simplicity of MyISAM means that you lose a few key features corresponding to data integrity. MyISAM does not support transactions or foreign key constraints. It also is not ACID compliant. Covering ACID and explaining it well would really need its own article but basically it represents a set of properties that guarantee transactions are processed reliably. Recovering from a crash also takes a bit more work since MyISAM tables are prone to corruption after a power failure or some other kind of failure. This isn't the end of the world though since tables can be repaired by running REPAIR TABLE against a corrupted table.

Now let's go over some of the advantages and disadvantages of InnoDB. Support for transactions, foreign key constraints, and row level locking are what makes InnoDB a great choice if your focus is data integrity and write performance. InnoDB is ACID compliant and since it supports transactions you are guaranteed reliability and integrity. Foreign key constraint support means that you can enforce relationships at the database level instead of at the application level. In addition to reducing errors and improving data consistency foreign key constraints can save development time which is always important. Probably one of the biggest advantages that InnoDB has over MyISAM is row level locking. This means that if a row is being inserted, updated, or deleted and there are additional changes that need to be made to the same row, only those changes are held up. This is vastly different from MyISAM's table level locking which will lock the whole table for situations like this. You can see why InnoDB excels at handling writes and would be a better choice for data-heavy applications. As with MyISAM, InnoDB comes with drawbacks of its own.

Since transactions and foreign key constraints can be used with InnoDB this means that your database design will be more complex and potentially take more time to build out. Additionally, you may need to change your application's underlying code to use transactions effectively and to take full advantage of the benefits they offer. Taking all this into consideration some say that InnoDB is harder for beginners to pick up and understand so there may be an increased learning curve compared to if MyISAM was being used. It was mentioned before that MyISAM is normally faster at handling reads so it's very possible that your tables using InnoDB will suffer from reduced performance if your application is primarily selecting data from them.

Each database engine has its own set of advantages and disadvantages. You'll want to evaluate what your application's requirements are such as what kind of data it will be dealing with and how much data you will be consuming in order to pick the correct engine. With the release of MySQL 5.6 InnoDB has become much more attractive due to the incorporation of full-text indexes but you certainly can't ignore MyISAM's read performance.

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