DZone Refcardz

Essential MySQL

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ABOUT MYSQL

MySQL is the world's most popular open source database, sporting a barrier of entry low enough to attract novice developers yet powerful enough to power some of the world's most popular websites, among them Yahoo!, BBC News, the U.S. Census Bureau, and Craigslist.

This reference card was created to help you quickly navigate some of MySQL's most popular features. Covering topics such as configuration, administration software, backup procedures, SQL features, and user management, this card will serve as a handy desk reference for countless projects to come.

CONFIGURATION

MySQL supports over 260 configuration parameters, capable of controlling behavior regarding memory, logging, error reporting, and much more. While it's possible to tweak these parameters by passing them as flags when starting the MySQL server, typically you'll want to ensure they're always set at server startup, done by adding them to the *my.cnf* file.

The my.cnf File

The *my.cnf* file's range of impact on the MySQL server is location-dependent:

File/Option	Description
/etc/my.cnf (C:\my.cnf or Windows' system directory\my.ini on Windows)	Global scope. All MySQL database servers installed on this server will first refer to this location. Keep in mind this is the only file MySQL's Windows distribution will reference.
--defaults-extra-file=name	Server-instance scope. Passing this flag along when starting MySQL will cause the server instance to examine any parameters found within the referenced file.
~/.my.cnf	User-specific scope. This file is located in the user's home directory.

my.cnf File Syntax

The *my.cnf* file is a text file broken into several sections. Each section defines the context of the parameters defined within, the context being specific to a particular MySQL client (see the later section *MySQL's Many Clients*). For example:

```
# All clients
[client]
port = 3306

# The mysql client
[mysql]
safe-updates

# The mysqldump client
[mysqldump]
quick
```

FYI MySQL comes bundled with several my.cnf templates, each geared towards a specific purpose and resource availability. You can find these files in the support-files directory found in MySQL's installation directory.

Viewing Configuration Parameters

You can view MySQL's configuration parameters and their current values using one of the following commands:

From the *mysqladmin* client:

```
%>mysqladmin -u root -p variables
```

From inside the *mysql* client:

```
mysql>SHOW VARIABLES;
```

You can find a specific parameter using the LIKE operator:

```
mysql>SHOW VARIABLES LIKE "key%";
+-----------------------------------+---+
| Variable_name              | Value    |
+-----------------------------------+--+
| key_buffer_size            | 18874368 |
| key_cache_age_threshold    | 300      |
| key_cache_block_size       | 1024     |
| key_cache_division_limit   | 100      |
+-----------------------------------+--+
```

STORAGE ENGINES

Storage Engine	Description
ARCHIVE	The ARCHIVE engine is optimized for managing large amounts of data designated as stored for archived purposes. Data stored using the ARCHIVE engine can only be inserted and selected, and not deleted nor modified.
BDB	The Berkeley DB (BDB) storage engine was the first MySQL engine to support transactional operations, but was removed in the version 5.1 release

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Storage Engines, continued

Storage Engine	Description
BLACKHOLE	The BLACKHOLE storage engine accepts inserted data without error but does not store it, instead deleting it upon acceptance. While seemingly useless, BLACKHOLE can actually serve several practical roles, ranging from facilitating data replication to assisting in the identification of bottlenecks (due to the ability to use BLACKHOLE to remove the storage engine from the bottleneck candidates).
CSV	Comma-separated values (CSV) format is a common storage solution supported by many applications. MySQL's CSV storage engine manages data in this format, the data files of which can subsequently be read from and written to by applications such as Microsoft Excel.
EXAMPLE	EXAMPLE is a featureless storage engine with the sole purpose of providing developers with a skeleton for writing their own storage engines. It is incapable of storing data.
Falcon	New to MySQL 6.0, Falcon is optimized for modern database environments requiring maximum data retrieval and update performance without sacrificing transactional/logging features.
FEDERATED	Introduced in MySQL 5.0, the FEDERATED storage engine can pool remote MySQL databases together under the guise of a single logical database by creating pointers to these remote tables.
InnoDB	MySQL's most popular transactional storage solution, InnoDB offers complete commit, rollback, and crash recovery features alongside attractive performance capabilities. InnoDB serves as MySQL's default storage engine on the Windows platform.
Maria	Introduced in MySQL 6.0.6, Maria is intended to ultimately serve as MySQL's default transactional and non-transactional storage engines.
MEMORY	The MEMORY storage engine stores data within system memory (RAM), resulting in volatile although extremely fast data access.
MERGE	The MERGE storage engine is useful for accessing a group of identical MyISAM tables as if the data resided within a single table structure. Such a configuration might be useful when accessing large amounts of sales data which has been separately stored by month according to an aptly-named table.
MyISAM	MyISAM is MySQL's default storage engine. Although incapable of supporting transactions, MyISAM is optimized for high traffic environments and is very simple to manage.

DATA TYPES

MySQL supports a rich set of data types capable of representing nearly every conceivable data format, ranging across dates and times, currency, strings, integers, and floats. This section defines each type and its respective range.

Date and Time Types

Type	Description
DATE	The *DATE* type represents dates in the format *'YYYY-MM-DD'*, and has a range of *'1000-01-01'* to *'9999-12-31'*.
DATETIME	The *DATETIME* type represents values containing both a date and a corresponding time in the format *'YYYY-MM-DD HH:MM:SS'*. It has a range of *'1000-01-01 00:00:00'* to *'9999-12-31 23:59:59'*.
TIME	The TIME type represents temporal values in the format *'HH:MM:SS'*, ranging from *'-838:59-59'* to *'838:59:59'*.
TIMESTAMP	Like *DATETIME*, the *TIMESTAMP* type represents values containing both a date and time, and sports a format identical to *DATETIME*. Its range is *'1970-01-01 00:00:01'* UTC to *'2038-01-09 03:14:07'* UTC. The *TIMESTAMP* differs from other data types in that it can be automatically assigned the current date/time and automatically updated at INSERT and UPDATE time.
YEAR	The YEAR type represents years, and supports a two- (*'YY'*) and four-digit format (*'YYYY'*). The two-digit format supports a range of 70 (1970) to 69 (2069). The four-digit format supports a range of 1901 to 2155.

Hot Tip

MySQL is fairly flexible in terms of how it accepts date and time type values. For instance, DATE, DATETIME, and TIMESTAMP will all accept '2008-09-02', '2008/09/02', and '2008*09*02' as valid date values.

Data Types, continued

Numeric Types

Type	Description
BIGINT	The *BIGINT* data type supports integer values ranging between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807.
BIT	The *BIT* data type supports binary values ranging between 1 and 64 bits.
DECIMAL	The *DECIMAL* type stores exact numeric values, and should be used when it is crucial for the data to be stored precisely as provided (currency for instance).
FLOAT	The *FLOAT* data type stores approximate numeric values. For instance, defining a column as *FLOAT(5,3)* will store 12.4785 as 12.479, because the defined precision is 3.
INT	The *INT* data type supports integer values ranging between -2,147,483,648 and 2,147,483,647.
MEDIUMINT	The *MEDIUMINT* data type supports integer values ranging between -8,388,608 and 8,388,607.
SMALLINT	The *SMALLINT* data type supports integer values ranging between 32,768 and 32,767.
TINYINT	The *TINYINT* data type supports integer values ranging between -128 and 127.

String Types

Type	Description
BINARY	The *BINARY* type stores up to 255 bytes, and operates identically to *CHAR* except that its used for binary strings.
BLOB / LONGBLOB / MEDIUMBLOB / TINYBLOB	The *BLOB, MEDIUMBLOB, TINYBLOB,* and *LONGBLOB* types are used to store data such as images or binary files, and store up to 65,545.
CHAR	The *CHAR* type stores between 0 and 255 characters. Any column defined as a *CHAR* will consume all of the allotted space regardless of the stored string size. For instance, any *CHAR* column defined as *CHAR(25)* will require the same amount of space (that required to store 25 characters) no matter the size of the stored string.
ENUM	The *ENUM* type restricts the stored value to one of several predefined strings. Up to 65,535 elements can be predefined. Allowable values also include '' and NULL.
SET	A *SET* type operates like an *ENUM*, although its predefined number of elements tops out at 64. Further, a SET can store zero, one, or multiple values
TEXT / LONGTEXT / MEDIUMTEXT / TINYTEXT	The *TEXT, LONGTEXT, MEDIUM,* and *TINYTEXT* types store up to 65,534, 4,294,967,295, 16,777,215, and 255 characters, respectively.
VARBINARY	The *VARBINARY* type stores up to 65,535 bytes, and operates identically to *VARCHAR* except that it's used for binary strings.
VARCHAR	The *VARCHAR* type stores up to 65,535 characters. Unlike *CHAR*, each *VARCHAR* instance requires only the space required to store the provided string, plus one or two additional bytes depending on the string length.

POPULAR ADMINISTRATION SOFTWARE

Web frameworks help the programmer to embrace best practices, simultaneously decreasing errors and eliminating redundant code. If you haven't yet settled upon a framework, consider checking out one or several of the following popular solutions:

Resource	URL
PHPMyAdmin	http://www.phpmyadmin.net/
MySQL Administrator	http://www.mysql.com/products/tools/administrator/
SQLyog	http://www.webyog.com/en/

MYSQL'S MANY CLIENTS

MySQL is bundled with quite a few clients capable of doing everything from performing backups, managing the MySQL server, converting table formats, and stress-testing the database. In this section I'll briefly introduce the most commonly used clients.

Client	Description
my_print_defaults	Outputs the options defined in the *my.cnf* files.
myisam_ftdump	Displays information regarding any defined FULLTEXT indexes found in MyISAM-defined tables
myisamchk	Aids in the review, repair and optimization of MyISAM-defined tables
myisamlog	Displays the contents of MyISAM log files
myisampack	Compresses MyISAM tables, greatly enhancing the read performance

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MySQL's Many Clients, continued

Client	Description
mysql	The MySQL client, used to manage users, databases, tables, and data, in addition to tweak MySQL's performance and behavior.
mysql_config	Displays information regarding options you may find useful when compiling MySQL.
mysql_convert_ table_format	Converts tables from one storage engine to another
mysql_fix_ extensions	Converts MyISAM table extensions to a standard format, which is useful when migrating MyISAM files from one operating system to another.
mysql_ setpermission	A wrapper for setting MySQL user privileges
mysqlaccess	Aids in the review of user privileges
mysqladmin	Performs a wide array of administrative tasks pertinent to server operation
mysqlbinlog	Used for examining the contents of MySQL's binary log
mysqlcheck	A unified wrapper for the SQL statements *CHECK TABLE, REPAIR TABLE, ANALYZE TABLE,* and *OPTIMIZE TABLE.*
mysqldump	Facilitates in database backup creation. See the later section "Performing Backups" for more information
mysqlhotcopy	Facilitates in database backup creation. See the later section "Performing Backups" for more information.
mysqlimport	A wrapper for the *LOAD DATA INFILE* SQL statement
mysqlshow	A wrapper to SHOW statements such as *SHOW TABLES.*
mysqlslap	Tests MySQL's performance by placing an artificial load on the server and reporting the results.
perror	The perror client helps to clarify the often cryptic system error numbers often returned alongside MySQL errors.

KEY ADMINISTRATION TASKS

Logging into the MySQL server

To login to the MySQL server using the *mysql* client, you'll typically provide your MySQL username and password:

```
%>mysql -u username -p
Enter password: *****
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.1.22-rc-community MySQL Community
Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear
the buffer.

mysql>
```

Once logged in, you can select a database or begin carrying out other administrative tasks. To save some time you can pass the desired database along on the command line when logging in:

```
%>mysql -u username -p database_name
```

If you're connecting to a remote database, pass the hostname or IP address along using the -h option:

```
%>mysql -h hostname -u username -p database_name
```

To logout of the MySQL server, use *quit* or the \q flag:

```
mysql>quit
Bye
%>
```

Modifying the mysql Prompt

MySQL's default prompt is enough to remind you you're currently logged into MySQL rather than into an operating system shell. However like most shells you can modify MySQL's prompt to your liking. For instance, when logged into the mysql client execute the following command to change your prompt to *mysql (user@host)>*:

```
mysql>prompt mysql (\U)>
mysql (root@localhost)>
```

Key Administration Tasks, continued

Mysql prompt sequences	Description
\c	A counter that tracks the total number of issued session commands
\d	The current database
\D	The current date
\h	The server host
\u	Your username
\U	Your username@hostname

Databases

Creating a Database	Once logged into the MySQL server, you can create a new database using the *CREATE DATABASE* command: `mysql>CREATE DATABASE dzone;`	You can also create a new database without logging into the server per se using the *mysqladmin* client: `%>mysqladmin -u root -p create dzone`
Switching to a Database	You can begin using a specific database by specifying it on the command-line when logging into the MySQL server (see "Logging into the MySQL server"), or by using the *USE* command: `mysql>USE dzone;`	
Deleting a Database	To delete a database, use the *DROP DATABASE* command: `mysql>DROP DATABASE dzone;`	

Tables

Creating a Table	To create a table, pass the desired table name to the *CREATE TABLE* structure, along with any column definitions:
	`CREATE TABLE table_name (`
	`   column1 definition,`
	`   column2 definition,`
	`   ...`
	`   columnN definition`
	`);`
		For instance:
		`CREATE TABLE authors (`
		`  id INTEGER UNSIGNED`
		`NOT NULL AUTO_INCREMENT`
		`PRIMARY KEY,`
		`  name VARCHAR(255) NOT`
		`NULL,`
		`  email VARCHAR(255)`
		`NOT NULL`
		`);`

Displaying a Table Structure	`mysql>DESCRIBE table_name;`	
Listing All Tables	To view a list of all tables in a database, execute the *SHOW TABLES* command: `mysql>SHOW TABLES;`	To view a list of tables residing in a database other than the one you're currently in, use: `mysql>SHOW TABLES FROM database_name;`

Altering a Table Structure	You can add, delete and modify table columns using the *ALTER TABLE* command.
	▪ To add a column to an existing table:
	`mysql>ALTER TABLE table_name ADD COLUMN column_name`
	`   ->column_type column_type_attributes;`
	▪ As an example, to add a column to the end of the previously created *authors* table:
	`mysql>ALTER TABLE authors ADD COLUMN telephone`
	`   ->VARCHAR(20) NOT NULL;`
	▪ To add a column at a specific location, use the *AFTER* clause. For instance:
	`mysql>ALTER TABLE authors ADD COLUMN telephone`
	`   ->VARCHAR(20) NOT NULL AFTER name;`
	▪ To delete a column:
	`mysql>ALTER TABLE table_name DROP COLUMN column_name;`
	▪ To modify an existing column:
	`mysql>ALTER TABLE table_name CHANGE COLUMN column_name`
	`   ->column_name column_type column_type_attributes;`	

Deleting a Table	To delete a table, use the *DROP TABLE* command: `mysql>DROP TABLE table_name;`	
Renaming a Table	To rename a table, use the *ALTER TABLE* command with the *RENAME* clause: `mysql>ALTER TABLE table_name RENAME new_table_name;`	

MANAGING USERS

MySQL is packaged with a powerful security model, capable of controlling practically every conceivable user action, ranging from which commands he can execute to how many queries he can execute in an hour. This model works in a two-step sequence:

Step 1—Authentication	The user's host, username, and password are examined. If a match is made within MySQL's privilege tables, the user is authorized. Otherwise, the user's connection attempt is denied.
Step 2—Authorization	Once authenticated, the user's submitted command is examined and compared against the user's defined privileges, also found in MySQL's privilege tables. If the user has sufficient privileges, the command is executed, otherwise it is denied.

Although covering the nuances surrounding MySQL's privilege tables is beyond the scope of this document, the remainder of this section should give you ample reminders regarding commonplace tasks. You are, however, encouraged to carefully review the privilege table documentation found in the MySQL manual (http://dev.mysql.com/doc/), as it's easy to make a mistake when using this powerful feature.

Creating a New User Account

New user accounts can be created in a variety of ways, however the easiest and most error-proof is through the GRANT command. The general structure looks like this:

```
mysql>GRANT privilege1, privilege2, privilegeN ON database_name.*
    ->TO 'username'@'host' IDENTIFIED BY 'password';
```

The following command will create a new user named *jason*, granting *SELECT, INSERT,* and *UPDATE* privileges to all tables found in the dzone database when connecting from *192.168.1.145* and when providing the password *secret*:

```
mysql>GRANT SELECT, INSERT, UPDATE ON dzone.*
    ->TO 'jason'@'192.168.1.145' IDENTIFIED BY 'secret';
```

To grant a user all privileges on all databases, use *.* in place of the database name.

Hot Tip Be sure to include the IDENTIFIED BY clause when creating new users! Neglecting to include this information results in a user being created without a required password.

Deleting a User Account

You can delete a user using two methods, the method you choose being dependent on the context of "delete". To remove all user privileges but not entirely remove the user from the system (for instance if you needed to temporarily disable account access), use the *REVOKE* command:

```
mysql>REVOKE ALL PRIVILEGES FROM 'jason'@'192.168.1.145';
```

To completely remove a user from the system, revoking all privileges and erasing the user account, use the *DROP USER* command:

```
mysql>DROP USER 'jason'@'192.168.1.145';
```

Changing a Password

To change a user's password, use the *SET PASSWORD* command. For instance, to change the password of the previously created jason account:

```
mysql>SET PASSWORD FOR 'jason'@'192.168.1.145' = PASSWORD('supersecret');
```

Granting Privileges

To grant additional privileges, you use the *GRANT* command in precisely the same manner as it was used to create a user; MySQL will recognize the user's existence and just modify the user's privileges accordingly. For instance, to add the *DELETE* privilege to the previously created user *jason@192.168.1.145*:

```
mysql>GRANT DELETE ON dzone.* TO 'jason'@'192.168.1.145';
```

Revoking Privileges

To revoke privileges, use the *REVOKE* command. For instance, to remove the *DELETE* and *UPDATE* privileges from the previously created user *jason@192.168.1.145*:

```
mysql>REVOKE DELETE, UPDATE FROM 'jason'@'192.168.1.145';
```

Managing Users, continued

Granting Table- and Column-specific Privileges

MySQL administrators can also control user privileges at the table and column level using the *GRANT* and *REVOKE* commands. For instance, to grant user *jason@192.168.1.145 INSERT* and *SELECT* privileges on the *dzone* database's *timesheets* table:

```
mysql>GRANT INSERT ON dzone.timesheets TO 'jason'@'192.168.1.145';
```

However, security-minded administrators can prevent users from potentially modifying or selecting any column but the *hours* column found in the *timesheets* table:

```
mysql>GRANT INSERT (hours), SELECT (hours) ON dzone.timesheets
    ->TO 'jason'@'192.168.1.145';
```

Renaming Users

To rename an existing user, use the *RENAME USER* command:

```
mysql>RENAME USER 'jason'@'192.168.1.145' TO 'wjg'@'192.168.1.145';
```

KEY SQL TASKS

While executing standard SQL statements is likely old hat for most users, it may be more difficult to recall the syntax pertinent to some of MySQL's relatively new SQL features, namely Stored Routines, Views, and Triggers. This section serves as a refresher for these features basic syntax.

Stored Routines

MySQL collectively refers to stored procedures and stored functions as *stored routines.* Stored procedures are executed using the CALL statement, and can return values as MySQL variables, whereas stored functions can be called directly from within a MySQL like any other standard MySQL function.

In this section a brief refresher is provided regarding managing what is arguably the more useful of the two, namely stored functions.

Creating a Stored Function

A stored function is created using the *CREATE FUNCTION* command. A simple example follows:

```
mysql>DELIMITER $$
mysql>CREATE FUNCTION calculate_bonus
    ->(employee_id INTEGER) RETURNS DECIMAL(5,2)
    ->BEGIN
    ->DECLARE article_count INTEGER;
    ->DECLARE bonus DECIMAL(10,2);
    ->SELECT count(id) AS article_count FROM articles
    ->WHERE author_id = employee_id;
    ->SET bonus = article_count * 10;
    ->RETURN bonus;
    ->END;
    ->$$
mysql>DELIMITER ;
```

Once created, you can call *calculate_bonus()* from within a query:

```
mysql>SELECT name, phone, calculate_bonus(id) FROM authors;
```

Hot Tip Stored procedures and functions support complex logical syntax features, including conditionals and looping statements.

Altering a Stored Function

To modify an existing function, use the *ALTER FUNCTION* command:

```
mysql>DELIMITER $$
mysql>ALTER FUNCTION calculate_bonus
    ->MODIFIED FUNCTION BODY...
    ->$$
mysql>DELIMITER $$
```

Deleting a Stored Function

To delete a stored function, use the *DROP FUNCTION* command:

```
mysql>DROP FUNCTION calculate_bonus;
```

Key SQL Tasks, continued

Views

Views can greatly simplify the execution and management of an otherwise complex query by assigning an alias to it, allowing the developers to execute the query by its alias rather than repeatedly entering the query in its entirety.

Creating a View

Views are created using the *CREATE VIEW* command. For instance:

```
mysql>CREATE VIEW author_view AS
    ->SELECT name, e-mail, phone FROM authors ORDER BY email ASC;
```

You can then execute the view like so:

```
mysql>SELECT * FROM author_view;
```

Passing Query Parameters

You can pass parameters to a view like you would any typical query. For instance to retrieve only information about the author with the e-mail address jason@example.com:

```
mysql>SELECT * FROM author_view WHERE email = "jason@example.com";
```

Viewing a View

You can examine the columns retrieved by the view using the *DESCRIBE* statement:

```
mysql>DESCRIBE author_view;
```

To view the view syntax, use *SHOW CREATE VIEW*:

```
mysql>SHOW CREATE VIEW author_view;
```

Modifying a View

To modify a view, use the *ALTER VIEW* statement:

```
mysql>ALTER VIEW author_view AS
    ->SELECT name, phone FROM authors ORDER BY phone;
```

Deleting a View

To delete a view, use the *DROP VIEW* statement:

```
mysql>DROP VIEW author_view;
```

Triggers

Triggers are automatically activated in accordance with a specific table-related event. They're useful for automating table updates which should occur when another table is modified in some way.

Creating a Trigger

To create a trigger, use the *CREATE TRIGGER* command, passing the trigger actions into the command body. For instance, the following trigger will increment an category's article counter each time a new article of that specific category is added to the database:

```
mysql>DELIMITER $$
mysql>CREATE TRIGGER article_counter
    ->AFTER INSERT ON articles
    ->FOR EACH ROW BEGIN
    ->UPDATE categories SET counter = counter + 1 WHERE id = NEW.category_id;
    ->END;
    ->$$
mysql>DELIMITER ;
```

Modifying a Trigger

You currently cannot modify an existing trigger from within the mysql client. Instead, you should delete the existing trigger and create it anew with the desired changes incorporated.

Deleting a Trigger

To delete a trigger, execute the *DROP TRIGGER* command:

```
mysql>DROP TRIGGER pay_author;
```

PERFORMING BACKUPS

Performing regular backups is an essential part of even the smallest database project. Fortunately MySQL makes this very easy by offering several backup solutions.

Copying Files

If your tables use the MyISAM storage engine, you can backup the database simply by copying the files used to store the tables and data. To do so, you'll need to first execute the *LOCK TABLES* command (only a read lock is required), followed by *FLUSH TABLES*. Once executed, copy the files, and when the copy is complete, execute *UNLOCK TABLES*.

Creating Delimited Backups

To backup the table data in delimited format, use the *SELECT INTO OUTFILE* command. For instance to backup the authors table used in previous examples, execute:

```
mysql>SELECT * INTO OUTFILE 'authors090308.sql' FROM authors;
```

Using mysqldump

The *mysqldump* client is convenient because it supports creating backups of all databases using any MySQL storage engine, not to mention that it automatically takes care of important details such as locking the tables during the backup.

The *mysqldump* client supports an enormous number of options, and it's recommended you take some time to review them in the MySQL manual, however this section will give you enough to at least remind you of what's required to perform a variety of different backups.

Backing Up a Specific Database

To backup a single database, just pass the database name to the mysqldump client, piping the output to a text file:

```
%>mysqldump [options] database_name > backup0903.sql
```

Of course, you'll require proper permissions to execute mysqldump in conjunction with a specific database (namely the *SELECT* and *LOCK* privileges), therefore you'll typically also need to pass along your username and password. In this case, this command typically looks similar to:

```
%>mysqldump -u root -p database_name > backup0903.sql
```

Backing Up Specific Tables

To backup specific tables, you'll need to identify the database, followed by each specific table name you'd like to backup:

```
%>mysqldump [options] database_name table_name [table_
name2...] > backupfile.sql
```

Backing Up All Databases

To backup all databases, pass the *--all-databases* option:

```
%>mysqldump [options] --all-databases > backupfile.sql
```

Using mysqlhotcopy

If all of your backup tables use the MyISAM storage engine, and you're able to log into the server where the tables are stored, the *mysqlhotcopy* might be the ideal solution due to its speed advantages.

To backup the *dzone* database to a directory located at */home/jason/backups using mysqlhotcopy*, execute:

```
%>mysqlhotcopy -u root -p dzone /home/jason/backups
```

To copy multiple databases, just string each database name together:

```
%>mysqlhotcopy -u root -p dzone wjgilmore /home/jason/backups
```

Like *mysqldump*, *mysqlhotcopy* offers an enormous number of options, so be sure to review the MySQL manual (http://dev.mysql.com/doc/) to learn all that's available.

Hot Tip MySQL's replication features make it possible to maintain a consistently synchronized version of the live database. Replication is out of the scope of this reference card, but be sure to visit the MySQL documentation (**http://dev.mysql.com/doc/**) if replication is more suitable to your needs.

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Performing Backups, continued

If you're looking for a more robust backup solution, check out mylvmbackup (http://lenz.homelinux.org/mylvmbackup/), which when configured properly can typically perform a safe backup while your application is still running. Another great solution is Zmanda (http://www.zmanda.com/), which is available in both community and enterprise versions.

MYSQL'S DATE AND TIME FEATURES

In addition to temporal data types, MySQL supports over 50 functions intended to facilitate the retrieval and manipulation of date-related data. Rather than exhaustively itemize these functions, it seems useful to instead offer a number of common examples which may help jumpstart your search for the appropriate approach to carry out date- and time-related queries.

Query	Function

Select all rows inserted within the last 24 hours	`mysql>SELECT * FROM entries WHERE entry_date >`
	`    ->UNIX_TIMESTAMP(NOW()) - 86400;`

Select all rows inserted today	`mysql>SELECT * FROM entries WHERE date(entry_date) =`
	`    ->date(NOW());`

Determine the weekday of the most recent entry	`mysql>SELECT DAYNAME(MAX(entry_date)) AS day FROM entries;`

Calculating the average age of users	`mysql>SELECT AVG(YEAR(CURDATE()) - YEAR(birthdate)) -`
	`    ->(RIGHT(CURDATE(),5) < RIGHT(birthdate,5)))`
	`    ->AS age FROM users;`

Calculating the number of days since the last blog post	`mysql>SELECT TO_DAYS(NOW()) - TO_DAYS(MAX(entry_date))`
	`    ->FROM posts;`

Calculating the number of weeks since the last blog post	`mysql>SELECT (TO_DAYS(NOW()) - TO_DAYS(MAX(entry_date)))`
	`    ->/ 7 FROM posts;`

Determining the date one week prior to a user's birthday	`mysql>SELECT DATE_SUB(CONCAT(YEAR(NOW()),"-",MONTH(birthdate),`
	`    ->"-",DAYOFMONTH(birthdate)), INTERVAL 7 DAY) as`
	`    ->one_week_prior FROM users;`

ABOUT THE AUTHOR

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Jason Gilmore is founder of W.J. Gilmore, LLC, a Columbus, Ohio-based firm providing web development, consulting, and technical writing services to clientele ranging from publicly traded corporations to small startups. Jason contributes to a number of publications such as *Developer.com*, *Linux Magazine*, and *TechTarget*. He's cofounder of the CodeMash conference (**http://www.codemash.org/**), a non-profit organization charged with organizing the annual namesake event. Away from the computer you'll find Jason starting more home remodeling projects than he could possibly complete, and checking more books out of the library than he could possibly read.

Publications

- Author of *Beginning PHP and MySQL, Third Edition* (Apress, 2008)
- Co-author of *Beginning PHP and PostgreSQL 8* (Apress, 2007) and *Beginning PHP and Oracle* (Apress, 2007)

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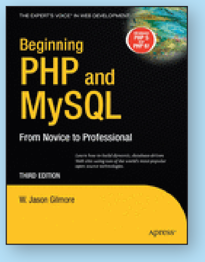

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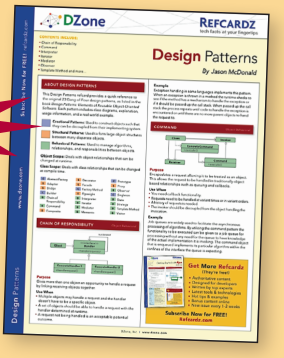

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