**MySQL**

**MySQL** is (as of July 2013) the world's second most widely used [relational database management system](http://en.wikipedia.org/wiki/Relational_database_management_system) (RDBMS) and most widely used open-source RDBMS. It is named after co-founder [Michael Widenius](http://en.wikipedia.org/wiki/Michael_Widenius)'s daughter, my. The [SQL](http://en.wikipedia.org/wiki/SQL) acronym stands for [Structured Query Language](http://en.wikipedia.org/wiki/Structured_Query_Language).

The MySQL development project has made its [source code](http://en.wikipedia.org/wiki/Source_code) available under the terms of the [GNU General Public License](http://en.wikipedia.org/wiki/GNU_General_Public_License), as well as under a variety of [proprietary](http://en.wikipedia.org/wiki/Proprietary_software) agreements. MySQL was owned and sponsored by a single [for-profit](http://en.wikipedia.org/wiki/Business) firm, the [Swedish](http://en.wikipedia.org/wiki/Sweden) company [**MySQL AB**](http://en.wikipedia.org/wiki/MySQL_AB)**,** now owned by [Oracle Corporation](http://en.wikipedia.org/wiki/Oracle_Corporation).

MySQL is a popular choice of database for use in web applications, and is a central component of the widely used [LAMP](http://en.wikipedia.org/wiki/LAMP_%28software_bundle%29) open source web application software stack (and other ['AMP'](http://en.wikipedia.org/wiki/List_of_AMP_packages) stacks). LAMP is an acronym for "[Linux](http://en.wikipedia.org/wiki/Linux), [Apache](http://en.wikipedia.org/wiki/Apache_HTTP_Server), MySQL, [Perl](http://en.wikipedia.org/wiki/Perl)/[PHP](http://en.wikipedia.org/wiki/PHP)/[Python](http://en.wikipedia.org/wiki/Python_%28programming_language%29)." [Free-software](http://en.wikipedia.org/wiki/Free_software)-open source projects that require a full-featured database management system often use MySQL.

For proprietary use, several paid editions are available, and offer additional functionality. Applications which use MySQL databases include: [TYPO3](http://en.wikipedia.org/wiki/TYPO3), [MODx](http://en.wikipedia.org/wiki/MODx), [Joomla](http://en.wikipedia.org/wiki/Joomla), [WordPress](http://en.wikipedia.org/wiki/WordPress), [phpBB](http://en.wikipedia.org/wiki/PhpBB), [MyBB](http://en.wikipedia.org/wiki/MyBB), [Drupal](http://en.wikipedia.org/wiki/Drupal) and other software. MySQL is also used in many high-profile, large-scale [websites](http://en.wikipedia.org/wiki/Website), including [Google](http://en.wikipedia.org/wiki/Google)[[13]](http://en.wikipedia.org/wiki/MySQL#cite_note-mysqlatgoogle-14)[[14]](http://en.wikipedia.org/wiki/MySQL#cite_note-15) (though not for searches), [Face book](http://en.wikipedia.org/wiki/Facebook), [Twitter](http://en.wikipedia.org/wiki/Twitter), [Flickr](http://en.wikipedia.org/wiki/Flickr), and [YouTube](http://en.wikipedia.org/wiki/YouTube).

## Interfaces

MySQL is a [relational database management system](http://en.wikipedia.org/wiki/Relational_database_management_system) (RDBMS), and ships with no [GUI](http://en.wikipedia.org/wiki/Graphical_user_interface) tools to administer MySQL databases or manage data contained within the databases. Users may use the included [command line](http://en.wikipedia.org/wiki/Command_line) tools, or use MySQL "front-ends", desktop software and web applications that create and manage MySQL databases, build database structures, back up data, inspect status, and work with data records. The official set of MySQL front-end tools, [MySQL Workbench](http://en.wikipedia.org/wiki/MySQL_Workbench) is actively developed by Oracle, and is freely available for use.

### Graphical

The official [MySQL Workbench](http://en.wikipedia.org/wiki/MySQL_Workbench) is a free integrated environment developed by MySQL AB, that enables users to graphically administer MySQL databases and visually design database structures. MySQL Workbench replaces the previous package of software, [MySQL GUI Tools](http://en.wikipedia.org/wiki/MySQL_GUI_Tools). Similar to other third-party packages, but still considered the authoritative MySQL front end, MySQL Workbench lets users manage database design & modeling, SQL development (replacing MySQL Query Browser) and Database administration (replacing MySQL Administrator).

MySQL Workbench is available in two editions, the regular [free and open source](http://en.wikipedia.org/wiki/Free_and_open_source_software) *Community Edition* which may be downloaded from the MySQL website, and the proprietary *Standard Edition* which extends and improves the feature set of the Community Edition.

Third-party proprietary and free graphical administration applications (or "front ends") are available that integrate with MySQL and enable users to work with database structure and data visually. Some well-known front ends, in alphabetical order, are:

* [Adminer](http://en.wikipedia.org/wiki/Adminer) – a free MySQL front end written in one [PHP](http://en.wikipedia.org/wiki/PHP) script, capable of managing multiple databases, with many [CSS](http://en.wikipedia.org/wiki/Cascading_Style_Sheets) skins available
* [Chive](http://en.wikipedia.org/wiki/Chive) a free, open source, web-based database management tool designed as an alternative to phpMyAdmin
* [Database Workbench](http://en.wikipedia.org/wiki/Database_Workbench) – a software application for development and administration of multiple relational databases including MySQL, with interoperationality between different database systems
* [DBEdit](http://en.wikipedia.org/wiki/DBEdit) – a free front end for MySQL and other databases
* [HeidiSQL](http://en.wikipedia.org/wiki/HeidiSQL) – a full featured free front end that runs on [Windows](http://en.wikipedia.org/wiki/Windows), and can connect to local or remote MySQL servers to manage databases, tables, column structure, and individual data records. Also supports specialised GUI features for date/time fields and enumerated multiple-value fields.
* [LibreOffice Base](http://en.wikipedia.org/wiki/LibreOffice) – LibreOffice Base allows the creation and management of databases, preparation of forms and reports that provide end users easy access to data. Like [Microsoft Access](http://en.wikipedia.org/wiki/Microsoft_Access), it can be used as a front-end for various database systems, including Access databases (JET), ODBC data sources, and MySQL or [PostgreSQL](http://en.wikipedia.org/wiki/PostgreSQL).
* [Navicat](http://en.wikipedia.org/wiki/Navicat) – a series of proprietary graphical database management applications, developed for Windows, Macintosh and Linux
* [OpenOffice.org](http://en.wikipedia.org/wiki/OpenOffice.org) – freely available [OpenOffice.org Base](http://en.wikipedia.org/wiki/OpenOffice.org_Base) can manage MySQL databases if the entire suite is installed
* [phpMyAdmin](http://en.wikipedia.org/wiki/PhpMyAdmin) – a free Web-based front-end, widely installed by [web hosting services](http://en.wikipedia.org/wiki/Web_hosting_service) since it is developed in PHP and included in the LAMP stack, and [MAMP](http://en.wikipedia.org/wiki/MAMP), [XAMPP](http://en.wikipedia.org/wiki/XAMPP) and [WAMP](http://en.wikipedia.org/wiki/WAMP_%28software_bundle%29) software bundle installers
* [SQLBuddy](http://en.wikipedia.org/wiki/SQLBuddy) – a free Web-based front end, developed in PHP
* [SQLyog](http://en.wikipedia.org/wiki/SQLyog) – proprietary, but there is also a free 'community' edition available
* [Toad for MySQL](http://en.wikipedia.org/wiki/TOAD_%28software%29) – a free development and administration front end for MySQL from [Dell Software](http://en.wikipedia.org/wiki/Dell_Software)
* [Webmin](http://en.wikipedia.org/wiki/Webmin) – a free Web-based management utility and a MySQL front end, developed in Perl with some parts written in Java

Other available proprietary MySQL front ends include [dbForge Studio for MySQL](http://en.wikipedia.org/w/index.php?title=DbForge_Studio_for_MySQL&action=edit&redlink=1), DBStudio, [Epictetus](http://en.wikipedia.org/wiki/Epictetus_Database_Client), [Microsoft Access](http://en.wikipedia.org/wiki/Microsoft_Access), [Oracle SQL Developer](http://en.wikipedia.org/wiki/Oracle_SQL_Developer), SchemaBank, [SQLPro SQL Client](http://en.wikipedia.org/wiki/SQLPro_SQL_Client), [Toad Data Modeler](http://en.wikipedia.org/wiki/Toad_Data_Modeler) and [DaDaBIK](http://en.wikipedia.org/wiki/DaDaBIK).

### Command line

MySQL ships with many [command line](http://en.wikipedia.org/wiki/Command_line) tools, from which the main interface is 'mysql' client. Third parties have also developed tools to manage MySQL servers.

* MySQL Utilities – a set of utilities designed to perform common maintenance and administrative tasks. Originally included as part of the MySQL Workbench, the utilities are now a stand-alone download available from Oracle.
* Percona Toolkit – a cross-platform toolkit for MySQL, developed in [Perl](http://en.wikipedia.org/wiki/Perl).[[31]](http://en.wikipedia.org/wiki/MySQL#cite_note-32) Percona Toolkit can be used to prove replication is working correctly, fix corrupted data, automate repetitive tasks, and speed up servers. Percona Toolkit is included with several [Linux](http://en.wikipedia.org/wiki/Linux) distributions such as [CentOS](http://en.wikipedia.org/wiki/CentOS) and [Debian](http://en.wikipedia.org/wiki/Debian), and packages are available for [Fedora](http://en.wikipedia.org/wiki/Fedora_%28operating_system%29) and [Ubuntu](http://en.wikipedia.org/wiki/Ubuntu_%28operating_system%29) as well. Percona Toolkit was originally developed as Maatkit, but as of late 2011, Maatkit is no longer developed.

### Programming

MySQL works on many [system platforms](http://en.wikipedia.org/wiki/System_platform), including [AIX](http://en.wikipedia.org/wiki/AIX_operating_system), [BSDi](http://en.wikipedia.org/wiki/BSD/OS), [FreeBSD](http://en.wikipedia.org/wiki/FreeBSD), [HP-UX](http://en.wikipedia.org/wiki/HP-UX), [eComStation](http://en.wikipedia.org/wiki/EComStation), [i5/OS](http://en.wikipedia.org/wiki/IBM_i5/OS), [IRIX](http://en.wikipedia.org/wiki/IRIX), [Linux](http://en.wikipedia.org/wiki/Linux), [OS X](http://en.wikipedia.org/wiki/OS_X), [Microsoft Windows](http://en.wikipedia.org/wiki/Microsoft_Windows), [NetBSD](http://en.wikipedia.org/wiki/NetBSD), [Novell NetWare](http://en.wikipedia.org/wiki/Novell_NetWare), [OpenBSD](http://en.wikipedia.org/wiki/OpenBSD), [OpenSolaris](http://en.wikipedia.org/wiki/OpenSolaris), [OS/2](http://en.wikipedia.org/wiki/OS/2) Warp, [QNX](http://en.wikipedia.org/wiki/QNX), [Oracle Solaris](http://en.wikipedia.org/wiki/Solaris_%28operating_system%29), [Symbian](http://en.wikipedia.org/wiki/Symbian), [SunOS](http://en.wikipedia.org/wiki/SunOS), [SCO OpenServer](http://en.wikipedia.org/wiki/SCO_OpenServer), SCO [UnixWare](http://en.wikipedia.org/wiki/UnixWare), [Sanos](http://en.wikipedia.org/wiki/Sanos) and [Tru64](http://en.wikipedia.org/wiki/Tru64). A port of MySQL to [OpenVMS](http://en.wikipedia.org/wiki/OpenVMS) also exists.

MySQL is written in [C](http://en.wikipedia.org/wiki/C_%28programming_language%29) and [C++](http://en.wikipedia.org/wiki/C%2B%2B). Its SQL parser is written in [yacc](http://en.wikipedia.org/wiki/Yacc), but it uses a home-brewed [lexical analyzer](http://en.wikipedia.org/wiki/Lexical_analysis). Many [programming languages](http://en.wikipedia.org/wiki/Programming_language) with language-specific [APIs](http://en.wikipedia.org/wiki/Application_programming_interface) include [libraries](http://en.wikipedia.org/wiki/Library_%28computing%29) for accessing MySQL databases. These include MySQL Connector/Net for integration with Microsoft's [Visual Studio](http://en.wikipedia.org/wiki/Visual_Studio) (languages such as [C#](http://en.wikipedia.org/wiki/C_Sharp_%28programming_language%29) and [VB](http://en.wikipedia.org/wiki/Visual_Basic) are most commonly used) and the JDBC driver for Java. In addition, an [ODBC](http://en.wikipedia.org/wiki/ODBC) interface called [MyODBC](http://en.wikipedia.org/wiki/MyODBC) allows additional programming languages that support the ODBC interface to communicate with a MySQL database, such as [ASP](http://en.wikipedia.org/wiki/Active_Server_Pages) or [ColdFusion](http://en.wikipedia.org/wiki/Adobe_ColdFusion). The [HTSQL](http://en.wikipedia.org/wiki/HTSQL) – [URL](http://en.wikipedia.org/wiki/Uniform_resource_locator)-based query method also ships with a MySQL adapter, allowing direct interaction between a MySQL database and any web client via structured URLs.

## Features

MySQL is offered under two different editions: the open source MySQL Community Server and the proprietary [Enterprise Server](http://en.wikipedia.org/wiki/MySQL_Enterprise). MySQL Enterprise Server is differentiated by a series of proprietary extensions which install as server plug-in, but otherwise shares the version numbering system and is built from the same code base.

Major features as available in MySQL 5.6:

* A broad subset of [ANSI SQL 99](http://en.wikipedia.org/wiki/SQL:1999), as well as extensions
* Cross-platform support
* [Stored procedures](http://en.wikipedia.org/wiki/Stored_procedure), using a procedural language that closely adheres to [SQL/PSM](http://en.wikipedia.org/wiki/SQL/PSM)
* [Triggers](http://en.wikipedia.org/wiki/Database_trigger)
* [Cursors](http://en.wikipedia.org/wiki/Cursor_%28databases%29)
* Updatable [views](http://en.wikipedia.org/wiki/View_%28SQL%29)
* [Online DDL](http://en.wikipedia.org/wiki/Data_Definition_Language) when using the InnoDB Storage Engine.
* [Information schema](http://en.wikipedia.org/wiki/Information_schema)
* Performance Schema
* A set of SQL Mode options to control runtime behavior, including a strict mode to better adhere to SQL standards.
* [X/Open XA](http://en.wikipedia.org/wiki/X/Open_XA) [distributed transaction processing](http://en.wikipedia.org/wiki/Distributed_transaction_processing) (DTP) support; [two phase commit](http://en.wikipedia.org/wiki/Two-phase-commit_protocol) as part of this, using the default [InnoDB](http://en.wikipedia.org/wiki/InnoDB) storage engine
* Transactions with [save points](http://en.wikipedia.org/wiki/Savepoint) when using the default InnoDB Storage Engine. The NDB Cluster Storage Engine also supports transactions.
* [ACID](http://en.wikipedia.org/wiki/Atomicity,_consistency,_isolation,_durability) compliance when using InnoDB and NDB Cluster Storage Engines
* [SSL](http://en.wikipedia.org/wiki/Secure_Sockets_Layer) support
* Query [caching](http://en.wikipedia.org/wiki/Cache_%28computing%29)
* Sub-[SELECTs](http://en.wikipedia.org/wiki/Select_%28SQL%29) (i.e. nested SELECTs)
* Built-in [Replication](http://en.wikipedia.org/wiki/Database_replication) support (i.e. Master-Master Replication & Master-Slave Replication) with one master per slave, many slaves per master. [Multi-master replication](http://en.wikipedia.org/wiki/Multi-master_replication) is provided in [MySQL Cluster](http://en.wikipedia.org/wiki/MySQL_Cluster), and multi-master support can be added to unclustered configurations using Galera Cluster.
* Full-text [indexing](http://en.wikipedia.org/wiki/Index_%28database%29) and searching
* Embedded database library
* [Unicode](http://en.wikipedia.org/wiki/Unicode) support
* Partitioned tables with pruning of partitions in optimizer
* [Shared-nothing](http://en.wikipedia.org/wiki/Shared-nothing) clustering through [MySQL Cluster](http://en.wikipedia.org/wiki/MySQL_Cluster)
* Multiple storage engines, allowing one to choose the one that is most effective for each table in the application.
* Native storage engines InnoDB, MyISAM, Merge, Memory (heap), [Federated](http://en.wikipedia.org/wiki/MySQL_Federated), Archive, [CSV](http://en.wikipedia.org/wiki/Comma-separated_values), Black hole, NDB Cluster.
* Commit grouping, gathering multiple transactions from multiple connections together to increase the number of commits per second.

The developers release minor updates of the MySQL Server approximately every two months. The sources can be obtained from MySQL's website or from MySQL's [Bazaar](http://en.wikipedia.org/wiki/Bazaar_%28software%29) repository, both under the GPL license.

### Limitations

Like other [SQL databases](http://en.wikipedia.org/wiki/SQL#Cross-vendor_portability), MySQL does not currently comply with the full SQL standard for some of the implemented functionality, including foreign key references when using some storage engines other than the default of InnoDB.

Up until MySQL 5.7, triggers are limited to one per action / timing, meaning that at most one trigger can be defined to be executed after an INSERT operation, and one before INSERT on the same table. No triggers can be defined on views.

MySQL, like most other [transactional](http://en.wikipedia.org/wiki/Database_transaction) relational databases, is strongly limited by hard disk performance. This is especially true in terms of write latency. Given the recent appearance of very affordable consumer grade SATA interface [solid-state drives](http://en.wikipedia.org/wiki/Solid-state_drive) that offer zero [mechanical latency](http://en.wikipedia.org/wiki/Latency_%28engineering%29#Mechanical_latency), a fivefold speedup over even an eight drive RAID array can be had for a smaller investment.

MySQL database's inbuilt functions like UNIX\_TIMESTAMP () will return 0 after 03:14:07 [UTC](http://en.wikipedia.org/wiki/UTC) on 19 January 2038.

### Deployment

MySQL can be built and installed manually from source code, but this can be tedious so it is more commonly installed from a binary package unless special customizations are required. On most Linux distributions the [package management system](http://en.wikipedia.org/wiki/Package_management_system) can download and install MySQL with minimal effort, though further configuration is often required to adjust security and optimization settings.

Though MySQL began as a low-end alternative to more powerful proprietary databases, it has gradually evolved to support higher-scale needs as well. It is still most commonly used in small to medium scale single-server deployments, either as a component in a [LAMP](http://en.wikipedia.org/wiki/LAMP_%28software_bundle%29)-based web application or as a standalone database server. Much of MySQL's appeal originates in its relative simplicity and ease of use, which is enabled by an ecosystem of open source tools such as [phpMyAdmin](http://en.wikipedia.org/wiki/PhpMyAdmin). In the medium range, MySQL can be scaled by deploying it on more powerful hardware, such as a multi-processor server with gigabytes of memory.

There are however limits to how far performance can scale on a single server ('scaling up'), so on larger scales, multi-server MySQL ('scaling out') deployments are required to provide improved performance and reliability. A typical high-end configuration can include a powerful master database which handles data write operations and is [replicated](http://en.wikipedia.org/wiki/Database_replication) to multiple slaves that handle all read operations. The master server synchronizes continually with its slaves so in the event of failure a slave can be promoted to become the new master, minimizing downtime. Further improvements in performance can be achieved by caching the results from database queries in memory using [memcached](http://en.wikipedia.org/wiki/Memcached), or breaking down a database into smaller chunks called [shards](http://en.wikipedia.org/wiki/Shard_%28database_architecture%29) which can be spread across a number of distributed server clusters.

### Backup

* [File system snapshot](http://en.wikipedia.org/wiki/Filesystem_snapshot) or [volume manager snapshot](http://en.wikipedia.org/wiki/Volume_manager_snapshot) – backups are performed by using an external tool provided by the operating system (such as [LVM](http://en.wikipedia.org/wiki/Logical_Volume_Manager_%28Linux%29)) or storage device, with additional support from MySQL for ensuring consistency of such snapshots.
* *mysqldump* – a logical backup tool included with both community and enterprise editions of MySQL. Supports backup from all storage engines.
* *MySQL Enterprise Backup* – a hot backup utility included as part of the MySQL Enterprise subscription from Oracle. Offers native InnoDB hot backup, as well as backup for other storage engines.
* *XtraBackup* – open source MySQL hot backup software. Some notable features include hot, non-locking backups for InnoDB storage, incremental backups, streaming, parallel-compressed backups, throttling based on the number of I/O operations per second, etc.

### High availability

Ensuring [high availability](http://en.wikipedia.org/wiki/High_availability) requires a certain amount of redundancy in the system. For database systems, the redundancy traditionally takes the form of having a primary server acting as a master, and using [replication](http://en.wikipedia.org/wiki/Replication_%28computing%29) to keep secondaries available to take over in case the primary fails. This means that the "server" that the application connects to is in reality a collection of servers, not a single server. In a similar manner, if the application is using a [sharded](http://en.wikipedia.org/wiki/Shard_%28database_architecture%29) database, it is in reality working with a collection of servers, not a single server. In this case, a collection of servers is usually referred to as a *farm.*

One of the projects aiming to provide high availability for MySQL is *MySQL Fabric*, an integrated system for managing a collection of MySQL servers, and a [framework](http://en.wikipedia.org/wiki/Software_framework) on top of which high availability and database sharding is built. MySQL Fabric is open-source and is intended to be extensible, easy to use, and to support procedure execution even in the presence of failure, providing an execution model usually called *resilient execution.* MySQL client libraries are extended so they are hiding the complexities of handling [failover](http://en.wikipedia.org/wiki/Failover) in the event of a server failure, as well as correctly dispatching transactions to the shards. As of September 2013, there is currently support for Fabric-aware versions of Connector/[J](http://en.wikipedia.org/wiki/J_Sharp), Connector/[PHP](http://en.wikipedia.org/wiki/PHP), Connector/[Python](http://en.wikipedia.org/wiki/Python_%28programming_language%29), as well as some rudimentary support for [Hibernate](http://en.wikipedia.org/wiki/Hibernate_%28Java%29) and [Doctrine](http://en.wikipedia.org/wiki/Doctrine_%28PHP%29). As of May 2014, MySQL Fabric is in the [general availability](http://en.wikipedia.org/wiki/General_availability) stage of development.

### Cloud deployment

MySQL can also be run on [cloud computing](http://en.wikipedia.org/wiki/Cloud_computing) platforms such as [Amazon EC2](http://en.wikipedia.org/wiki/Amazon_EC2). Listed below are some common deployment models for MySQL on the cloud:

* [Virtual Machine](http://en.wikipedia.org/wiki/Virtual_machine) Image – cloud users can upload a machine image of their own with MySQL installed, or use a ready-made machine image with an optimized installation of MySQL on it, such as the one provided by Amazon EC2.
* MySQL as a Service – some cloud platforms offer MySQL "as a service". In this configuration, application owners do not have to install and maintain the MySQL database on their own. Instead, the database service provider takes responsibility for installing and maintaining the database, and application owners pay according to their usage. Notable cloud-based MySQL services are the [Amazon Relational Database Service](http://en.wikipedia.org/wiki/Amazon_Relational_Database_Service); [Rackspace](http://en.wikipedia.org/wiki/Rackspace); [HP Converged Cloud](http://en.wikipedia.org/wiki/HP_Converged_Cloud); [Heroku](http://en.wikipedia.org/wiki/Heroku) and [Jelastic](http://en.wikipedia.org/wiki/Jelastic).
* Managed MySQL cloud hosting – the database is not offered as a service, but the cloud provider hosts the database and manages it on the application owner's behalf. As of 2011, of the major cloud providers, only [Terremark](http://en.wikipedia.org/wiki/Terremark) and Rackspace offer managed hosting for MySQL databases.

## Community

The MySQL server software itself and the client libraries use [dual-licensing](http://en.wikipedia.org/wiki/Dual_license) distribution. They are offered under GPL version 2, beginning from 28 June 2000 (which in 2009 has been extended with a [FLOSS](http://en.wikipedia.org/wiki/Alternative_terms_for_free_software) License Exception) or to use a proprietary license.

Support can be obtained from the official manual. Free support additionally is available in different IRC channels and forums. Oracle offers paid support via its MySQL Enterprise products. They differ in the scope of services and in price. Additionally, a number of third party organisations exist to provide support and services, including SkySQL Ab and Percona.

MySQL has received positive reviews, and reviewers noticed it "performs extremely well in the average case." and that the "developer interfaces are there, and the documentation (not to mention feedback in the real world via Web sites and the like) is very, very good". It has also been tested to be a "fast, stable and true multi-user, multi-threaded sql database server".

### Related projects

* [Drizzle](http://en.wikipedia.org/wiki/Drizzle_%28database_server%29) – a fork targeted at the web-infrastructure and cloud computing markets. The developers of the product describe it as a "smaller, slimmer and (hopefully) faster version of MySQL". As a result, many common MySQL features will be stripped out, including stored procedures, query cache, prepared statements, views, and triggers. This is a partial rewrite of the server that does not maintain compatibility with MySQL. However, Drizzle made no new releases since May 2012.
* [MariaDB](http://en.wikipedia.org/wiki/MariaDB) – a community-developed fork of the MySQL database source code. The intent also being to maintain high fidelity with MySQL, ensuring a "drop-in" replacement capability with library binary equivalency and exact matching with MySQL APIs and commands. It includes the [XtraDB](http://en.wikipedia.org/wiki/XtraDB) storage engine as a replacement for InnoDB.
* [Percona Server](http://en.wikipedia.org/wiki/Percona_Server) – a fork of MySQL that includes the XtraDB storage engine. Its policy is to deviate as little as possible from MySQL and remain fully compatible, while providing new features, better performance, and additional instrumentation for analysis of performance and usage.
* [WebScaleSQL](http://en.wikipedia.org/wiki/WebScaleSQL) – A branch of MySQL 5.6 maintained by Face book, LinkedIn, Google and Twitter.

## History

MySQL was created by a Swedish company, MySQL AB, founded by [David Ax mark](http://en.wikipedia.org/wiki/David_Axmark), [Allan Larsson](http://en.wikipedia.org/wiki/Allan_Larsson) and [Michael "Monty" Widenius](http://en.wikipedia.org/wiki/Michael_%28Monty%29_Widenius). The first version of MySQL appeared on 23 May 1995. It was initially created for personal usage from [mySQL](http://en.wikipedia.org/wiki/MSQL) based on the low-level language [ISAM](http://en.wikipedia.org/wiki/ISAM), which the creators considered too slow and inflexible. They created a new [SQL](http://en.wikipedia.org/wiki/Structured_Query_Language) interface, while keeping the same [API](http://en.wikipedia.org/wiki/Application_programming_interface) as mySQL. By keeping the API consistent with the mySQL system, many developers were able to use MySQL instead of the (proprietarily licensed) mSQL antecedent.

### Legal and acquisition impacts

On 15 June 2001, [NuSphere](http://en.wikipedia.org/wiki/NuSphere) sued MySQL AB, TcX DataKonsult AB and its original authors Michael ("Monty") Widenius and David Ax mark in U.S District Court in Boston for "breach of contract, tortious interference with third party contracts and relationships and unfair competition".

In 2002, MySQL AB sued Progress NuSphere for [copyright](http://en.wikipedia.org/wiki/Copyright_infringement) and [trademark infringement](http://en.wikipedia.org/wiki/Trademark_infringement) in [United States district court](http://en.wikipedia.org/wiki/U.S._District_Court_for_the_District_of_Massachusetts). NuSphere had allegedly violated MySQL's copyright by linking MySQL's GPL'ed code with NuSphere Gemini table without being in compliance with the license. After a preliminary hearing before Judge Patti Saris on 27 February 2002, the parties entered settlement talks and eventually settled. After the hearing, [FSF](http://en.wikipedia.org/wiki/Free_Software_Foundation) commented that "Judge Saris made clear that she sees the GNU GPL to be an enforceable and binding license."

In October 2005, Oracle Corporation acquired [Innobase](http://en.wikipedia.org/wiki/Innobase) OY, the [Finnish](http://en.wikipedia.org/wiki/Finland) company that developed the third-party InnoDB storage engine that allows MySQL to provide such functionality as transactions and [foreign keys](http://en.wikipedia.org/wiki/Foreign_key). After the acquisition, an Oracle [press release](http://en.wikipedia.org/wiki/News_release) mentioned that the contracts that make the company's software available to [MySQL AB](http://en.wikipedia.org/wiki/MySQL_AB) would be due for renewal (and presumably renegotiation) sometime in 2006. During the MySQL Users Conference in April 2006, MySQL issued a press release that confirmed that MySQL and InfoBase OY agreed to a "multi-year" extension of their licensing agreement.

In February 2006, Oracle Corporation acquired [Sleepy cat Software](http://en.wikipedia.org/wiki/Sleepycat_Software), makers of the [Berkeley DB](http://en.wikipedia.org/wiki/Berkeley_DB), a database engine providing the basis for another MySQL storage engine. This had little effect, as Berkeley DB was not widely used, and was dropped (due to lack of use) in MySQL 5.1.12, a pre-GA release of MySQL 5.1 released in October 2006.

In April 2009, Oracle Corporation entered into an agreement to purchase Sun Microsystems, then owners of MySQL copyright and trademark. Sun's board of directors unanimously approved the deal; it was also approved by Sun's shareholders, and by the U.S. government on 20 August 2009. On 14 December 2009, Oracle pledged to continue to enhance MySQL as it had done for the previous four years.

A movement against Oracle's acquisition of MySQL, to "Save MySQL “from Oracle was started by one of the MySQL founders, [Monty Widenius](http://en.wikipedia.org/wiki/Monty_Widenius). The petition of 50,000+ developers and users called upon the European Commission to block approval of the acquisition. At the same time, several Free Software [opinion leaders](http://en.wikipedia.org/wiki/Opinion_leadership) (including [Eben Moglen](http://en.wikipedia.org/wiki/Eben_Moglen), [Pamela Jones](http://en.wikipedia.org/wiki/Pamela_Jones) of [Groklaw](http://en.wikipedia.org/wiki/Groklaw), [Jan Wildeboer](http://en.wikipedia.org/w/index.php?title=Jan_Wildeboer&action=edit&redlink=1) and [Carlo Piana](http://en.wikipedia.org/wiki/Carlo_Piana), who also acted as co-counsel in the merger regulation procedure) advocated for the unconditional approval of the merger. As part of the negotiations with the European Commission, Oracle committed that MySQL server will continue until at least 2015 to use the dual-licensing strategy long used by MySQL AB, with proprietary and GPL versions available. The antitrust of the EU had been "pressuring it to divest MySQL as a condition for approval of the merger". But, as revealed by [WikiLeaks](http://en.wikipedia.org/wiki/WikiLeaks), the US Department of Justice and Antitrust, at the request of Oracle, pressured the EU to unconditionally approve the merger. The European Commission eventually unconditionally approved Oracle's acquisition of MySQL on 21 January 2010.

In January 2009, prior to Oracle's acquisition of MySQL, Monty Widenius started a GPL-only fork, [MariaDB](http://en.wikipedia.org/wiki/MariaDB). MariaDB is based on the same code base as MySQL server 5.1 and strives to maintain compatibility with Oracle-provided versions.

### Milestones

Notable milestones in MySQL development include:

* Original development of MySQL by [Michael Widenius](http://en.wikipedia.org/wiki/Michael_Widenius) and [David Ax mark](http://en.wikipedia.org/wiki/David_Axmark) beginning in 1994
* First internal release on 23 May 1995
* Version 3.19: End of 1996, from www.tcx.se
* Version 3.20: January 1997
* Windows version was released on 8 January 1998 for Windows 95 and NT
* Version 3.21: production release 1998, from www.mysql.com
* Version 3.22: alpha, beta from 1998
* Version 3.23: beta from June 2000, production release 22 January 2001
* Version 4.0: beta from August 2002, production release March 2003 ([unions](http://en.wikipedia.org/wiki/Set_operations_%28SQL%29))
* Version 4.01: beta from August 2003, Jyoti adopts MySQL for database tracking
* Version 4.1: beta from June 2004, production release October 2004 ([R-trees](http://en.wikipedia.org/wiki/R-tree) and [B-trees](http://en.wikipedia.org/wiki/B-tree), sub queries, prepared statements)
* Version 5.0: beta from March 2005, production release October 2005 (cursors, stored procedures, triggers, views, [XA transactions](http://en.wikipedia.org/wiki/Database_transaction))

The developer of the Federated Storage Engine states that "The Federated Storage Engine is a [proof-of-concept](http://en.wikipedia.org/wiki/Proof_of_concept) storage engine", but the main distributions of MySQL version 5.0 included it and turned it on by default. Documentation of some of the short-comings appears in "MySQL Federated Tables: The Missing Manual". [Sun Microsystems](http://en.wikipedia.org/wiki/Sun_Microsystems) acquired [MySQL AB](http://en.wikipedia.org/wiki/MySQL_AB) in 2008.

* Version 5.1: production release 27 November 2008 (event scheduler, [partitioning](http://en.wikipedia.org/wiki/Partition_%28database%29), plugin API, row-based replication, [server log](http://en.wikipedia.org/wiki/Server_log) tables)

Version 5.1 contained 20 known crashing and wrong result bugs in addition to the 35 present in version 5.0 *(almost all fixed as of release 5.1.51)*. MySQL 5.1 and 6.0-alpha showed poor performance when used for [data warehousing](http://en.wikipedia.org/wiki/Data_warehousing) – partly due to its inability to utilize multiple CPU cores for processing a single query.

* Oracle acquired Sun Microsystems on 27 January 2010.
* The day Oracle announced the purchase of Sun, Michael "Monty" Widenius forked MySQL, launching MariaDB, and took a swathe of MySQL developers with him.
* MySQL Server 5.5 was generally available (as of December 2010). Enhancements and features include:
  + The default storage engine is InnoDB, which supports transactions and referential integrity constraints.
  + Improved InnoDB I/O subsystem
  + Improved [SMP](http://en.wikipedia.org/wiki/Symmetric_multiprocessing) support
  + Semi synchronous replication.
  + SIGNAL and RESIGNAL statement in compliance with the SQL standard.
  + Support for supplementary Unicode character sets utf16, utf32, and utf8mb4.
  + New options for user-defined partitioning.
* MySQL Server 6.0.11-alpha was announced on 22 May 2009 as the last release of the 6.0 line. Future MySQL Server development uses a New Release Model. Features developed for 6.0 are being incorporated into future releases.
* MySQL 5.6 general availability was announced in February 2013. New features included performance improvements to the [query optimizer](http://en.wikipedia.org/wiki/Query_optimizer), higher transactional throughput in InnoDB, new [NoSQL](http://en.wikipedia.org/wiki/NoSQL_%28concept%29)-style me cached APIs, improvements to partitioning for querying and managing very large tables, TIMESTAMP column type that correctly stores milliseconds, improvements to replication, and better performance monitoring by expanding the data available through the PERFORMANCE\_SCHEMA. The InnoDB storage engine also included support for full text search and improved group commit performance.
* MySQL 5.7 Development Milestone 3 was released December 2013.