***CASE STUDY: SQL***

1. ***My sql***

***INTRODUCTION*** :-

**MySQL**was a [software company](https://en.wikipedia.org/wiki/Software_company) that was founded in 1995. It was acquired by [Sun Microsystems](https://en.wikipedia.org/wiki/Sun_Microsystems) in 2008; Sun was in turn acquired by [Oracle Corporation](https://en.wikipedia.org/wiki/Oracle_Corporation) in 2010. MySQL AB is the creator of [MySQL](https://en.wikipedia.org/wiki/MySQL), a [relational database management system](https://en.wikipedia.org/wiki/Relational_database_management_system), as well as related products such as [MySQL Cluster](https://en.wikipedia.org/wiki/MySQL_Cluster). The company was dually headquartered in [Uppsala](https://en.wikipedia.org/wiki/Uppsala), [Sweden](https://en.wikipedia.org/wiki/Sweden) and [Cupertino](https://en.wikipedia.org/wiki/Cupertino), [California](https://en.wikipedia.org/wiki/California) with offices in other countries ([Paris](https://en.wikipedia.org/wiki/Paris), [Munich](https://en.wikipedia.org/wiki/Munich), [Dublin](https://en.wikipedia.org/wiki/Dublin), [Milan](https://en.wikipedia.org/wiki/Milan), and [Tokyo](https://en.wikipedia.org/wiki/Tokyo)).

***What is mysql ?***

* ***MySQL is a database management system.***
* ***MySQL databases are relational.***
* ***MySQL software is Open Source.***
* ***MySQL software is Open Source.***
* ***The MySQL Database Server is very fast, reliable, scalable, and easy to use.***
* ***MySQL Server works in client/server or embedded systems.***
* ***A large amount of contributed MySQL software is available.***

The SQL part of “MySQL” stands for “Structured Query Language”. SQL is the most common standardized language used to access databases. Depending on your programming environment, you might enter SQL directly (for example, to generate reports), embed SQL statements into code written in another language, or use a language-specific API that hides the SQL syntax.SQL is defined by the ANSI/ISO SQL Standard

*MAIN FEATRUES OF MYSQL:*

#### Internals and Portability

* Written in C and C++.
* Tested with a broad range of different compilers.
* Works on many different platforms. See <http://www.mysql.com/support/supportedplatforms/database.html>.
* For portability, uses **CMake** in MySQL 5.5 and up. Previous series use GNU Automake, Autoconf, and Libtool.
* Tested with Purify (a commercial memory leakage detector) as well as with Valgrind, a GPL tool (<http://developer.kde.org/~sewardj/>).
* Uses multi-layered server design with independent modules.
* Designed to be fully multi-threaded using kernel threads, to easily use multiple CPUs if they are available.
* Provides transactional and non-transactional storage engines.
* Implements in-memory hash tables, which are used as temporary tables.

#### Data Types

* Many data types: signed/unsigned integers 1, 2, 3, 4, and 8 bytes long, [FLOAT](http://dev.mysql.com/doc/refman/5.7/en/floating-point-types.html), [DOUBLE](http://dev.mysql.com/doc/refman/5.7/en/floating-point-types.html), [CHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [VARCHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [BINARY](http://dev.mysql.com/doc/refman/5.7/en/binary-varbinary.html), [VARBINARY](http://dev.mysql.com/doc/refman/5.7/en/binary-varbinary.html), [TEXT](http://dev.mysql.com/doc/refman/5.7/en/blob.html), [BLOB](http://dev.mysql.com/doc/refman/5.7/en/blob.html), [DATE](http://dev.mysql.com/doc/refman/5.7/en/datetime.html), [TIME](http://dev.mysql.com/doc/refman/5.7/en/time.html), [DATETIME](http://dev.mysql.com/doc/refman/5.7/en/datetime.html),[TIMESTAMP](http://dev.mysql.com/doc/refman/5.7/en/datetime.html), [YEAR](http://dev.mysql.com/doc/refman/5.7/en/year.html), [SET](http://dev.mysql.com/doc/refman/5.7/en/set.html), [ENUM](http://dev.mysql.com/doc/refman/5.7/en/enum.html), and OpenGIS spatial types. See [Chapter 11, *Data Types*](http://dev.mysql.com/doc/refman/5.7/en/data-types.html).
* Fixed-length and variable-length string types.

#### Statements and Functions(Syntax):

* Full operator and function support in the [SELECT](http://dev.mysql.com/doc/refman/5.7/en/select.html) list and WHERE clause of queries. For example:

mysql> **SELECT CONCAT(first\_name, ' ', last\_name)**

-> **FROM citizen**

-> **WHERE income/dependents > 10000 AND age > 30;**

* Full support for SQL GROUP BY and ORDER BY clauses. Support for group functions ([COUNT()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_count), [AVG()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_avg), [STD()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_std), [SUM()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_sum), [MAX()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_max), [MIN()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_min), and [GROUP\_CONCAT()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_group-concat)).
* Support for LEFT OUTER JOIN and RIGHT OUTER JOIN with both standard SQL and ODBC syntax.
* Support for aliases on tables and columns as required by standard SQL.
* Support for [DELETE](http://dev.mysql.com/doc/refman/5.7/en/delete.html), [INSERT](http://dev.mysql.com/doc/refman/5.7/en/insert.html), [REPLACE](http://dev.mysql.com/doc/refman/5.7/en/replace.html), and [UPDATE](http://dev.mysql.com/doc/refman/5.7/en/update.html) to return the number of rows that were changed (affected), or to return the number of rows matched instead by setting a flag when connecting to the server.
* Support for MySQL-specific [SHOW](http://dev.mysql.com/doc/refman/5.7/en/show.html) statements that retrieve information about databases, storage engines, tables, and indexes. MySQL 5.0 adds support for theINFORMATION\_SCHEMA database, implemented according to standard SQL.

#### Security

* A privilege and password system that is very flexible and secure, and that enables host-based verification.
* Password security by encryption of all password traffic when you connect to a server.

#### Scalability and Limits

* Support for up to 64 indexes per table. Each index may consist of 1 to 16 columns or parts of columns. The maximum index width is 767 bytes for InnoDB tables, or 1000 for MyISAM. An index may use a prefix of a column for [CHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [VARCHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [BLOB](http://dev.mysql.com/doc/refman/5.7/en/blob.html), or [TEXT](http://dev.mysql.com/doc/refman/5.7/en/blob.html) column types.

#### Connectivity

* Clients can connect to MySQL Server using several protocols:
* On Windows systems, clients can connect using named pipes if the server is started with the [--enable-named-pipe](http://dev.mysql.com/doc/refman/5.7/en/server-options.html#option_mysqld_enable-named-pipe) option. Windows servers also support shared-memory connections if started with the [--shared-memory](http://dev.mysql.com/doc/refman/5.7/en/server-options.html#option_mysqld_shared-memory) option. Clients can connect through shared memory by using the --protocol=memoryoption.

#### Clients and Tools

* MySQL includes several client and utility programs. These include both command-line programs such as [**mysqldump**](http://dev.mysql.com/doc/refman/5.7/en/mysqldump.html) and [**mysqladmin**](http://dev.mysql.com/doc/refman/5.7/en/mysqladmin.html), and graphical programs such as [MySQL Workbench](http://dev.mysql.com/doc/refman/5.7/en/workbench.html).
* MySQL Server has built-in support for SQL statements to check, optimize, and repair tables. These statements are available from the command line through the[**mysqlcheck**](http://dev.mysql.com/doc/refman/5.7/en/mysqlcheck.html) client. MySQL also includes [**myisamchk**](http://dev.mysql.com/doc/refman/5.7/en/myisamchk.html), a very fast comma

### *LIMITATIONS*

Like other [SQL databases](https://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, and check constraints.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.[[79]](https://en.wikipedia.org/wiki/MySQL#cite_note-dev.mysql.com-83) No triggers can be defined on views.[

1. ***SQL PLUS***

***INTRODUCTION:-***

**SQL** ([Listen](https://upload.wikimedia.org/wikipedia/commons/5/5f/En-us-SQL.ogg)[**i**](https://en.wikipedia.org/wiki/File:En-us-SQL.ogg)[/ˈɛs kjuː ˈɛl/](https://en.wikipedia.org/wiki/Help:IPA_for_English),[[4]](https://en.wikipedia.org/wiki/SQL#cite_note-learningSQL-4) or [Listen](https://upload.wikimedia.org/wikipedia/commons/7/7a/En-us-sequel.ogg)[**i**](https://en.wikipedia.org/wiki/File:En-us-sequel.ogg)[/ˈsiːkwəl/](https://en.wikipedia.org/wiki/Help:IPA_for_English);[[5]](https://en.wikipedia.org/wiki/SQL#cite_note-oed-5) **Structured Query Language**[[6]](https://en.wikipedia.org/wiki/SQL#cite_note-Britannica-6)[[7]](https://en.wikipedia.org/wiki/SQL#cite_note-oed-US-7)[[8]](https://en.wikipedia.org/wiki/SQL#cite_note-IBM-SQL-8)[[9]](https://en.wikipedia.org/wiki/SQL#cite_note-MS-SQL-def-9)) is a [special-purpose programming language](https://en.wikipedia.org/wiki/Special-purpose_programming_language) designed for managing data held in a[relational database management system](https://en.wikipedia.org/wiki/Relational_database_management_system) (RDBMS), or for stream processing in a [relational data stream management system](https://en.wikipedia.org/wiki/Relational_data_stream_management_system) (RDSMS).’

***What is sql+ ?***

* ***SQL+ is a database management system.***
* ***SQL+ databases are relational.***
* ***SQL+ software is Open Source.***
* ***SQL+ software is Open Source.***
* ***SQL+ Database Server is very fast, reliable, scalable, and easy to use.***
* ***SQL+ Server works in client/server or embedded systems.***
* ***A large amount of contributed SQL+ software is available.***

***Main features of sql+***

#### 1 )Internals and Portability

* Tested with a broad range of different compilers.
* Works on many different platforms. See <http://www.mysql.com/support/supportedplatforms/database.html>.
* For portability, uses **CMake** in MySQL 5.5 and up. Previous series use GNU Automake, Autoconf, and Libtool.
* Tested with Purify (a commercial memory leakage detector) as well as with Valgrind, a GPL tool (<http://developer.kde.org/~sewardj/>).
* Uses multi-layered server design with independent modules.
* Designed to be fully multi-threaded using kernel threads, to easily use multiple CPUs if they are available.
* Provides transactional and non-transactional storage engines..

#### 2) Data Types

* Many data types: signed/unsigned integers 1, 2, 3, 4, and 8 bytes long, [FLOAT](http://dev.mysql.com/doc/refman/5.7/en/floating-point-types.html), [DOUBLE](http://dev.mysql.com/doc/refman/5.7/en/floating-point-types.html), [CHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [VARCHAR](http://dev.mysql.com/doc/refman/5.7/en/char.html), [BINARY](http://dev.mysql.com/doc/refman/5.7/en/binary-varbinary.html), [VARBINARY](http://dev.mysql.com/doc/refman/5.7/en/binary-varbinary.html), [TEXT](http://dev.mysql.com/doc/refman/5.7/en/blob.html), [BLOB](http://dev.mysql.com/doc/refman/5.7/en/blob.html), [DATE](http://dev.mysql.com/doc/refman/5.7/en/datetime.html), [TIME](http://dev.mysql.com/doc/refman/5.7/en/time.html), [DATETIME](http://dev.mysql.com/doc/refman/5.7/en/datetime.html),[TIMESTAMP](http://dev.mysql.com/doc/refman/5.7/en/datetime.html), [YEAR](http://dev.mysql.com/doc/refman/5.7/en/year.html), [SET](http://dev.mysql.com/doc/refman/5.7/en/set.html), [ENUM](http://dev.mysql.com/doc/refman/5.7/en/enum.html), and OpenGIS spatial types. See [Chapter 11, *Data Types*](http://dev.mysql.com/doc/refman/5.7/en/data-types.html).
* Fixed-length and variable-length string types.

#### 3) Statements and Functions( SYNTAX)

* Full operator and function support in the [SELECT](http://dev.mysql.com/doc/refman/5.7/en/select.html) list and WHERE clause of queries. For example:
* mysql> **SELECT CONCAT(first\_name, ' ', last\_name)**
* -> **FROM citizen**
* -> **WHERE income/dependents > 10000 AND age > 30;**
* Full support for SQL GROUP BY and ORDER BY clauses. Support for group functions ([COUNT()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_count), [AVG()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_avg), [STD()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_std), [SUM()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_sum), [MAX()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_max), [MIN()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_min), and [GROUP\_CONCAT()](http://dev.mysql.com/doc/refman/5.7/en/group-by-functions.html#function_group-concat)).
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#### 3)Security

* A privilege and password system that is very flexible and secure, and that enables host-based verification.
* Password security by encryption of all password traffic when you connect to a server.

#### 4)Scalability and Limits

* Support for large databases. We use MySQL Server with databases that contain 50 million records. We also know of users who use MySQL Server with 200,000 tables and about 5,000,000,000 rows.

#### 5)Connectivity

* Clients can connect to MySQL Server using several protocols:
  + On Windows systems, clients can connect using named pipes if the server is started with the [--enable-named-pipe](http://dev.mysql.com/doc/refman/5.7/en/server-options.html#option_mysqld_enable-named-pipe) option. Windows servers also support shared-memory connections if started with the [--shared-memory](http://dev.mysql.com/doc/refman/5.7/en/server-options.html#option_mysqld_shared-memory) option. Clients can connect through shared memory by using the --protocol=memoryoption.

#### 6)Localization

* The server can provide error messages to clients in many languages. See [Section 10.2, “Setting the Error Message Language”](http://dev.mysql.com/doc/refman/5.7/en/error-message-language.html).
* Full support for several different character sets, including latin1 (cp1252), german, big5, ujis, several Unicode character sets, and more. For example, the Scandinavian characters “å”, “ä” and “ö” are permitted in table and column names.
* All data is saved in the chosen character set.

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#### Clients and Tools

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* MySQL Server has built-in support for SQL statements to check, optimize, and repair tables. These statements are available from the command line through the[**mysqlcheck**](http://dev.mysql.com/doc/refman/5.7/en/mysqlcheck.html) client. MySQL also includes [**myisamchk**](http://dev.mysql.com/doc/refman/5.7/en/myisamchk.html), a very fast command-line utility for performing these operations on MyISAM tables. See [Chapter 4, *MySQL Programs*](http://dev.mysql.com/doc/refman/5.7/en/programs.html).

*LIMITATIONS:-*

When using SQL\*Plus to extract data, there are some limitations to keep in mind. Because SQL\*Plus was designed as a reporting tool and not a data extraction tool, the output must be text. If you need to write a file containing packed-decimal data or binary data, SQL\*Plus is not the tool to use.

***Comparison between MYSQL and SQL+***

|  |  |
| --- | --- |
| MySQL | Sql+ |
| MySQL is an open source and MySQL is available for free download and installation. | Only Sql+ Express Edition is free of cost. But Oracle Express Edition has very limited features compared to MySQL |
| User authentication is performed in MySQL by using only location, username and password. | Sql+ provides enhanced database security. User authentication is performed in Oracle by specifying global roles in addition to location, username and password. |
| Flexibility of creating stored procedures and functions using PL/SQL is very less in MySQL. | Sql+ provides more flexible features for creating stored procedures and functions using PL/SQL. |
| MySQL offers very few commands related to generating output as report and defining variables. MySQL includes only very simple SQL commands. | SQL commands in SQL\*Plus include are for generating output as report and defining variables. |
| MySQL does not have the audit vault feature in the server. | Sql+ provides audit vault facility. |
| MySQL does not offer tools at enterprise level | Sql+ offers tools at enterprise level. |
| MySQL has only table locking facility. | Sql+ provides the row locking facility as well. |