MySQL Overview

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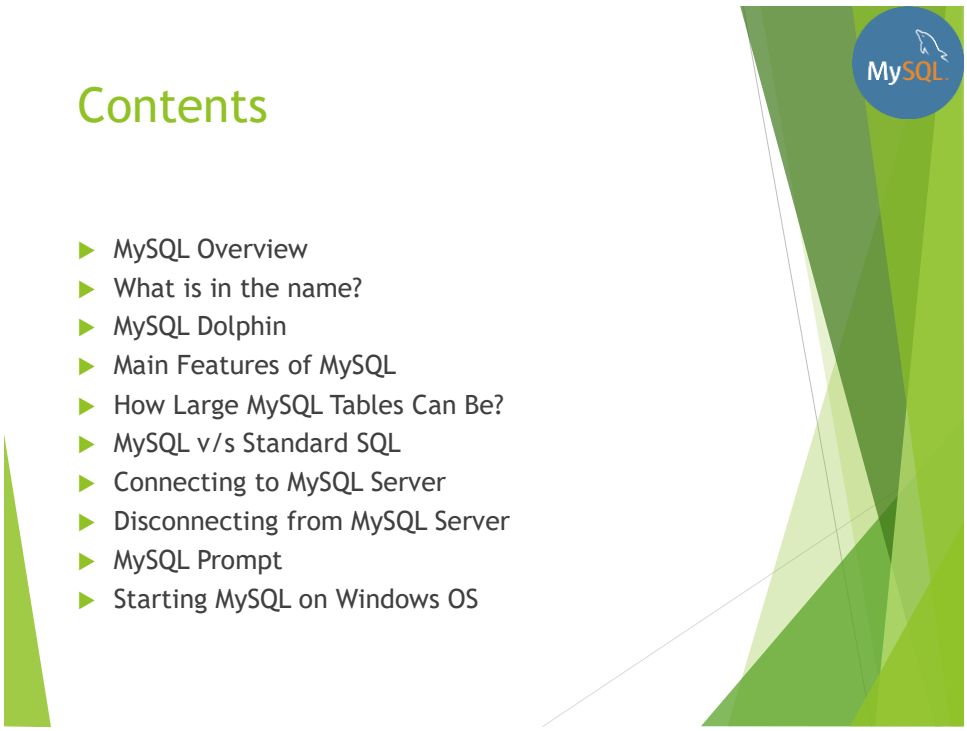

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MySQL AB

- **MySQL AB** is the company of the MySQL founders and main developers.
- MySQL AB was originally established in **Sweden** by **David Axmark**, **Allan Larsson**, and **Michael** "Monty" **Widenius**.
- By the way, the "**AB**" part of the company name is the acronym for the Swedish "**aktiebolag**", or "**stock company**". It translates to "**MySQL, Inc.**"

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MySQL Overview

- **MySQL**, is the most popular **Open Source SQL** database management system, is developed, distributed, and supported by **MySQL AB**.
- It is a Open Source company that unites Open Source values and methodology with a successful business model.

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MySQL Overview

- **MySQL** is a relational database management system.
- **MySQL** software is Open Source.
- The **MySQL** Database Server is very fast, reliable, and easy to use.
- **MySQL** Server works in client/server or embedded systems.
- The official way to pronounce "**MySQL**" is "**My Ess Que Ell**" (not "my sequel").

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What's in the name?

- The derivation of the name **MySQL** is not clear.
- Our base directory and a large number of our libraries and tools have had the prefix "**my**".
- Co-founder Monty Widenius's daughter is also named **My**.
- Which of the two gave its name to **MySQL** is still a **mystery**.

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MySQL Dolphin

- The name of the **MySQL Dolphin** (our logo) is "**Sakila**," which was chosen by the founders of MySQL AB from a huge list of names suggested by users in our "**Name the Dolphin**" contest.
- The winning name was submitted by **Ambrose Twebaze**, an Open Source software developer.

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Main Features of MySQL

- The following list describes some of the important characteristics of the MySQL Database Software.
- **Internals and Portability**.
  - Written in C and C++.
  - Tested with a broad range of different compilers.
  - Works on many different platforms.
  - Uses GNU Automake, Autoconf, and Libtool for portability.
  - APIs for C, C++, Eiffel, Java, Perl, PHP, Python, Ruby, and Tcl are available.

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Main Features of MySQL

- **Internals and Portability**.
  - Fully multi-threaded using kernel threads. It can easily use multiple CPUs if they are available.
  - Provides transactional and non-transactional storage engines.
  - Uses very fast B-tree disk tables (**MyISAM**) with index compression.
  - Relatively easy to add other storage engines. This is useful if you want to add an SQL interface to an in-house database.
  - A very fast thread-based memory allocation system.
  - Very fast joins using an optimized multi-join.

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Main Features of MySQL

- **Internals and Portability**.
  - In-memory hash tables, which are used as temporary tables.
  - SQL functions are implemented using a highly optimized class library and should be as fast as possible. Usually there is no memory allocation at all after query initialization.
  - The MySQL code is tested with Purify (a commercial memory leakage detector) as well as with Valgrind, a GPL tool.

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Main Features of MySQL

- **Data Types**
  - Many data types: signed/unsigned integers 1, 2, 3, 4, and 8 bytes long, **FLOAT**, **DOUBLE**, **CHAR**, **VARCHAR**, **TEXT**, **BLOB**, **DATE**, **TIME**, **DATETIME**, **TIMESTAMP**, **YEAR**, **SET**, and **ENUM** types.
  - Fixed-length and variable-length records.

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Main Features of MySQL

- **Statements and Functions**
  - Full operator and function support in the **SELECT** and **WHERE** clauses of queries.
  - Full support for SQL **GROUP BY** and **ORDER BY** clauses. Support for group functions.
  - 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

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Main Features of MySQL

- **Statements and Functions**
  - **DELETE**, **INSERT**, **REPLACE**, and **UPDATE** return the number of rows that were changed (affected).
  - The MySQL-specific **SHOW** statement can be used to retrieve information about databases, storage engines, tables, and indexes.
  - The **EXPLAIN** statement can be used to determine how the optimizer resolves a query.

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Main Features of MySQL

- **Statements and Functions**
  - You can mix tables from different databases in the same query.
- **Security**
  - A privilege and password system that is very flexible and secure, and that allows host-based verification.
  - Passwords are secure because all password traffic is encrypted when you connect to a server.

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Main Features of MySQL

- **Scalability and Limits**
  - Handles large databases.
  - We use MySQL Server with databases that contain 50 million records.
  - We also know of users who use MySQL Server with 60,000 tables and about 5,000,000,000 rows.
  - Up to 64 indexes per table are allowed (32 before MySQL 4.1.2).

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Main Features of MySQL

- **Scalability and Limits**
  - Up to 64 indexes per table are allowed (32 before MySQL 4.1.2).
  - Each index may consist of 1 to 16 columns or parts of columns.
  - The maximum index width is 1000 bytes (767 for **InnoDB**); before MySQL 4.1.2, the limit is 500 bytes.

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Main Features of MySQL

- **Connectivity**
  - Clients can connect to the MySQL server using TCP/IP sockets on any platform.
  - In MySQL 4.1 and higher, Windows servers also support shared-memory connections.
  - The Connector/ODBC (MyODBC) interface provides MySQL support for client programs that use ODBC (Open Database Connectivity) connections.

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Main Features of MySQL

- **Connectivity**
  - The Connector/J interface provides MySQL support for Java client programs that use JDBC connections.
  - MySQL Connector/NET enables developers to easily create .NET applications that require secure, high-performance data connectivity with MySQL.

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Main Features of MySQL

- **Localization**
  - The server can provide error messages to clients in many languages.
  - Unicode support is available as of MySQL 4.1.
  - All data is saved in the chosen character set. All comparisons for normal string columns are case-insensitive.
  - Sorting is done according to the chosen character set

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Main Features of MySQL

- **Clients and Tools**
  - 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** client. MySQL also includes **myisamchk**, a very fast command-line utility for performing these operations on **MyISAM** tables.

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How Large MySQL Tables Can Be?

- MySQL 3.22 had a 4GB (4 gigabyte) limit on table size.
- With the **MyISAM** storage engine in MySQL 3.23, the maximum table size was increased to 65536 terabytes (256^7 – 1 bytes).
- However, the table size also depends on the operating system. The following table illustrate that.

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How Large MySQL Tables Can Be?

- However, the table size also depends on the operating system. The following table illustrate that.

Operating System	File-size Limit
Linux 2.4+	(using ext3 filesystem) 4TB
Solaris 9/10	16TB
Win32 w/ FAT/FAT32	2GB/4GB
Win32 w/ NTFS	2TB
MacOS X w/ HFS+	2TB

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Year 2000 Compliance

- The MySQL Server itself has no problems with Year 2000 (Y2K) compliance.

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MySQL v/s Standard SQL

- **MySQL** Server follow the **ANSI SQL** standard and the **ODBC SQL** standard, but MySQL Server performs operations differently in some cases:
  - For **VARCHAR** columns, trailing spaces are removed when the value is stored.
  - **CHAR** columns are silently converted to **VARCHAR** columns when you define a table or alter its structure.

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MySQL v/s Standard SQL

- MySQL v/s Standard SQL
  - **MySQL**, privileges for a table are not automatically revoked when you delete a table. You must explicitly issue a **REVOKE** statement to revoke privileges for a table.
  - The **CAST()** function does not support cast to **REAL** or **BIGINT**.

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Connecting to MySQL Server

- To connect to the server, you will usually need to provide a MySQL user name when you invoke **mysql** and, most likely, a password.
- If the server runs on a machine other than the one where you log in, you will also need to specify a host name.

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Connecting to MySQL Server

- Once you know the proper parameters, you should be able to connect like this:

```
shell> mysql -h host -u user -p
Enter password: *******
Welcome to the MySQL monitor. Commands end with ; or \g. Your
MySQL connection id is 26 to server version: 4.1.22

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

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Disconnecting from MySQL

- After you have connected successfully, you can disconnect any time by typing QUIT (or \q) at the mysql> prompt:

```
mysql> Quit
Bye
```

- On Unix/Linux, you can also disconnect by pressing Control-D.

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MySQL Prompt

- A command normally consists of an SQL statement followed by a semicolon or \g.
- It can be split across multiple lines.
- If you decide you do not want to execute a command that you are in the process of entering, cancel it by typing \c.
- If you decide you do not want to execute a command that you are in the process of entering, but quit type \q.

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MySQL Prompt

- Table shows each of the prompts you may see and summarizes what they mean about the state that **mysql** is in:

Prompt	Meaning
mysql>	Ready for new command
->	Waiting for next line of multiple-line command.
' >	Waiting for next line, waiting for completion of a string that began with a single quote ('').
" >	Waiting for next line, waiting for completion of a string that began with a double quote ('"').
` >	Waiting for next line, waiting for completion of an identifier that began with a backtick (``').
/* >	Waiting for next line, waiting for completion of a comment that began with /*.

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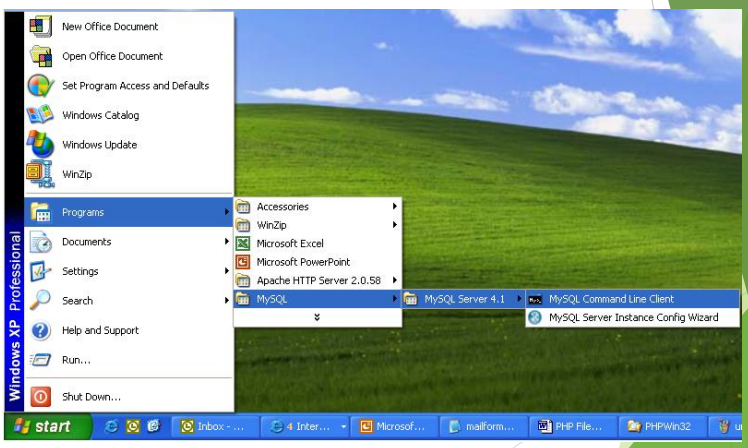
Starting MySQL on Windows

- To start MySQL on Windows, choose "MySQL Command Line Client" from MySQL Server 4.1 as shown below:



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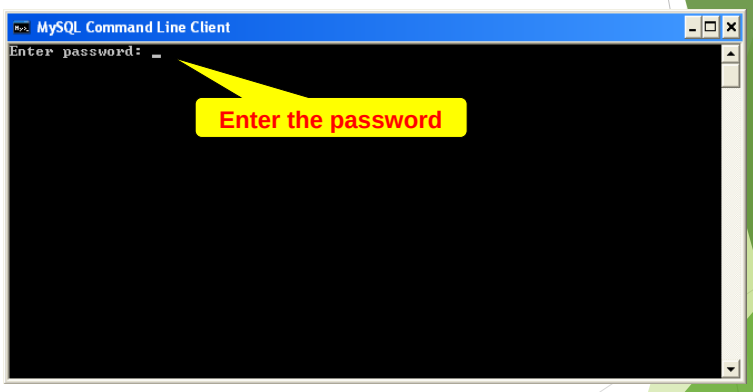
Starting MySQL on Windows

- The MySQL Command Line Client window will be displayed as shown below:



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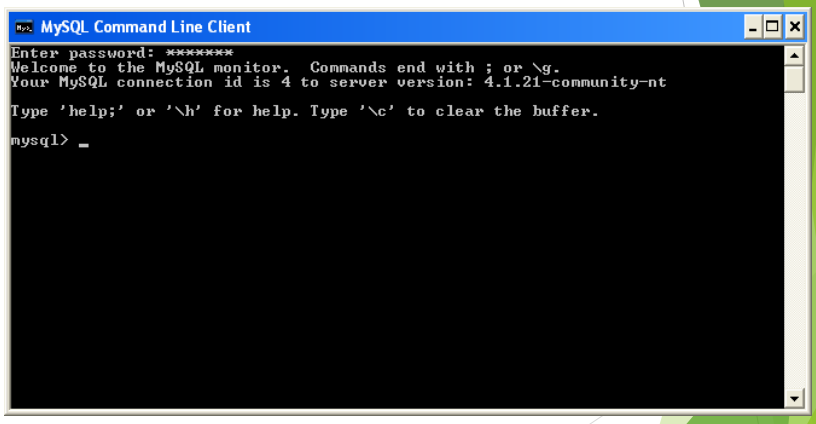
Starting MySQL on Windows

- On Entering the password, the screen looks as shown below:



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Ending MySQL Session

- Now, we can issue MySQL commands.
- Once you're done you can end mysql client by typing **quit** or **exit** at the **mysql>** prompt.

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