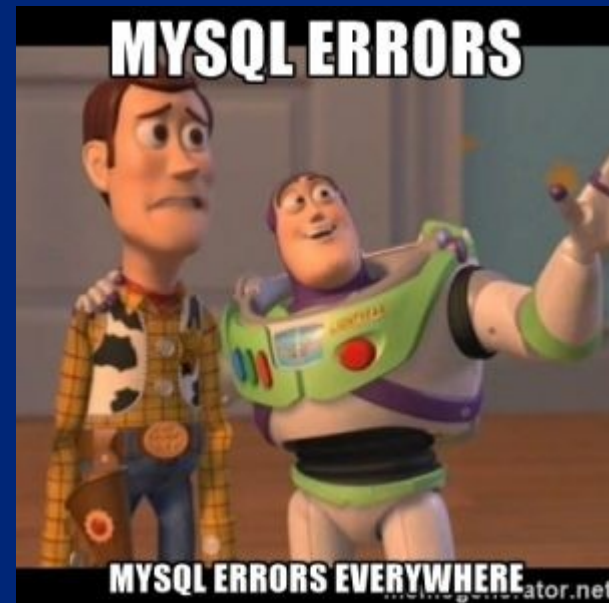


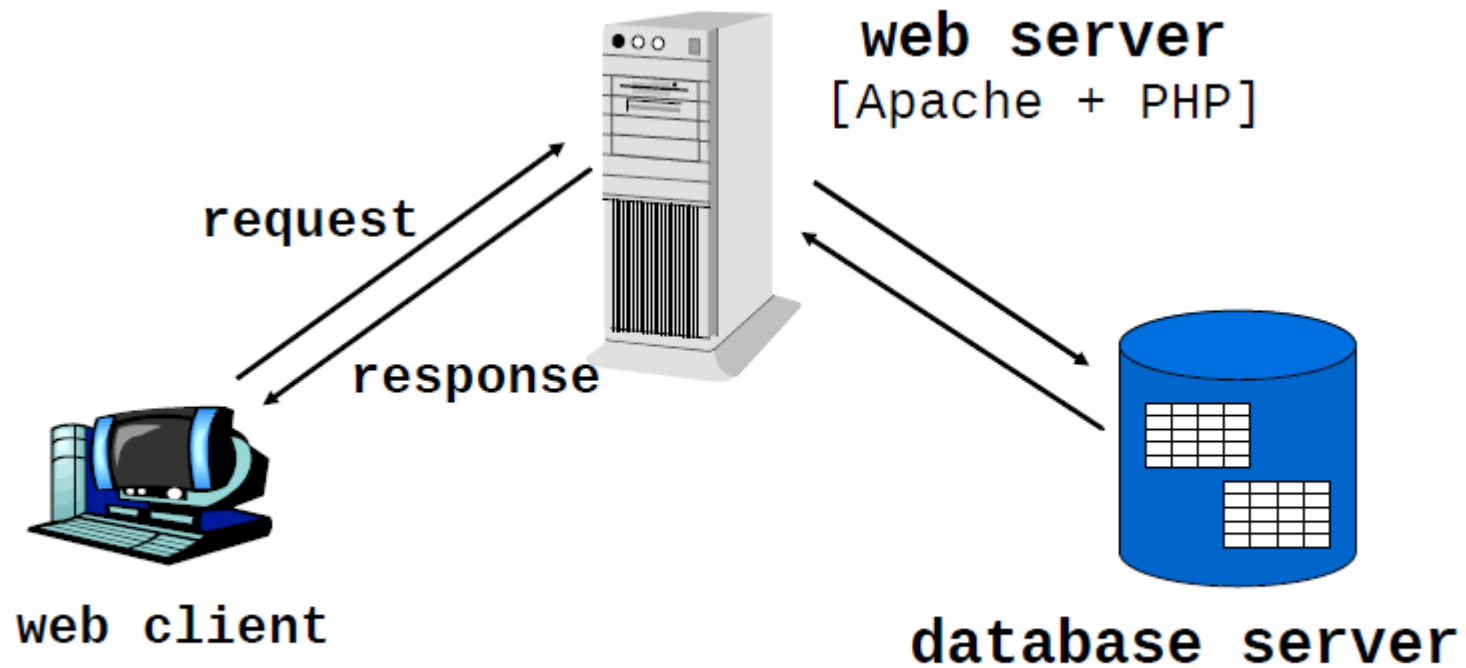
MySQL



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Interazione con il database

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Interazione con il database

3



The MySQL website header features the MySQL logo, the tagline "The world's most popular open source database", and navigation links for MySQL.COM, DOWNLOADS, DOCUMENTATION, and DEVELOPER ZONE. A search bar and social media icons are also present. Below the header is a blue navigation bar with links for Products, Cloud, Services, Partners, Customers, Why MySQL?, News & Events, and How to Buy. The main banner promotes "Migrate from MariaDB to MySQL HeatWave" with a "GET STARTED" button.



MySQL HeatWave

MySQL HeatWave is a fully managed database service for transactions, real-time analytics across data warehouses and data lakes, and machine learning services, without the complexity, latency, and cost of ETL duplication. It is available on OCI, AWS, and Azure. [Learn More »](#)



MySQL for OEM/ISV

Over 2000 ISVs, OEMs, and VARs rely on MySQL as their products' embedded database to make their applications, hardware and appliances more competitive, bring them to market faster, and lower their cost of goods sold.



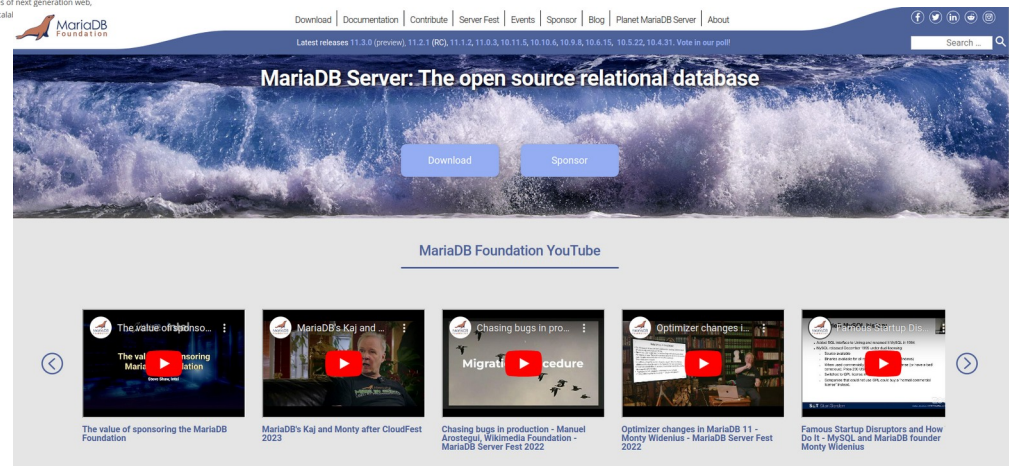
MySQL Enterprise Edition

The most comprehensive set of advanced features, management tools and technical support to achieve the highest levels of MySQL scalability, security, reliability, and uptime. [Learn More »](#)



MySQL Cluster CGE

MySQL Cluster enables users to meet the database challenges of next generation web, cloud, and communications services with uncompromising scalability. [Learn More »](#)



The MariaDB website header includes navigation links for Download, Documentation, Contribute, Server Fest, Events, Sponsor, Blog, Planet MariaDB Server, and About. It also features a search bar and social media icons. The main banner promotes "MariaDB Server: The open source relational database" with "Download" and "Sponsor" buttons. Below the banner is a "MariaDB Foundation YouTube" section with a carousel of video thumbnails.



MySQL: client

4

```
marina@:~$ mysql -h localhost -u username -p
```

```
Enter password:
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
```

```
Your MySQL connection id is 6
```

```
Server version: ...
```

```
...
```

```
...
```

```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> use mysite;
```

```
Reading table information for completion of table and column names
```

```
You can turn off this feature to get a quicker startup with -A
```

```
Database changed
```

```
mysql>
```

Permette di interagire con il server MySQL da **linea di comando**

MySQL: client



Welcome to phpMyAdmin

Language

English

Log in

Username:

sawuser

Password:

Go

marina@:~\$

Enter password:

Welcome to the MySQL client
Your MySQL connection information is
Server version: ...

...

...

Type 'help;' or '\h' for help.

mysql> use mysql;

Reading table information for
You can turn off this

Database changed

mysql>

Permette di interagire con il server MySQL **via web**

MySQL: tabelle InnoDB e MyISAM

6

- *“Storage engines are MySQL components that handle the SQL operations for different table types.”*
- *“**InnoDB is the default** and most general-purpose storage engine, and Oracle recommends using it for tables except for specialized use cases.”*
- *“MyISAM is optimized for environments with heavy read operations, and few writes, or none at all.”*

MySQL: tabelle InnoDB e MyISAM

7

- *InnoDB has row-level locking, MyISAM can only do full table-level locking*
- *InnoDB has better crash recovery*
- *InnoDB implements transactions, foreign keys and relationship constraints, MyISAM does not*

MySQL: utenti

8

- Un server MySQL può gestire **più utenti e più database**
- L'utente **root** deve essere usato solo per l'amministrazione del DBMS
- Al momento dell'**installazione** si deve specificare la **password per l'utente root!**
- Per ogni utente che deve usare il sistema (ancora meglio, per ogni database) si dovrebbe definire **un utente MySQL**

Privilegi su database e tabelle

9

“ ... principle of **Least Privilege**: a user (or process) should have the lowest level of privilege required in order to perform his task assigned ...”

MySQL: controllo dell'accesso

10

- Il controllo dell'accesso in MySQL si svolge in due passi
 1. Controllo delle **credenziali** dell'utente MySQL (authentication)
 2. Se le credenziali sono OK, per ogni istruzione SQL il server MySQL verifica se l'utente ha i **privilegi** sufficienti (authorization)

MySQL: privilegi

11

“ ... A privilege is the right to perform a particular action on a particular object, and is associated with a particular user.

You can create a user within MySQL, you **grant** her a set of privileges to specify what she can and cannot do within the system ...”

“Internally, the server stores privilege information in the **grant tables** of the **mysql** database ...”

MySQL: privilegi

12

- MySQL fornisce **4 livelli di privilegi**:
 - Global, Database, Table, Column
- Per **assegnare** (cancellare) un privilegio ad un utente si usa il comando **GRANT** (REVOKE)

GRANT <privileges>

ON <item>

TO <username> [**IDENTIFIED BY** '<password>']

[**WITH GRANT OPTION**];

MySQL: privilegi

13

- MySQL permette di definire privilegi per l'utente generico, privilegi per l'amministratore, e dei privilegi speciali
- Per l'utente generico si possono ad esempio specificare i seguenti privilegi
 - **SELECT, INSERT, UPDATE, DELETE, INDEX, ALTER, CREATE, DROP**

Creazione utente/db

14

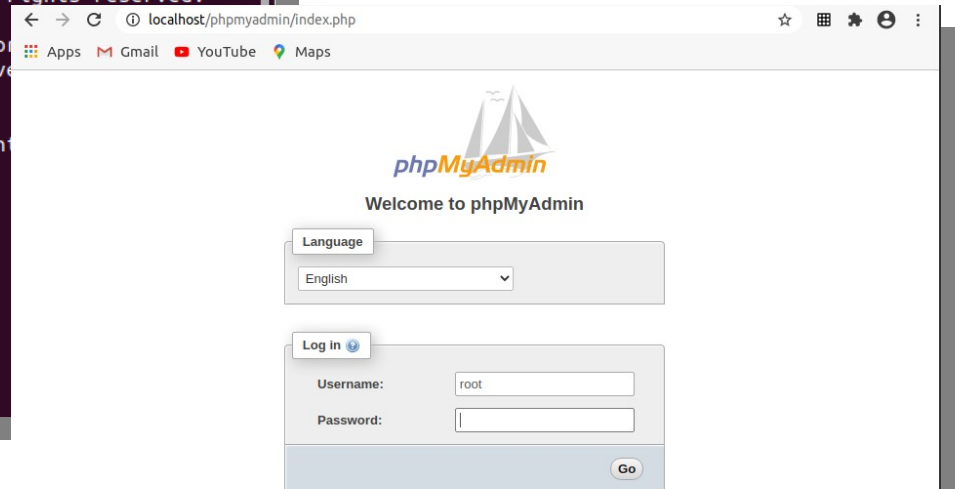
- Sul server del corso

```
CREATE USER '<sawuser>'@'localhost' IDENTIFIED BY '<sawpwd>';  
CREATE DATABASE <sawdb>;  
GRANT ALL PRIVILEGES ON <sawdb>.* TO '<sawuser>'@'localhost';  
FLUSH PRIVILEGES;
```

Hands on...

15

```
marina@XPS-13-9360: ~  
marina:~$ mysql -u marina -p  
Enter password:  
Welcome to the MySQL monitor.  Commands end with ; or \g.  
Your MySQL connection id is 701  
Server version: 8.0.22-0ubuntu0.20.04.2 (Ubuntu)  
  
Copyright (c) 2000, 2020, Oracle and/or its affiliates. All rights reserved.  
  
Oracle is a registered trademark of Oracle Corporation and/or its  
affiliates. Other names may be trademarks of their respective  
owners.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current  
statement.  
mysql> 
```



The screenshot shows the phpMyAdmin web interface in a browser window. The address bar displays 'localhost/phpmyadmin/index.php'. The page features the phpMyAdmin logo and the text 'Welcome to phpMyAdmin'. Below this, there is a 'Language' dropdown menu set to 'English'. A 'Log In' button is visible, followed by input fields for 'Username' (containing 'root') and 'Password'. A 'Go' button is located at the bottom right of the login section.