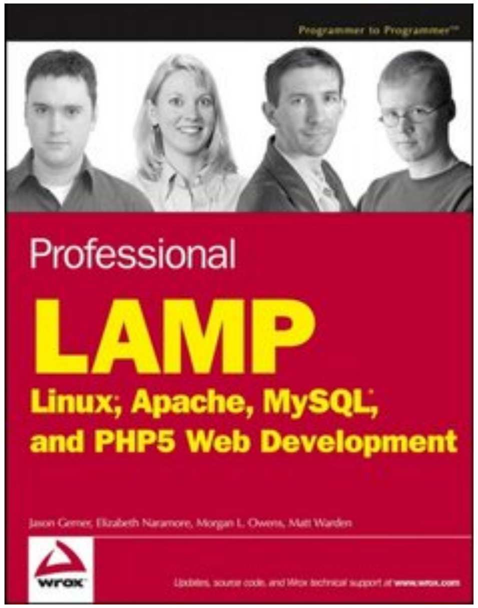
The M in LAMP: MySQL


Programmer to Programmer™

Professional
LAMP
Linux®, Apache, MySQL®, and PHP5 Web Development

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LAMP
Linux Apache MySQL PHP,Perl,Python

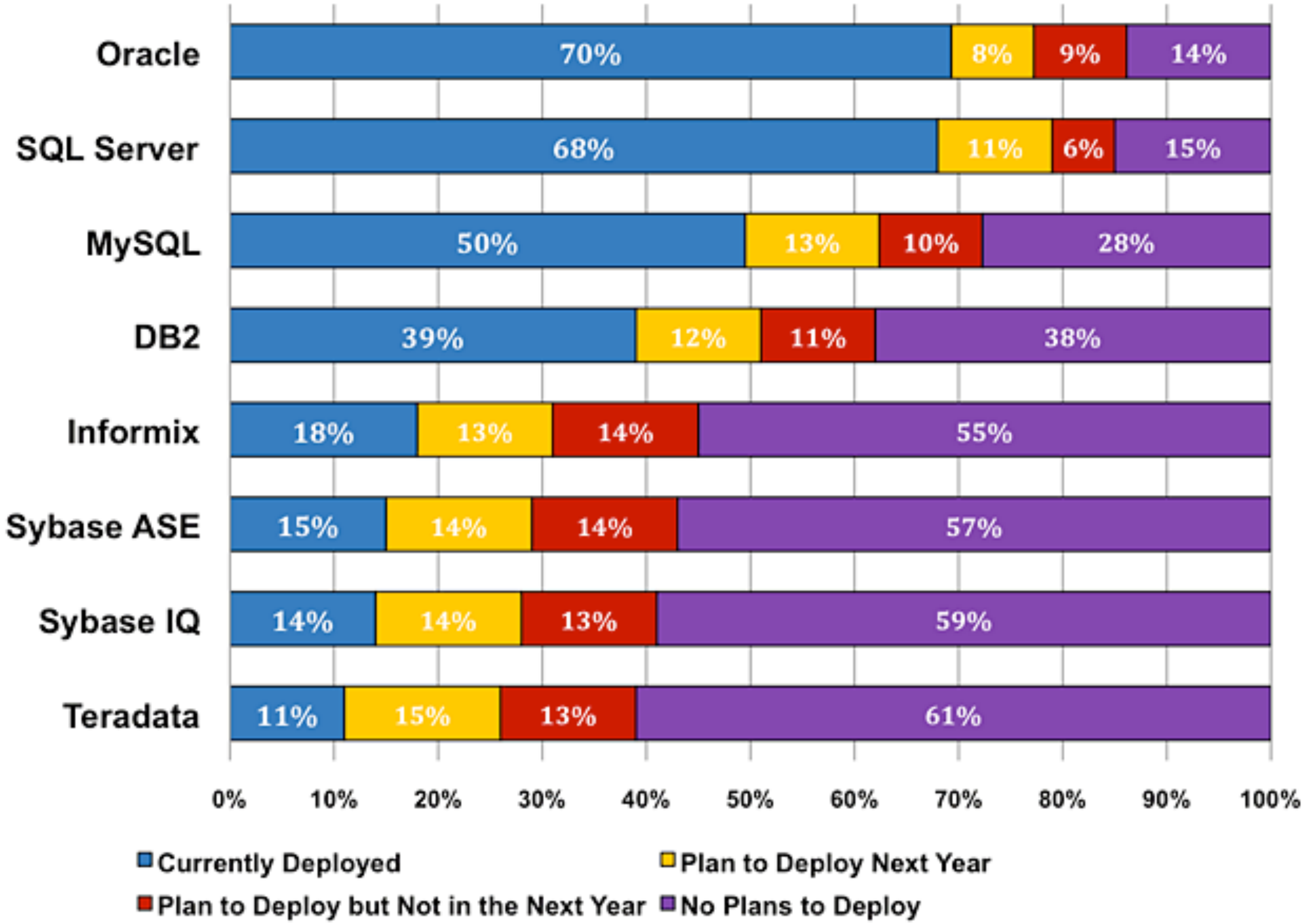
Overview

- MySQL
  - Setup, using console
  - Data types
  - Creating users, databases and tables
- SQL queries
  - INSERT, SELECT, DELETE
  - WHERE, ORDER BY, GROUP BY, LIKE, LIMIT, COUNT(*)
- Using from PHP
  - Procedural vs. Object-oriented
  - Iterating over results

MySQL history

- MySQL
  - "My ess queue ell", "My sequel"
  - 1995, MySQL AB founded in Sweden
  - 2000, goes open source
  - 2003, 4 million active installations, 30K downloads/day
  - 2006, 33% market share, 0.2% of revenue
  - 2008, acquired by Sun for $1B

MySQL installations



Some numeric data types

Type	Storage	Signed range
`TINYINT`	1 byte	-128 to +127
`SMALLINT`	2 bytes	-32768 to +32767
`MEDIUMINT`	3 bytes	-8388608 to +8388607
`INT, INTEGER`	4 bytes	-2147483648 to +2147483647
`BIGINT`	8 bytes	-9223372036854775808 to 9223372036854775807

Type	Storage	
`FLOAT`	4 bytes	Single precision, approximate
`DOUBLE`	8 bytes	Double precision, approximate
`DECIMAL(x,y)`	varies	Exact value, x significant figures, y decimal places
`BIT(M)`	varies	Stores 1-64 bits

Some string data types

Type	
`CHAR(X)`	Fixed-length text data, 0-255 in length
`VARCHAR(X)`	Variable-length text data, 0 to 65,535 in length
`BLOB`	Binary Large Object, used to store large amounts of binary data such as image or files, 64K max length
`TEXT`	Large amounts of text data, 64K max length
`TINYBLOB` `TINYTEXT`	255 max length
`MEDIUMBLOB` `MEDIUMTEXT`	16,777,215 max length
`LONGBLOB` `LONGTEXT`	4,294,967,295 max length
`ENUM`	Enumerated type, string value in a specified set of allowed values

Some date/time data types

Type	
`DATE`	YYYY-MM-DD
`DATETIME`	YYYY-MM-DD HH:MM:SS
`TIMESTAMP`	YYYYMMDDHHMMSS Automatically update when row changed
`TIME`	HH:HMM:SS
`YEAR(M)`	YY, or YYYY

Setting up a database

- Log in as root
- Create a new database:

```
CREATE DATABASE grocery;
```

- Create a new user, grant privileges:

```
CREATE USER 'username'@'localhost'
IDENTIFIED BY 'pwd';

GRANT ALL PRIVILEGES ON grocery.*
TO 'username'@'localhost';
```

Creating a table

- Table creation syntax:

```
CREATE TABLE table_name (col_name1 col_type1,
                         col_name2 col_type2, ...)
```

```
CREATE TABLE inven
(
   id      INT NOT NULL PRIMARY KEY AUTO_INCREMENT,
   name    VARCHAR(50) NOT NULL,
   details TEXT,
   price   FLOAT NOT NULL,
   qty     INT NOT NULL
);
```

Inserting data into a table

- Insertion syntax:

```
INSERT INTO table_name (col_name1, col_name2, ...)
                 VALUES (col_val1, col_val2, ...);
```

```
INSERT INTO inven (name, details, price, qty)
VALUES ('Apples', 'Ripe apples.', '0.25', 1000);
```

```
INSERT INTO inven (name, details, price, qty)
VALUES ('Apples', 'Rotten apples.', '0.02', 594);
```

```
INSERT INTO inven
VALUES (NULL, 'Apples', 'Ripe apples.', '0.25', 1000);
```

Need to include values for every column if you don't provide column name list!

Selecting data form a table

- Select syntax:

```
SELECT col_name1, col_name2, ... FROM table_name
[WHERE condition]
[GROUP BY col_name]
[ORDER BY condition [ASC | DESC]]
[LIMIT [offset,] rows]
```

```
SELECT *
FROM inven;
```

```
SELECT name, qty
FROM inven;
```

```
SELECT name, qty
FROM inven
ORDER BY price
LIMIT 2;
```

Selecting data form a table

- Select syntax:

```
SELECT col_name1, col_name2, ... FROM table_name
[WHERE condition]
[GROUP BY col_name]
[ORDER BY condition [ASC | DESC]]
[LIMIT [offset,] rows]
```

```
SELECT *
FROM inven
WHERE qty <= 500;
```

```
SELECT *
FROM inven
WHERE name LIKE 'a%';
```

Any names that begin with the letter a.

Selecting data form a table

- Select syntax:

```
SELECT col_name1, col_name2, ... FROM table_name
[WHERE condition]
[GROUP BY col_name]
[ORDER BY condition [ASC | DESC]]
[LIMIT [offset,] rows]
```

```
SELECT *, count(*) as freq
FROM inven
GROUP BY name;
```

Causes generation of a new column that counts number of rows that were aggregated by GROUP BY clause

Deleting data from a table

- Delete syntax:

```
DELETE FROM table_name
[WHERE condition]
[LIMIT rows]
```

```
DELETE FROM inven;
```

```
DELETE FROM inven
WHERE qty < 500;
```

Using MySQL from PHP

- PHP's MySQL extension
  - Original extension
  - mysql_* functions
- PHP's mysqli extension
  - New improved extension
  - Takes advantage of new MySQL v4.1.3+ features
  - Supported in PHP v5+
  - Object-oriented interface
  - Support for multiple statements
  - Support for transactions
  - mysqli_* functions

Procedural style

```
<?php

   $mysqli = mysqli_connect("localhost", "webuser", "password", "grocery");
   if (mysqli_connect_errno())
   {
      printf("Connect failed: %s\n", mysqli_connect_error());
      exit();
   }

   $sql = "SELECT * FROM inven";
   $res = mysqli_query($mysqli, $sql);
   if ($res)
   {
      while ($newArray = mysqli_fetch_array($res, MYSQLI_ASSOC))
      {
          $name     = $newArray['name'];
          $details  = $newArray['details'];
          $price    = $newArray['price'];
          echo "$name $details $price <br />";
      }
      mysqli_free_result($res);
   }
   mysqli_close($mysqli);

?>
```

Object-oriented style

```
<?php

   $mysqli = new mysqli("localhost", "webuser", "password", "grocery");
   if ($mysqli->connect_errno)
   {
      printf("Connect failed: %s\n", $mysqli->connect_error);
      exit();
   }

   $sql = "SELECT * FROM inven";
   $res = $mysqli->query($sql);
   if ($res)
   {
      while ($newArray = $res->fetch_array(MYSQLI_ASSOC))
      {
          $name     = $newArray['name'];
          $details  = $newArray['details'];
          $price    = $newArray['price'];
          echo "$name $details $price <br />";
      }
      $res->close();
   }
   $mysqli->close();

?>
```

Summary

- MySQL
  - The most popular open source database
  - More than good enough for most web apps
  - Supports standard SQL syntax
    - SELECT, INSERT, DELETE, UPDATE
    - WHERE, ORDER BY, GROUP BY, LIMIT
    - LIKE, COUNT
  - Use in PHP
    - Procedural style
    - Object-oriented style