Performance study of various connectivity of PHP and MySQL database

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Abstract: PHP and MySQL are best open source software to develop a web site. The paper deals with research on investigating the performance of the various connectivity options of the PHP and MySQL database. There are many aspect of compare but in this paper analyze the execution speed of mysql, mysqli and PDO database connectivity. Apache JMeter is standard testing tool that used to measure the performance.

IndexTerms **- PHP, MySQL, PDO, Apache JMeter.**

I. INTRODUCTION

A static website design using HTML, CSS, JavaScript, JQuery etc…. A server side scripting language and database are use to design and develop a dynamic websites. PHP is a most popular server-side, HTML-embedded scripting language [8]. It is available for most operating systems and Web servers, and can access most common databases, including MySQL. PHP may be run as a separate program or compiled as a module for use with a Web server [7].

MySQL is a most popular open source RDBMS software. It was designed and optimized for website. MySQL became the platform of choice for web developers, and the default database for web-based applications [1]. Since then, the performance & scalability, reliability, and ease of use of the world's most popular open source database, characteristics that made MySQL the first choice for web applications. PHP, MySQL and Apache web server improves operational efficiency and reduce IT infrastructure costs for developing a website.

II. PHP / MYSQL DATABASE CONNECTIVITY

PHP offers mysql, mysqli, and PDO extensions APIs to connect to MySQL. PHP 5 users can choose between the deprecated mysql extension, mysqli, or PDO_MySQL. PHP 7 removes the mysql extension, leaving only the latter two options [7].

1. PHP MySQL Extension

This is the original extension designed to allow you to develop PHP applications that interact with a MySQL database. The mysql extension provides a procedural interface and is intended for use only with MySQL versions older than 4.1.3 [8]. This extension can be used with versions of MySQL 4.1.3 or newer, but not all of the latest MySQL server features will be available.

2. PHP MySQLi Extension

Mysqli is the new variant of mysql, providing both procedural and object-oriented support. It introduced prepared statements, transactions and multiple statements execution. The mysqli extension is included with PHP versions 5 and later [7, 8].

3. PDO:

The PHP Data Objects (PDO) database abstraction layer may use one of several database-specific drivers. One of the drivers it has available is the PDO MYSQL driver, which allows it to interface with the MySQL server. In theory, if you are using the PDO API, you could switch the database server you used, from say Firebird to MySQL, and only need to make minor changes to your PHP code. While PDO has its advantages, such as a clean, simple, portable API, its main disadvantage is that it doesn't allow you to use all of the advanced features that are available in the latest versions of MySQL server.

All these three connectivity feature comparison is given table 1.

Table 1: Feature Comparison

	mysql	*mysqli*	*PDO*
Introduced Version	PHP 2.0	PHP 5.0	PHP 5.1
Procedural Interface	Yes	Yes	No
Object Oriented Interface	No	Yes	Yes
Support Prepared Statement	No	Yes	Yes
Support Store Procedure	No	Yes	Yes
Supports nonblocking, asynchronous queries with mysqlnd	No	Yes	No
Lifecycle	Deprecated in 5.x Removed from 7.x	Active	Active

III. MATERIALS AND METHODS

The Apache JMeter application is open source software, a 100% pure Java application designed to load test functional behavior and measure performance [6]. JMeter testing tool is used to generate different user load and http requests. All http requests are generated from the same machine. The experiment is carried out in JMeter GUI mode. JMeter test plan parameter setting is as under

No. of Threads(User):5
Ramp up Period (in seconds):1
Execution Time:60 seconds.

The machine hardware and software configuration is as under.

Desktop Processor : Intel® Core ™ i5-2320 CPU @ 3.00GHz
RAM : 2 GB / 4GB
Operating System: Window 7 Home Basic (32 bits)
Apache JMeter : Version 2.9 r1437961
PHP: Version 5.5.27
MySQL Database: Version 5.6.25
Apache Web Server: Version 2.4.12 (Win32)

The experiment will generate throughput for the all three database connectivity with 2GB RAM and 4GB RAM other configuration are same. Throughput is calculated as requests/unit of time. The formula is: Throughput = (number of requests) / (total time). The Throughput is the most important parameter. It represents the ability of the server to handle heavy load. The higher throughput is the better performance of the database connectivity..

IV. RESULTS AND DISCUSSION

MySQL, MySQLi and PDO database connectivity performance measure for the display record and insert record operation of database. The experiment result data shown in Table 2 and result graph of display record and insert record are shown in Figure 1 and Figure 2 respectively.

Table 2: Throughput of Display and Insert Record Operation

Connection Type	Display Record Operation		Insert Record Operation	
	2GB RAM	4GB RAM	2GB RAM	4GB RAM
MySQL	171.2	435.9	77.3	85.4
MySQLi	180.1	460.7	85.8	105.2
PDO	175.7	448.3	83.4	97.3

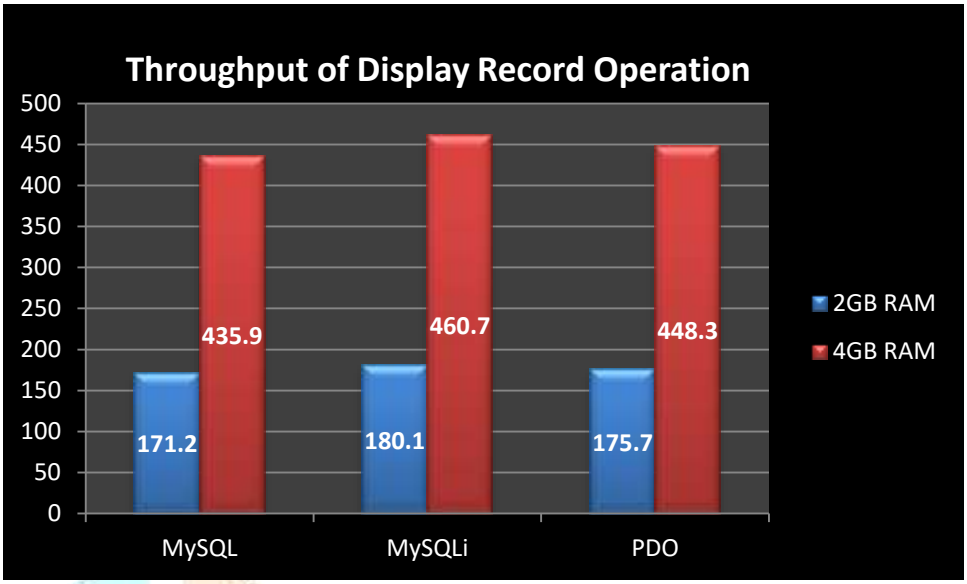

Figure 1: Throughput of display record operation

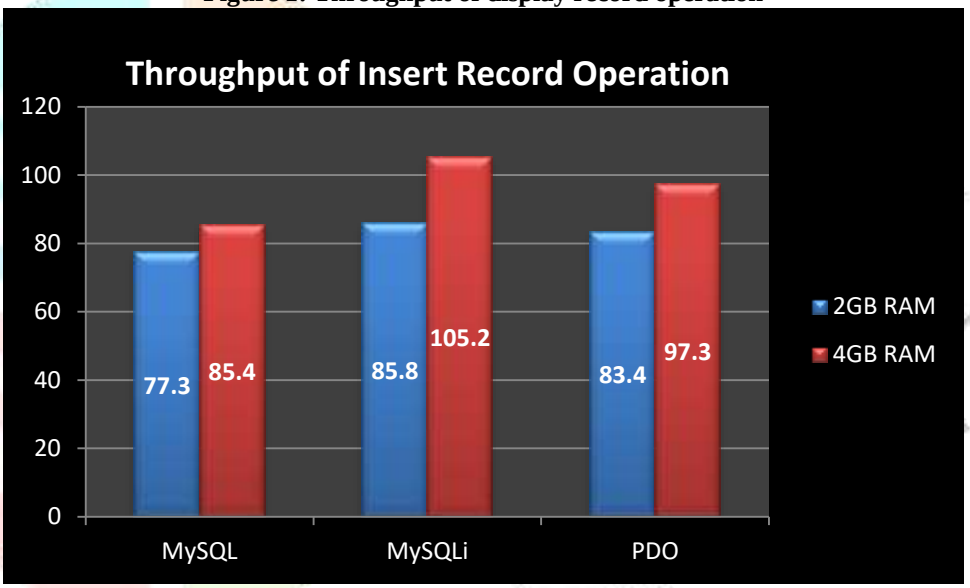

Figure 2: Throughput of insert record operation

The experiment results indicate the MySQLi connectivity method performance is better than MySQL connectivity but the minor performance variation in PDO and MySQLi. Furthermore record display operation program RAM utilization is more than record insert operation therefore result data of 2GB and 4GB has more difference in display record and less difference in Insert record.

V. CONCLUSION

MySQL is a most popular open source relational database management system. There are three api "MySQL, MySQLi and PDO" to connect the MySQL with PHP serverside scripting. MySQL api extension is removed from the PHP 7.x version and it doesn't support the Object Oriented features and not support the Prepare statement. MySQL api performance is low compare to the MySQLi and PDO. MySQLi and PDO api support the object oriented features, security and other features. MySQLi and PDO performance has not a much more difference and both are the active in latest PHP version.

REFERENCES

[1] Cornelia Gyorodi, Ioana Andrada Olah, Robert Győrödi, Livia Bandici. Vol. 7, No. 11, 2016. A Comparative Study Between the Capabilities of MySQl Vs. MongoDB as a Back-End for an Online Platform. (IJACSA) International Journal of Advanced Computer Science and Applications

[2] D. Milosevic, S. Pepic, C. Besic, M. Saracevic, M. Tasic. Weighted Moore-Penrose generalized matrix inverse: MySQL vs. Cassandra database storage system. International Journal Of Computers Communications & Control, ISSN 1841-9836
[3] Master Thesis: PHP: Securing Against SQL Injection; Ioana Rucareanu; Supervisors: Dr. Jurgen Vinju and Dr. Mark Hills; Institute: Centrum voor Wiskunde en Informatica, Amsterdam; October 28, 2013
[4] Top 10 Reasons to Choose MySQL for Web-based Applications; A MySQL Strategy Whitepaper; August 2011
[5] Rana Naim, Mohammad Fahim Nizam, Sheetal Hanamasagar, Jalal Noureddine, Marinela Miladinova . Comparative Studies of 10 Programming Languages within 10 Diverse Criteria
[6] http://jmeter.apache.org
[7] www.php.net/
[8] https://www.w3schools.com/php/php_intro.asp