Adaptation of Database System on Web Framework and PHP Native using Quantitative Comparative Methods

DB Pratama[1], Muhammad Arfan[2], Maman Somantri[3], Eko Handoyo[4]

Department of Electrical Engineering,Undip, Central Java, Indonesia
arfan.undip@gmail.com

Abstract— Web framework technology provides a new paradigm in web programming. Besides web development, new paradigms are needed in the database system. The role of the database is to store and access data accurately and can regulate the flow of information effectively and efficiently. The database system requires re-evaluation in a certain period with the aim of assessing the feasibility of the times and improves the performance of the database system. There are several methods of re-evaluating a database system. One of them is comparative analysis. From this, it is necessary to evaluate the database system comparison between web framework and PHP Native.

Keywords— programming; web; web framework

1. INTRODUCTION

The use of technology in a company, institution or organization has an important role to achieve goals. A company is required to work as efficiently as possible in order to survive in the competition. The application of technology in data processing is needed. The use of a database in accordance with the rules will provide benefits [1]. At retail companies, for example, able to help a cashier work faster when looking for the number of items or the price of goods to be sold.

Besides being able to improve the performance of corporate information systems, the use of a database still has many other advantages that we can get. The database system needs to be re-evaluated every certain time period with the aim of assessing the feasibility of the times and improving the performance of the database system. To solve this problem, reference is needed in the process of re-evaluating a database system, one of which is the data analysis of a comparison.

In this process a database system analysis will be carried out between the Web Framework database system and the native PHP using a causal-comparative research method. Based on the analysis conducted obtained a number of differences between the Web Framework database system with PHP Native. The use of the framework is expected to increase in the number of programmers because it helps programmers in completing application development.

2. METHODOLOGY

2.1 Database and Framework

A database is a collection of information that is stored in a computer systematically so that it can be checked using a computer program to obtain information from that database. The software used to manage and call database queries is called a database management system (DBMS). The basic concept of a database is a collection of records, or pieces of knowledge. A database has a structured explanation of the types of facts stored in it, this explanation is called a scheme.[2]

Schema describes the object that is represented by a database, and the relationship between these objects. There are many ways to organize a schema, or to model a database structure: this is known as a database model or data model. There are several models used, including the relational model. The relational model is a model commonly used now, where this model represents all information in the form of interconnected tables where each table consists of rows and columns. In this model, relationships between tables are represented using values.

Web Framework is a working model that is used to facilitate software developers in creating and developing applications. The framework contains basic commands and functions that are commonly used to build a software application so that the application is expected to be built quickly, structured and neatly arranged. However, using a framework does not mean it is free from coding. Users / programmers use commands and functions in a framework so that the execution time is effective because they do not have to create functions anymore. open source web application network that is used to build dynamic php applications. Web Framework becomes a PHP framework with an MVC model (Model, View, Controller) to build dynamic websites using PHP that can speed up developers to create a web application. In addition to being lightweight and fast, Web Framework also has super complete documentation along with examples of code implementation.[3]

There are 3 types of components that build an MVC pattern in an application, namely:

1. View, is the part that handles presentation logic. In a web application this section is usually in the form of an HTML template file, which is managed by the controller. View functions to receive and represent data to the user. This section does not have direct access to parts of the model.

2. Models, usually related directly to the database to manipulate data (insert, update, delete, search), handle validation from the controller part, but cannot be directly related to the view part.

3. Controller, is the part that regulates the relationship between the model and view section, the controller functions to receive requests and data from the user then determine what will be processed by the application.
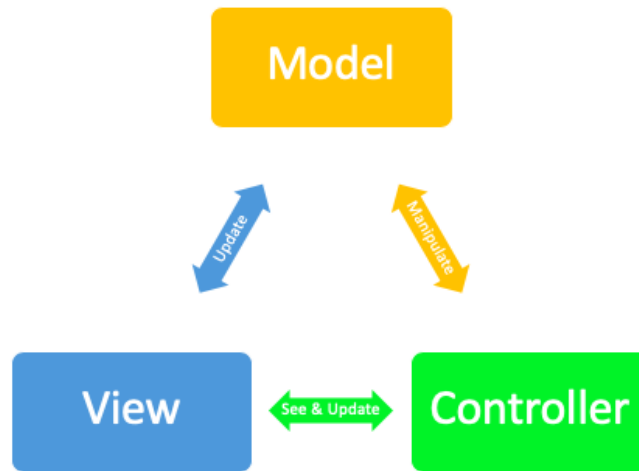
Figure 1 shows that the MCV Concept

Figure 1: MVC Concept

There are several excellent features in the web framework. One of them is a helper. Helper is a helper file similar to the controller in the Web Framework. The helper functions to help the controller in writing the provisions of the Web Framework.

2.2 Quantitative Comparative

Quantitative comparative research method is a type of comparative research, which is conducted to compare the similarities and differences of 2 or more properties and facts of the object under study. This method is usually used to compare between 2 or more groups in a particular variable. Quantitative comparative research methods have the following objectives: comparing the similarities and differences of 2 or more facts and properties of the object under study, making generalizations of the level of comparison, determining which is better or which should be chosen, investigating possible causal relationships.

3. RESULT

In PHP Native, it is necessary to adjust the database path and routing by changing some configuration files such as database.php or autoload.php. While in web framework with standard settings, only need to change a few files in the config folder. The Web Framework database configuration is located in the application / config / database folder. In the web framework, the configuration process is simpler than in PHP Native. Configuration on a simple web framework is another advantage possessed by this PHP framework.

Figure 2: Database Configuration

Transaction systems help databases enter data securely. Transaction system works by tracking the failure and success of the query, then determining whether to keep executing the query or rollback to return the data as before. Web Framework has prepared transaction system features that can be run automatically. Whereas in PHP Native, the transaction system is run manually. Example query for running a transaction system on the Web Framework.

```
$this->db->trans_start();
$this->db->query('AN SQL QUERY...');
$this->db->query('ANOTHER
QUERY...');
$this->db->query('AND YET ANOTHER
QUERY...');
$this->db->trans_complete();
```

Figure 3: Transaction Query

3.1 Performance

Query caching system occurs dynamically when a web page is loaded. When caching is activated, the first time a page is loaded, the query results object will be serialized and stored in the cache folder. The next time the page is loaded, the cache file will be used to divert access to the database.[4]

Database load can be effectively reduced to zero for each page that has been cached. In Web Framework caching system queries as well as in PHP Native, only read-type (SELECT) queries can be cached, because this is the only type of query that produces a result object. Write-type queries (INSERT, UPDATE, etc.), because they do not produce results, will not be cached by the system. The cache file is not expired. The cache system allows the removal of cache files on certain web pages, or can delete the entire cache file collection.[5]

There are differences in Query caching system in Web Framework and PHP Native. Web Framework provides a special way of query caching, the user only needs to activate it in aplication / config / database, the cache will start and cache automatically.

Table 1: Results of Testing PHP Native and Web Framework with 20 users

No.	Trial	*PHP Native (ms)*	*Web Framework(ms)*
1.	1	25	28
2.	2	30	20
3.	3	31	21

4.	4	29	25
5.	5	25	24
6.	6	24	19
7.	7	26	18
8.	8	24	22
9.	9	24	19
10.	10	27	27

In Table 1 it can be seen that, Results of Testing PHP Native and Web Framework with 20 users. The requests that do everything in successful status.

3.2 Utilization

In PHP Native, the query caching key lies in the serialize () and unserialize () functions. Serialize () functions to take an object and convert it into a string representation containing the class name and its properties. When an object is serialized, content is placed with several types of specifiers followed by colons, then followed by actual data followed by semicolons. Unserialize () takes a string or serial string obtained from the object and converts it again to the object. Is the opposite of serialize[6].

With Query Builder, you can do minimal queries so as to improve query optimization. For example in connecting to a database, the query structure in PHP Native is as follows:

```
$connection =
mysql_connect("localhost","fred","12
345");
mysql_select_db("websites",
$connection);
$result = mysql_query ("SELECT *
FROM sites", $connection);
while ($row =
mysql_fetch_array($result,
MYSQL_NUM))
{ foreach ($row as $attribute)
 print "{$attribute[1]} ";   }
```

Figure 4: Query Builder PHP Native

While the query structure in the Web Framework is as follows:

```
$this->load->database('websites');
$query = $this->db->get('sites');
 foreach ($query->result() as $row)
 {   print $row->url   }
```

Figure 5: Query Builder Web Framework

With Query Builder, the characters in a query for connecting and processing data in the Database become fewer and simpler, thereby increasing query optimization and reducing the database workload.

Web Framework provides Database Forge Class features in managing databases. Queries provided in the Database Forge Class have fewer characters than queries for managing databases in PHP Native. Database Forge Class makes the characters in a query for database management become fewer and simpler, thus increasing query optimization and reducing database workload.[7]
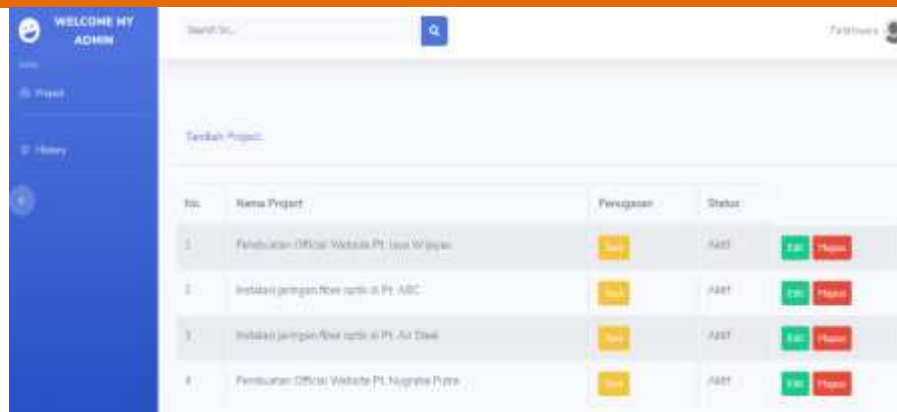
Figure 6: Database Forgery Class Interface

Besides that programmers can use Custom Function Calls. This function makes it possible to call PHP database functions that are not included in the Web Framework. The function name must be given without the mysql_ prefix in the first parameter. Every parameter needed by the function that is called will be added to the second parameter. [8]

4. CONCLUSION

Transaction systems help databases enter data securely. Transaction system works by tracking the failure and success of the query, then determining whether to keep executing the query or rollback to return the data as before. In a trial transaction system using native php, transactions are only done manually so that it requires a lot of work because it demands to track the query, then determine whether to execute the query or make a return based on the success or failure of the query. Whereas on the Web Framework, transaction systems can be done automatically. From the study of these differences, it can be concluded that overall the database system in the web framework is better than PHP Native, both in terms of efficiency, effectiveness, reliability, etc.

5. REFERENCES

[1]   Z. F. Yang, Y. Shi, B. Wang, and H. Yan, "Website quality and profitability evaluation in ecommerce firms using two-stage DEA model," *Procedia Comput. Sci.*, vol. 30, pp. 4–13, 2014.

[2]   Z. Zheng, Z. Du, L. Li, and Y. Guo, "BigData Oriented Open Scalable Relational Data Model," *2014 IEEE Int. Congr. Big Data*, pp. 398–405, 2014.

[3]   A. Boukerche and R. E. De Grande, "Vehicular cloud computing: Architectures, applications, and mobility," *Comput. Networks*, vol. 135, pp. 171–189, 2018.

[4]   P. R. Kumar, P. H. Raj, and P. Jelciana, "Exploring Data Security Issues and Solutions in Cloud Computing," *Procedia Comput. Sci.*, vol. 125, no. 2009, pp. 691–697, 2018.

[5]   A. N. Khan, M. L. Mat Kiah, S. U. Khan, and S. A. Madani, "Towards secure mobile cloud computing: A survey," *Futur. Gener. Comput. Syst.*, no. c, 2012.

[6]   B. J. Jansen and P. R. Molina, "The effectiveness of Web search engines for retrieving relevant ecommerce links," *Inf. Process. Manag.*, vol. 42, no. 4, pp. 1075–1098, 2006.

[7]   R. Y. K. Lau, "Towards a web services and intelligent agents-based negotiation system for B2B eCommerce," *Electron. Commer. Res. Appl.*, vol. 6, no. 3, pp. 260–273, 2007.

[8]   G. Santucci, "The Internet of Things : Between the Revolution of the Internet and the Metamorphosis of Objects," *Forum Am. Bar Assoc.*, pp. 1–23, 2010.