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Information System Monitoring Access Log Database on Database Server

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Abstract. The purpose of the study was to build information system monitoring access log database on database server. Data security on the database is an absolute must. Not all users can access the data freely. It should only be accessible to those who have privileges only. Currently, it is still not known easily anyone who accesses the data or database. This research is done so that the built system can know easily who is the user who accesses the data on the server. Built-in web-based system using PHP and MySQL with monitoring and validation techniques on privileged access to the database. The resulting system is able to display the results of monitoring who the user is accessing data in real-time, so it can know which traffic access rights most frequently access the data. With this system can help to increase the use of privilege effectively and can perform monitoring of data, because it can be known for certain user whoever accesses the data.

1. Introduction

The developments in information technology have a major impact on the sustainability of a company. Most of the activities in a company require information technology, information technology and communication roles, such as for communication, or administrative work. A database is a collection of data that are interconnected with each other that is stored on computer hardwareserver and required a software to manipulate the data [1].

The database is usually stored on the server in charge of providing various kinds of client computer needs. These developments have served to bring issues of security. Many firms are filling victims of cybercrimes [2]. Privileges of the database can be abused in many ways. A user may abuse privilege for an unauthorized purpose. Privilege abuse comes in different flavors such as legitimate privilege abuse and unused privilege abuse [3].

SQL injection has a meaning and meaning that is a technique that misuses a security hole that occurs in the database layer of an application. This gap can occur when a programmer who creates code or script does not filter correctly from special characters used in the input data. SQL injection is a hacking action on computer security where an attacker can gain access to the database within the server. When a website application fails to perform parameter filtering into the database, the SQL command entered in the website address executed so that the attacker can get structure from the database [4]. Akamai report indicated that there was an 87 percent increase in SQL injection attacks in Q1 2016 compared with the previous quarter [5].

An information system is a system within an organization that brings daily transaction management needs, support operations, managerial, and strategic activities of an organization and provides certain outside parties with the required reports [6]. The information system is a combination of people, facilities, technology, media, procedures and controls aimed at obtaining important communication channels, processing certain types of routine transactions, signaling to management and others to internal events and externally important and provides a basis for decision-making [7].

In the management system, monitoring is necessary and the result is a feedback management to further improve the operational plan and take corrective action steps. Therefore, managers should have a monitoring system so that feedback or deviations that occur will be managed properly, quickly and can be done immediately repair efforts. Website and server monitoring systems are also available as products that may be installed and operated "in-house." Various tools and services also exist for allowing website operators to load test and functionality-test their applications and server systems prior to deployment [8].

In this era of technological advances, the value of information is very important, especially the progress of the company. Therefore, the use and mastery of the database are very important as many several terms for data units [9]. This research using MySQL database for testing because MySQL is a database program capable of sending and receiving data for multiuser, very quickly [10] and efficient in query process [11]. MySQL is a multithreaded program, MySQL support from several programming languages like c++, java, and PHP, for windows operating system MySQL has had open database connectivity that's a standard application programming interface (API) for accessing database management systems (DBMS) [12]. Monitoring is a series of observation or to measurements planned to produce an accurate record and can be used for verification [13].

This is what attracts researchers to conduct research on the construction of information systems monitoring the activity of the database access log on the database server. With this monitoring the activity of the database access log on the database server is expected to provide data track record/log of each user who accesses the database on the server.

2. Experimental method

The research methodology used in this research is descriptive analysis methodology. Descriptive analysis methodology is a method that describes facts and information in the present situation or event systematically, factually and accurately, the study was to build information system monitoring access log database on database server. This research methodology has two stages, namely data collection stage and software development phase.

2.1. Collecting data methodology

The technique used in data collection is descriptive research method, descriptive research method is a research method that gives an objective picture of an existing problem. Data collection methods used in this study are as follows:

2.1.1. Interview. The interview method is by way of frequently asked questions directly with some administrators related to the management and maintenance of the database server.

2.1.2. Literature study. Litetature study is a technique of collecting data by collecting data through literature, journals, papers and readings that have something to do with the title of the study. This process is done to search and collect any information for the construction of information systems monitoring the activity of the database access log on the database server.

2.1.3. Observation. Observation is a technique of data collection by conducting research and direct review of the problems that occur.

2.2. Software development methodology

The method used to build the information system monitoring the activity of the database access log on the database server adopted from the waterfall model. The steps passed on the waterfall model are as follows:

2.2.1. Requirements definition. At this stage, the complete collection of needs is then analyzed and defined needs that must be met by the program to be built. This phase should be done completely to produce a complete design.

2.2.2. System and software design. The design is done after the requirement is completely defined. System design is a system design that is done based on data that has been collected in the previous stage.

2.2.3. Implementation and unit testing. Implementation of the software is done by implementing the results of software design into the program code that is understood by machine language. Software testing is focusing on the internal logic of software, external functions, and looking for any possible errors, checking whether the input matches the desired result after the process.

2.2.4. Integration and system testing. Integration and system testing focuses on the internal logic of software and external functions and looks for all possible errors, as to whether the input matches the desired result after the process. System testing is the unification of program units then tested as a whole.

2.2.5. Operation and maintenance. Operation and maintenance is the overall application with maintenance if there is a change in structure both in terms of software and hardware.

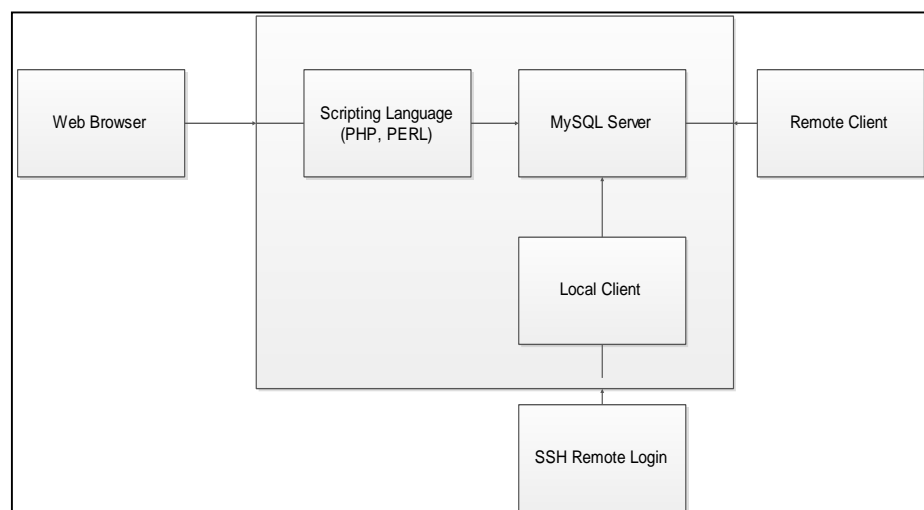A prototype of MySQL database server in this research show in figure 1.

Figure 1. MySQL server prototype stage in this research.

3. Result and discussion
Computer hardware is all the physical parts of the computer that serves to provide input, process and display output, and used by the system to execute commands that have been programmed. Hardware requirements to implement information system monitoring access log database on database server can be seen in table 1.
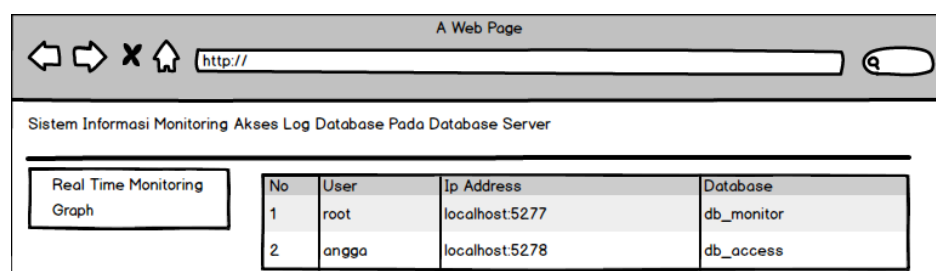
Table 1. Hardware requirements.

Hardware Type	Specification
Server Computer	Intel Xeon Processor Single CPUT Tower Server 32 GB Memory Integrated Matrox G200e Video Type IBM 300GB 2.5in SFF 10K 6Gbps HS SAS HDD 1 PCI-E 16, 1 PCI-e x8 slot, one 32-bit 33MHz 5v PCI 2.2 slot
Client Computer	Motherboard Asrock Intel Dual Core Prosesor 120 SSD Harddisk Case PowerLogic Gusto + PowerSupply Wireless Card
Computer Builder for building Information System Monitoring Access Log Database on Database Server	IntelCore i7 8 GB Memory 120 SSD hardisk Wireless Card

A requirement of software needed in the implementation of this information system can be seen in table 2.

Table 2. Software requirements.

Type of Software	Specification
Server Computer	Windows Server 2016 Operating System MySQL Database
Client Computer	Windows 7 Operating System Sublime Text 3 Firefox Browser
Computer Builder for building Information System Monitoring Access Log Database on Database Server	Windows 7 Operating System Sublime Text 3 Firefox Browser

The interface is a graphical display that relates directly to the user. The following is the interface information system monitoring access database logs on the database server. Here is the interface display for real-time monitoring page can be seen in figure 2 and figure 3 for graph view.

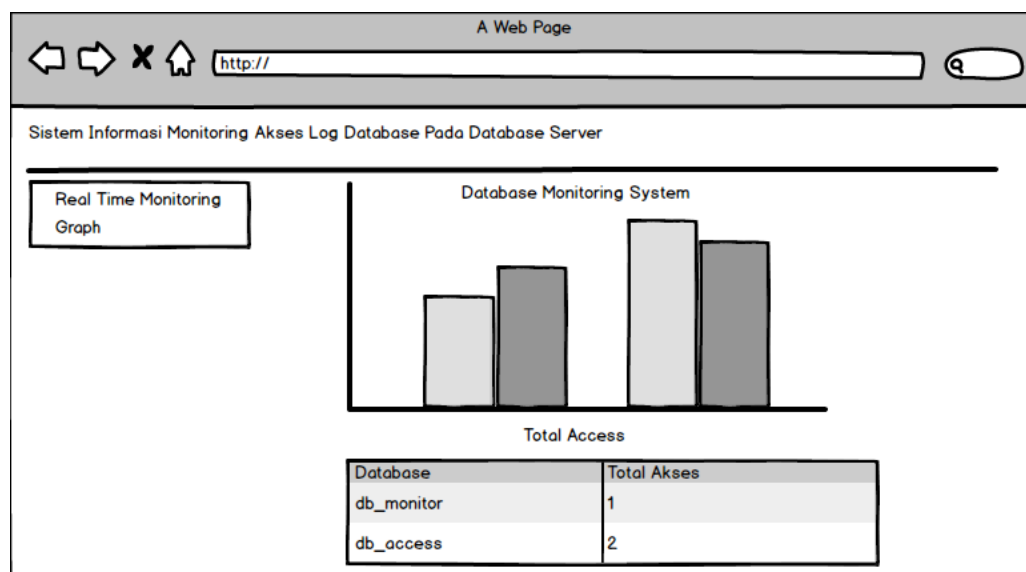**Figure 2**. Model grid view of the real-time interface system.

Figure 3. Model graph of the real-time interface system.

Implementation system is the stage of application of the system to be performed including programs/applications that have been made at the design stage. The following is the output screen of the system implementation information log database access activity on the database server can be seen in Figure 4.
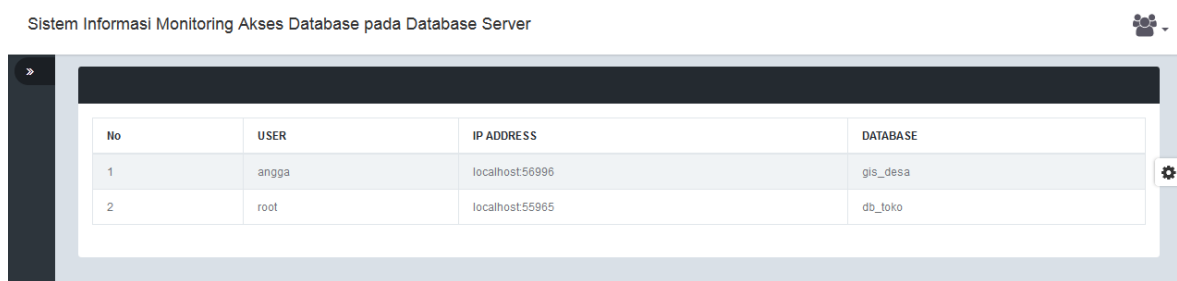

Figure 4. The output screen of the system information database access log on database server.

The system built in this research can also monitor the use of database system in graphical form, so that can be easily known by the statistical result of database access log. The appearance can be seen in Figure 5.
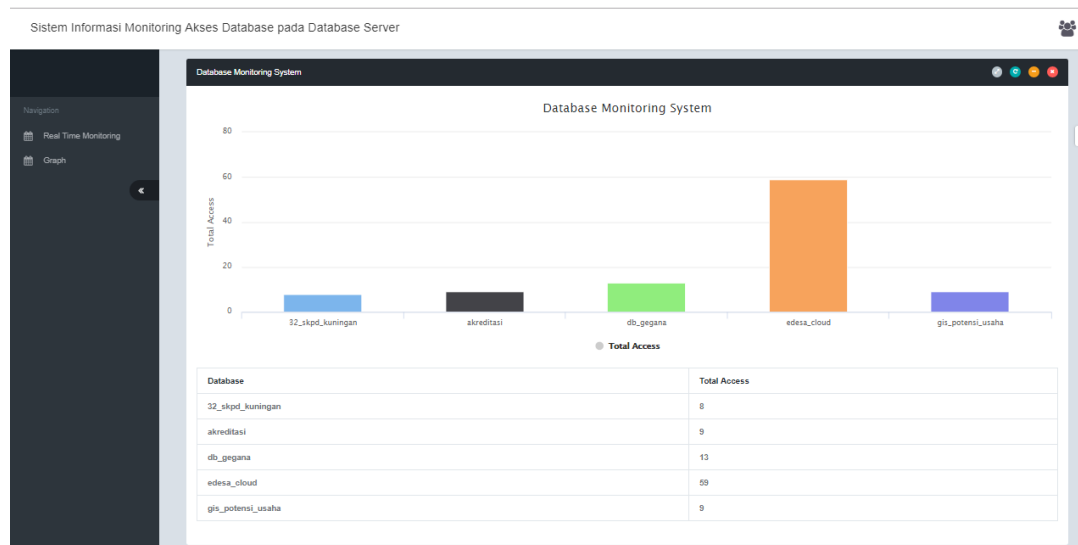
Figure 5. Graph of the system information database access log on a database server.

4. Conclusion

This research has been able to generate information system log database access activity on a database server. The system activity of the database access log on the database server can already prepare the track record/log data of each user accessing the database on the server. The system built in this research is still focused on the MySQL database. This is because the use of MySQL for the current database is still high. But the concept of the method offered can also be done for other types of databases that will ultimately increase the security level of a database.

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