

The Replication of Academic Database System using Linux Ubuntu Server Technology


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ABSTRACT

Replication system is a system that is currently widely used, with the advantage of data security that can be guaranteed security. The replication of the Web-Based Student Academic System Database is implemented using VMWare workstation 9.0. By using Ubuntu Server 12.04 which is a server, there are three servers that are built including the master server, slave 1 and slave 2, with the three servers synchronized and replicated automatically in the system, with a system like this it is hoped that the data inside is guaranteed the security and distribution are faster. The system is implemented using a Local Area Network (LAN) using a client, which is accessed from the browser on the client.

Keyword: Replication, Vmware, Eucalyptus, Ubuntu Server 12.04, Web Server.

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1. INTRODUCTION

Information technology, this technology is of course inseparable from a network that connects two or more computers so that they can be connected and can communicate, with a set of separate computers, but are interconnected in carrying out their duties so that it will produce an efficiency and work optimization. Devices from computer technology have developed rapidly, starting from PCs, Laptops, Notebooks, Netbooks and Tablet PCs which are now loved by many students and entrepreneurs who are close to this technology every day, the development of gadget devices such as smartphones and tablet PCs is the same as has the ability to replace a computer, with a small size and can be carried anywhere (Maulana, 2016; Lubis, Fachrizal & Maulana; 2017; Syaputra et al., 2018).

Along with the mobility needs of internet users, I want to provide a solution that can help their routine. In High Schools and Universities, for example, of course, want to create a system that can provide convenience for the continuity of academic activities that are running at High Schools and Universities, especially for filling out the Study Plan Card (KRS) and information on Student Study Result Cards (KHS) which are still carried out with one-way, without any interaction between students and department employees, students to lecturers or department staff to lecturers, which will take a little longer if the student or lecturer comes face to face with department employees to make improvements or changes to data (Purnomo & Hendrawan, 2010; Wibawa et al., n.d).

From the description above, the researcher wants to build a web-based database replication system for the academic system where each lecturer and student will be given an ID to log in to be able to carry out activities according to their respective needs and capacities. It is hoped that this distributed system can help and make it easier for Lecturers to give grades where grades can be inputted via the web into a database server, as well as for students, of course it will be easier to fill KRS and make it easier to see KHS at the end of each semester.

2. LITERATURE REVIEW

A. Distribution System

The distribution of the system is different from the client server, where servers are connected to one another in a network, and if a crash occurs on one of the servers, the data that you want to access will be retrieved from another server.

A distributed system is where one component located in a computer network communicates and coordinates their actions by simply passing messages (Deviana, 2013; Amran, 2012; Niswatin, 2013).

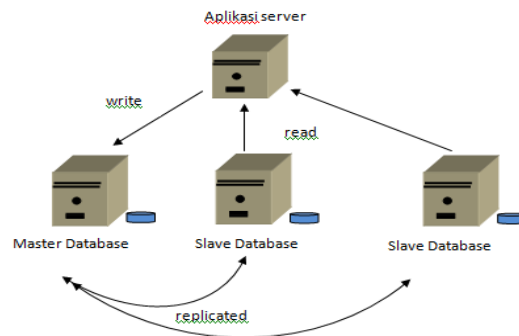


Figure 1. Distributed System

A distributed system is a system in which the components in an information system are distributed to various locations on a computer network.

B. Database Replication

Replication is a technique for copying and distributing data and database objects from one database to another and synchronizing between databases so that data consistency can be guaranteed. With this database replication technique, data can be distributed to different locations via a local network connection or the internet. Replication is also possible to support application performance, physical data distribution according to its use, such as online transaction processing and DSS (Desiscion Support System) or distributed database processing on each server (Lenti, 2014; Purwanto 2012; Darmawan, Isnawaty & Subardin, 2018).

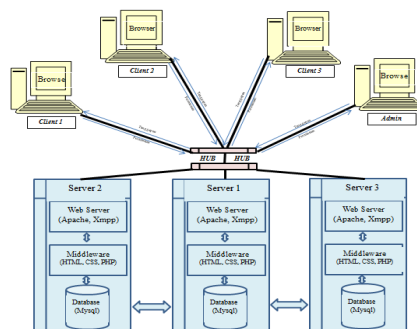


Figure 2. Database Replication

The advantages of replication depend on the type of replication. In general, replication supports the availability of data at any time and wherever the data is needed.

3. RESULTS AND DISCUSSION

This section discusses system analysis which can be defined as the decomposition of a complete information system into its component parts in order to identify and evaluate problems, opportunities, obstacles that occur and needs. the expected needs so that improvements can be proposed. A system that runs at the Harapanam Technical College regarding inputting grades is still being developed manually. Where the lecturers must write down the results of a list of scores which are then submitted to each office of their respective department. And students must look directly at the office of their respective department to get information on the results of the student's grade. And when there are problems with unregistered grades, students will find it difficult to confirm directly to the lecturer in question. This is of course a problem faced by academic bureaus, lecturers and students, where when inputting errors occur or student scores do not come out on KHS, the student concerned will find it

difficult to confirm directly to the lecturer concerned, so a forum is needed for the bureau. , lecturers and students so that it is easier to interact with each other on academic problems.

The distributed system is a unit of elements that interact systematically and regularly to distribute data, information, objects and services from and to the users involved in it. The main infrastructure of a distributed system is the network, software hardware and the users involved in it. In a distributed system there is a division of work between one element and another. Communication means between elements is bridged by a network. The procedure for communication between elements is regulated by an agreement so that communication can be understood between each of the elements involved.

With the development of information technology, especially in information technology, which is developing very fast and rapidly, it is hoped that it will be able to provide benefits to the continuity of the existing academic process. Speed up and make it easy for users to get information. Seeing this problem, the authors propose to build a student academic system using a distributed database that is centralized on a web-based server so that it can be used as value input by lecturers of courses, inputting KRS and viewing student KHS output.

User analysis is intended to find out who are the users involved in the research process. Where in this case it involves two users to run and one admin to manage the application data. The first user is a lecturer as a client who inputs the values of students who take courses taught through a device that supports opening web pages. And the second user is a client student who wants to input courses into KRS and to see the results of the courses taught by the lecturer concerned in KHS.

Mysql replication can serve multiple copies of data to many systems and automatically the data is copied from the master database to another database (slave). If a server goes down / crashes then the client can access data from the database available on the slave.

The results of the application display of the Academic System for Colleges and Universities will be implemented using the Mozilla Firefox 29.0.1 browser. Display results starting from the initial display to the final display of the application. The student data input menu displays input NPM, Student Name, Department and Address, and all input data will be stored in the dbacademik database in tbl_mhs, after the data is stored, the system will automatically be replicated into the 3 servers that have been built. Shown in the picture below.

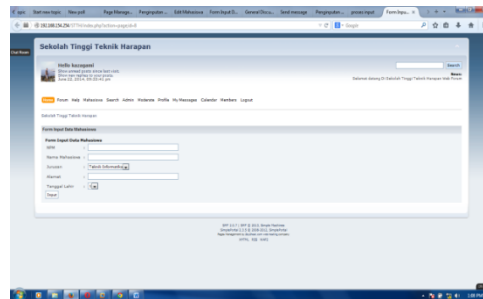


Figure 3 Display of Student Data Input

In the KRS input menu, input NPM and Pssword, this is done to confirm that the NPM and Password are registered in tbl_mhs in the dbharapan database. Seen in the image below.

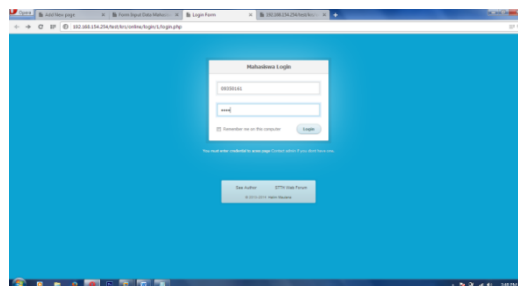


Figure 4 Login Display Contents of KRS

After system confirmation is successfully carried out into the database, the system automatically calls and displays all Course Codes, Course Names and SKS distributed from `tbl_matakuliah` which has been linked to `tbl_mhs` in the NPM field, all data displayed is the capacity of the NPM that makes the call, then selects the course that has appeared according to the selection capacity, and the course code will be sent to `tbl_krd` using the NPM id contained in `tbl_mhs`. Seen in Figure 4:15



Figure 5 Display Select Course

In the menu, see KRS input NPM, Semester and Year, the input data will be confirmed in advance to the previous year, where the date has been related to the subject to fill in KRS. Seen in the picture below.

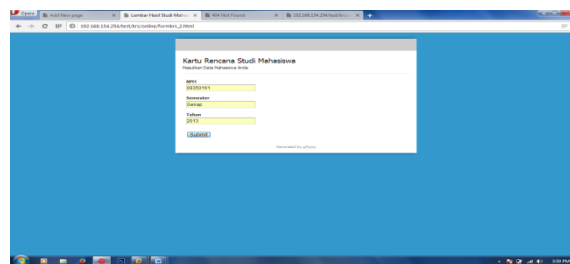


Figure 6 Menu Display See KRS

The value input nemu display contains the course code input, semester, year where the input data will be confirmed into `tbl_krs`. Seen in the picture below.



Figure 7 Display Select Course

After confirmation is successful, the system will distribute and display data that takes the selected courses from `tbl_krs`, where the fields displayed are the course name, semester and year and the data displayed from `tbl_mhs` is the NPM and Student Name fields, and input the value that will be stored in your `tbl_khs`. Shown in the picture below.

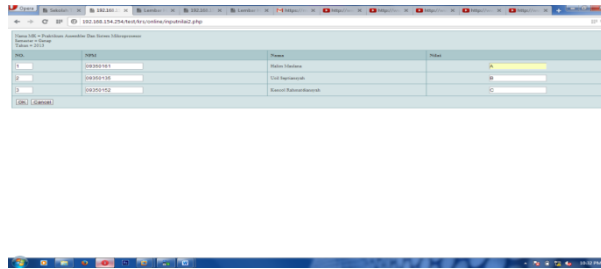


Figure 8 Value Content Display

The menu display, see this value, contains the Course Code, Semester and Year that will be checked into tbl_khs. Seen in the picture below.

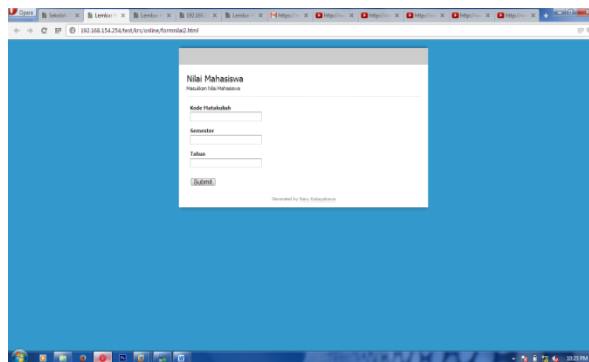


Figure 9 Display View Value

After the confirmation is successful, the system will distribute and display the data from the tbl_khs associated with tbl_matakuliah, tbl_mhs and tbl_krs. As shown in the figure below.

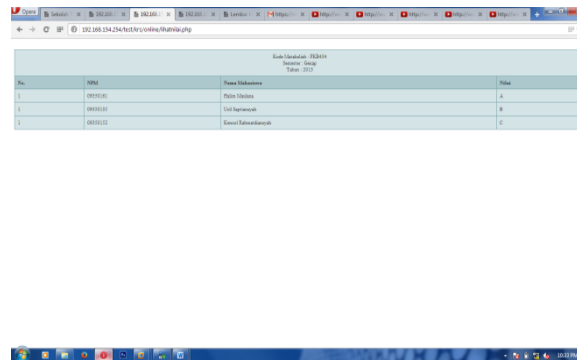


Figure 10 Value Display

The display of the KHS menu contains the input of NPM, Semester and Year which will be sent and confirmed into tbl_khs which is also related to student, student, and student. Seen in the picture below.

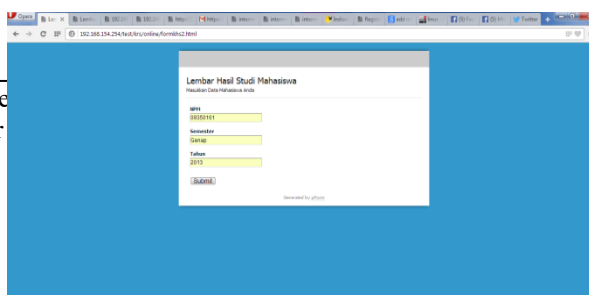


Figure 11 Display See KHS

After the confirmation is successful, the system will distribute and display the data taken from the taken tbli_mhs, namely the NPM, Name, Semester and Year fields, from the subjects taken, namely the Subject Code field, Subject Name and SKS, from the tbl_khs field taken is Value, Quality and Boot. Seen in the picture below.

No.	Kode	Nama Matakuliah	SKS	Nilai	Minus	Rata-Rata
1	PS2014	Praktikum Asaslabar Das Sistem Manajemen	1	A	+	+
2	PS2017	Manajemen Pjbl	2	A	+	+
3	PS2016	Praktikum Perancangan Web	1	A	+	+
4	PS2017	Struktur Data	2	A	+	+
5	PS2016	Praktikum Sistem Data	1	A	+	+
Jumlah Mhs						5
Jumlah Mhs						20
Rata-Rata						40

Figure 12 Display See KHS

4. CONCLUSION

From the implementation of the application that has been done in the previous chapter, it can be concluded that the application built has solved the problems described in previous chapters where the system can be run by the user to facilitate academic activities in Colleges and Universities, where the media for Student value input, KRS input, KHS output and web-based forum media that have been built can be used by admins, lecturers, students and employees of high schools and universities as a medium of communication that is faster and easier to access, It is hoped that the system that has been built can reduce the problems that have been an obstacle to the academic system of Colleges and Universities. The system is built using three servers including the master server

REFERENCES

- Amran, R. Y. (2012). Interoperabilitas Sistem KTP Elektronik Terdistribusi Berbasis Simple Object Access Protocol (SOAP). *Inspiration: Jurnal Teknologi Informasi dan Komunikasi*, 2(1).
- Darmawan, M. H., Isnawaty, I., & Subardin, S. (2018). Perancangan dan Implementasi Sistem Replikasi Database Terdistribusi Pada Fakultas Teknik Universitas Halu Oleo. *semanTIK*, 4(2), 91-98.
- Deviana, H. (2013). Penerapan XML Web service Pada Sistem Distribusi Barang. *Jurnal Generic*, 6(2), 61-70.
- Lenti, F. N. (2014). Rekayasa Database Terdistribusi Pada Layanan Pemesanan Tiket Pesawat Terbang. *Jurnal Teknologi Technoscientia*, 129-134.
- Lubis, A. R., Fachrizal, F., & Maulana, H. (2017). Database Management Optimization Using PostgreSQL Replication Database in Database System. *Advanced Science Letters*, 23(5), 4132-4135.
- Maulana, H. (2016). Analisis dan Perancangan Sistem Replikasi Database Mysql dengan Menggunakan Vmware pada Sistem Operasi Open Source. *InfoTekjar: Jurnal Nasional Informatika dan Teknologi Jaringan*, 1(1), 32-37.
- Niswatin, R. K. (2013). Sistem Informasi Terdistribusi Pada Manajemen Inventarisasi Peralatan Laboratorium. *SEMNASSTEKNOMEDIA ONLINE*, 1(1), 08-13.
- Purnomo, F., Hendrawan, D., & Hendry, F. (2010). Analisis Dan Perancangan Sistem Mobile Krs Berbasis J2Me Menggunakan Jaringan Gprs. In *Seminar Nasional Aplikasi Teknologi Informasi (SNATI)*.
- Purwanto, E. (2012). Perbandingan Strategi Replikasi Pada Sistem Basis Data Terdistribusi. *JURNAL MAHASISWA TI S1*.

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- Syahputra, E. R., Sembing, B. O., Dewi, A. R., Hasdiana, H., & Maulana, H. (2018). Ads block management system using open Virtual Private Network on Ubuntu operating system. *International Journal of Engineering Technology*, 7, 58-61.
- Wibawa, B. S., Setiawan, D., Harmoko, F., Rahmanda, W. M., & Biredoko, Y. Y. PERANCANGAN DATA WAREHOUSE UNTUK KASUS KAMPUS (KRS ONLINE).