Raspberry-Pi as Portable Web Server E-Learning Moodle for Student Learning and Assignment

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Abstract. Today the application of Moodle (Object Oriented Dynamic Learning Environment) as a learning tool has been very massive. The development of the internet provides various alternatives for providing learning for everyone. Practical use of Moodle is needed when educators want to do learning and assignments. One practical way to enjoy learning through e-learning is to use a portable web server. This studyanalyzes the usefulness of Raspberry Pi, a mini computer, as a portable web server for e-learning , installation and implementation Portable Web Server Moodle for Student

Keywords: portable, e-learning, moodle, webserver

1. Introduction

Today, the Internet network and various applications and information on it are growing very rapidly. Various information, social media, learning and so on can be found on the Internet. Likewise, the use of online learning or so-called e-learning. Moodle (Modular Object-Oriented Dynamic Learning Environment) is one of the e-learning parts that is massive and open to everyone. On the internet there are many sites that provide this facility. This facility has provided many benefits for many people to learn anything they want. One practical way to enjoy learning through e-learning is to use a portable web server. This platform does not require a continuous connection to the Internet. portable server can be brought back to the area to do learning. One of the challenges in this platform is creating a portable web server, considering that this device is the backbone of the success of learning mechanisms for people without Internet access. In this research, Raspberry Pi is used as a portable server device. Raspberry Pi 3B + is a minicomputer that has been equipped with internal WiFi features, and can run various Linux-based applications.

Rasperry Pi [1] is a mini-sized computer that supports I / O with various operating systems. Raspberry pi was first introduced in early 2012 where the development of science, especially in the field of integrated circuits, in addition to its small size the price is also relatively cheap. This is an opportunity for developers to work together to build various tools that require a computer with an operating system as the main processing. Despite its small size, raspberry pi has specifications like a computer in general, such as CPU, RAM, GPU and storage. It can also use various operating systems such as Linux and Windows. There have been many studies to date using raspbery as one of its main components, Achmad Basuki writes several projects using raspberry [2].

2. Research Method

Raspberry pi

The raspberry used by the author here is the Raspberry Pi 3 model B also measuring no more than the size of a credit card. This computer uses a 5v 1a power supply, and weighs less than 90g, with its small size, raspberries can be designed to be easier to carry and more flexible. Raspberry Pi 3B already has 4 USB, RJ45, 3.5mm Audio, HDMI and GPIO 40 pin ports for development such as adding sensor modules, led lights and others. All of this is combined into 1 computer board called raspberry pi, the use of raspberries is not limited to a single job, but can handle several jobs at once.
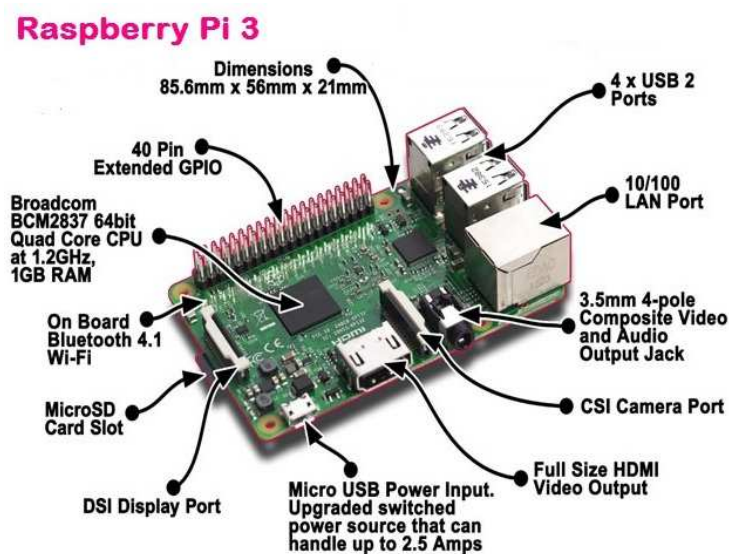.

Figure 1. Raspberry Pi

Operating Systems

Raspberry generally uses Linux as its operating system, which is a Unix base, the operating systems supported by some are raspberian, ubuntu, debian, centos and windows. Raspberry pi provides sdcard input for main storage. To start using the Raspberry Pi, the user must install the operating system by moving the Raspberian operating system into the SD card storage.

Block Diagram

The Stage of designing Raspberry-Pi as Portable Web Server E-Learning Moodle for Student Learning and Assignment block diagram in Fig 2.
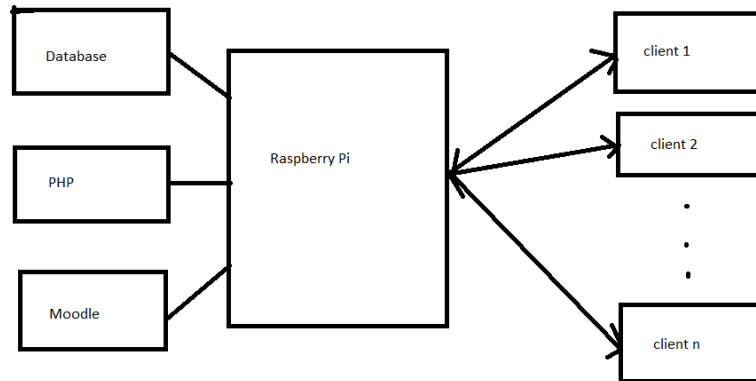
Figure 2. Block Diagram

Webserver

Web Server is a backend of webpage processes, logic and databases combined here, some web servers such as apache, nginx, lighttpd. the webpage will produce html that can be read by the browser. The html consists of page html, css, javascript, and text content [3].

Raspberry pi web server, In developing smaller scale web servers, such as making raspberry e-learning is the perfect choice. for the initial configuration of raspberries by connecting SSH to the computer, usually the host address is written in ip format 192.168.1.2 and port 22. The tool used to connect SSH can be used putty, bash git, or command line / terminal. if SSH is connected, Apache can be installed with the command sudo apt-get install apache2 php5 libapache2-mod-php5. apache2 is the webserver and php5 is the programming language used by the apache webserver, while libapache is used for connections between the webserver and the programming language, then installs mysqlDB with the command sudo apt-get install mysql-server mysql-client php5-mysql, here mysql and the link between mysqlDB with the command sudo apt-get install mysql-server mysql-client php5-mysql, here mysql and the link between mysqlDB Database and programming language are also installed. the default apache directory is in / var / www. and if you access the localhost address it will be directed to read the contents in var / www.
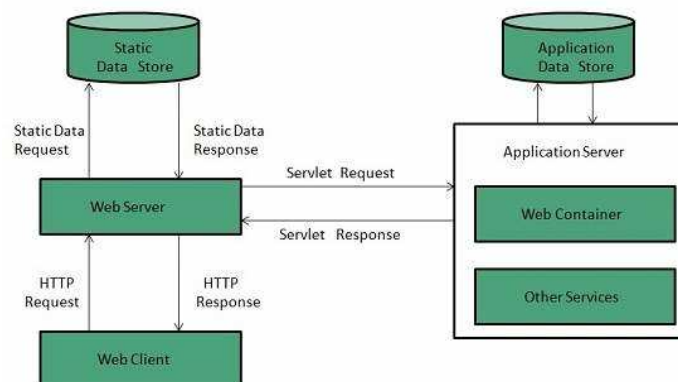
Figure 3. Webserver working
(https://www.tutorialspoint.com/internet_technologies/web_servers.htm)

Design and Implementation

Moodle was basically developed using the linux operating system and the Apache webserver. for its database moodle has many database options such as Mysql, MariaDB, PostgreSQL. For programming languages supported only PHP version 5. To be able to walk moodle has minimum hardware requirements as follows.

Hardware Requirements :

1) Disk space: 500MB for moodle source code, plus content for e-learning such as assignments and material, it requires at least 32GB to be comfortable to use.
2) Processor: 1GHz , 2-3GHz dual core or more recommended.
3) Memory: 512MB (min), 4GB or more is recommended. 8GB plus is likely on a large production server

Figure 4 raspberry Pi

If the database and web server are in the same environment, it will be easier to configure it. Minimum requirements above depend on the needs of the applied e-learning scale, the moddle can be easily configured, here are some ways to install moodle

The following are the steps to install Moodle on Raspberry Pi :

1) Configure the Raspberry Pi server, such as activating SSH, expanding the file system, activating the network, installing the PHP webserver and database, in this case the database used is MySQL.
2) Create an empty database

    create a new database by entering mysql with the "mysql -u root" command and the command to create a new database "create database moodle database"
3) Create moodle directory

    The moodle directory will be used for data uploads, learning materials, assignments, make sure there is enough storage space to enter data here..
4) Installation moodle

    for easy installation of moodle, do the installation via the web, it is highly recommended to configure by enabling the host address to be public, then to run the installation using the web by accessing the url of the host using a web browser.
5) Configuration within Moodle

    To configure, an admin / root user is required, and login to the 'Site Administration' menu.

3. Simulation result and discussion

After installation moodle to raspberry pi and system design that has been done. So that the results obtained do not come out of the system analysis has been made then held a trial scenario for 3 levels user, namely admin, lecturer and student.
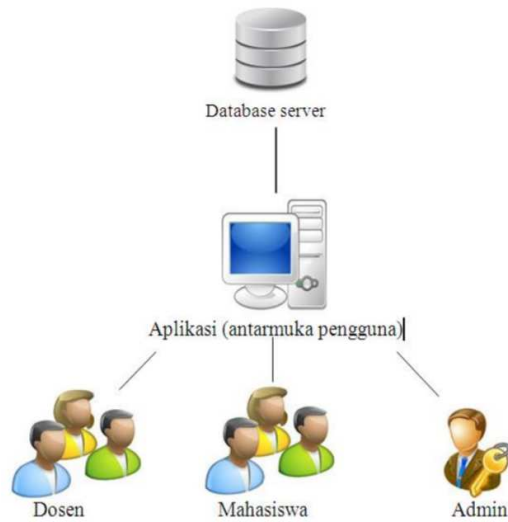

Figure 5. Architecture 3 level user moodle

In Figure 6(a) is the class data display. When admin want to add new class data, then the admin must press the plus button to open the add class form. In Figure 6(b) the admin fills in selecting majors data, course, academic year, semester, year and year teaching lecturer. Then press the save button.

Figure 6. Class data (a) and manage class b)

In the form manage tasks such as Figure 7(a), lecturer need to fill in the assignment name, start date for assignment collection and the final date for collection of assignments.
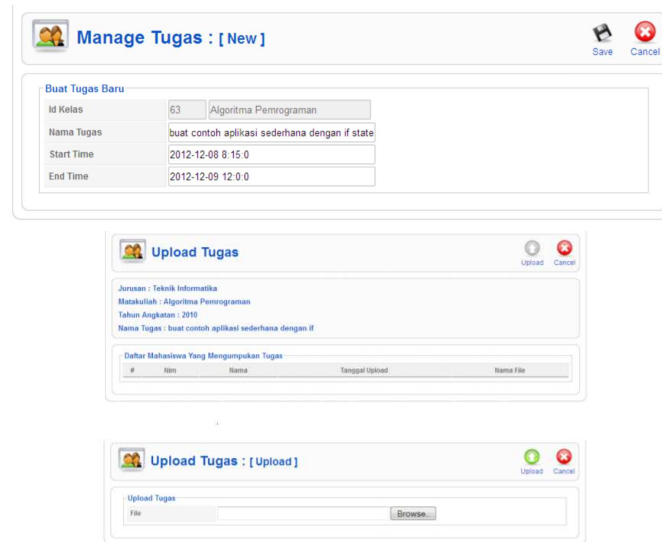
Figure 7. Task (a) and upload Task(b)

4. Conclusions

After making this Raspberry as portable moodle class application then the event lectures can be done offline, and class applications This virtual can do presence presence online, and this application can handle the collection of tasks in a way. Suggestions for application development namely with find the video chat feature.

5. References

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