Learning Of Laboratory Project Based Learning (Lipbl) On Subject Of Hardware Basic Computer Cloud Server Real Time Communication Video Conference Based On Bigblubutton

Abdul Rohmad Basar, Ganefr, Wakhinuddin, M.Ropianto

Abstract: to support video conferencing (vicon) services, a duplex and real time multimedia application, as supporting educational services is integrated with e-learning. The research took the object at STT-Ibnu Sina Batam using the Network Development Life Cycle method. This method is to build a real time communication server and integrate bigbluebutton into video conferencing services. The final result of this research provides the alternative designs on video conferencing services that can be accessed through a web browser integrated with Learning Management Service (Chamilo). Based on observations using Wireshark, to obtain good audio-video quality, a stable internet connection is required when performing a vicon.

Keywords: Laboratory, Project Based Learning, NDLC Cloud Computing, Video Conference, Bigbluebutton.

1. INTRODUCTION

Technical college (STT) - Ibnu Sina Batam as one of the colleges located in the city of Batam, with a vision: to become a superior institution of higher education, globally competitive, based on science and technology and IMTAQ, has utilized Google classroom as a virtual class) where lecturers and students can interact anytime and anywhere. According to Gunawan and Sunarmart,[1][2], the use of Google classroom actually makes it easier for the teachers to manage learning and convey information to students accurately. Unfortunately, the Google classroom has no teleconference or video conference features[3], so the students and lecturers cannot communicate face-to-face and talk directly to conduct dialogue in the learning and teaching process like in a real class[4]. So, there needs to be a real time communication server that can transmit data, sound and images at the STT-Ibnu Sina Batam[5]. According to Purnomo, et al.[6], video conferencing is a multimedia application that allows communication of data, sounds and images that are duplex and real time. The form of this application is a conversation via audio and video between users which is expected to replace the face-to-face function directly[7][8]. However, there are still many educational institutions in Indonesia which have not implemented and utilized the multimedia video conference technology so far, including STT Ibnu Sina Batam. Based on the description above, the researcher proposes a new teaching method in order to solve problems with appropriate solutions. The title of this research is "Cloud Server Real Time Communication Video Conference Based on Big Blue Button"[9].

2. Method

This research uses literature study research by finding theoretical references from various written sources, whether in the form of books, archives, articles, documents and previous journals that are related to the research. Thus, theoretical references obtained during the research of literature will be used as a basic foundation and main tool in the research. The data analysis method used in this research is qualitative analysis (a type of non-statistical data analysis), which is the data that cannot be framed but it can be processed or analyzed based on the content or substance[10]. For system design, researcher uses the NDLC (Network Development Life Cycle) method which requires planning, involves analyzing the hardware and software requirements as well as analyzing the system topology.

3. RESULT AND DISCUSSION

To obtain the data used in this research report, the researcher conducts the primary and secondary data, as follow:

Primary data
The research has begun by conducting a literature study. Through internet media, the researcher looks for information related to NDLC cloud computing, video conferencing and bigbluebutton. Then, the researcher also discusses directly with several officials at STT Ibnu Sina Batam. Furthermore, the researcher receives the permission or approval from STT Ibnu Sina Batam to continue the research. To get additional primary data, the researcher conducts the written interviews with two types of questions, namely: open and closed questions. The conclusion of the discussion and interview is that STT- Ibnu Sina Batam agrees and supports to immediately make the cloud computing-based video conference service at STT-Ibnu Sina Batam.

Secondary Data
The next step is to collect the secondary data in the form of literature from books and previous research journals. The data is used to find out and learn the concept of the work of the vicon system in cloud computing.

Analysis of System Requirements
Analysis of system requirements is also called data processing or data interpretation is the most decisive process in a research. Therefore, it needs hard work, creativity and high intellectual abilities to get satisfying results. The analysis of the system includes:

Problem Analysis
Based on the above background, it can be concluded that the problem faced by STT-Ibnu Sina Batam to improve academic quality in the teaching and learning process in virtual
classrooms is that there is no real time communication server and video conferencing service application.

**Hardware and Software Needs Analysis**

In building the video conference server, two main components are needed: hardware and software. Hardware and software requirements used can be seen in the following table:

<table>
<thead>
<tr>
<th>Table 1. Hardware Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware</strong></td>
</tr>
<tr>
<td>Server Vicon</td>
</tr>
<tr>
<td>Server Chamilo</td>
</tr>
<tr>
<td>Laptop 1 (Client)</td>
</tr>
<tr>
<td>Laptop 2 (Client)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Software Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware</strong></td>
</tr>
<tr>
<td>Ubuntu server 16.04 x64Bit</td>
</tr>
<tr>
<td>Centos 7.0 x64Bit</td>
</tr>
<tr>
<td>Bigbluebutton</td>
</tr>
<tr>
<td>Chamilo</td>
</tr>
<tr>
<td>Domain</td>
</tr>
<tr>
<td>Windows 8.1 x64Bit</td>
</tr>
<tr>
<td>Mac OS X</td>
</tr>
<tr>
<td>Web browser</td>
</tr>
<tr>
<td>Adobe flash player</td>
</tr>
<tr>
<td>Putty</td>
</tr>
</tbody>
</table>

**Vicon System Topology Analysis**

In general, the vicon system topology in cloud computing is almost the same as the star topology on UTP or STP cable networks. The choice of network topology is based on the scale of the network, costs, goals and users. The overview of the Vicon System Topology.

**Planning**

Planning is a process or step or strategy to determine a series of actions to achieve the desired results, including:

a. **Determine Research Objectives**

Based on section 1.2 (Introduction).

b. **Selection of Cloud Computing Technology**

This research uses the IaaS service model from Google Cloud, considering: goals, functions and costs. Based on its function, the service model in cloud computing consists of three models, namely:

<table>
<thead>
<tr>
<th>Table 3. Software Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Model</strong></td>
</tr>
<tr>
<td>Software as a Service (SaaS)</td>
</tr>
<tr>
<td>Platform as a Service (PaaS)</td>
</tr>
<tr>
<td>Infrastructure as a Service (IaaS)</td>
</tr>
</tbody>
</table>

**Vicon Application Selection**

At present, there are many vicon applications available on the internet both free and paid. In this research, the researcher chooses BigBluebutton, because it is easily integrated with other applications and there are many features including: Live or streaming video, VoIP, Meeting recording, Whiteboard, Text Chat, Polls and Surveys, Screen sharing or Desktop sharing.

**System Design**

System design is a method of describing a system to be built (figure 1.2). To give a complete picture of vicon system, the researcher uses unfield modeling language (UML), where there are two actors, students and lecturers. The actors can log into the system and interact with each other if they have registered according to the specified level[11].

**Simulation Prototype**

To create a prototype vicon system simulation image in this research, the researcher uses Microsoft Visio 2010 tool. As in Figure 3 below:
System Implementation
In implementing the bigbluebutton based real communication video conference server system, there are several stages, including:

a. Operating System Installation and Configuration in Cloud Computing

Cloud Computing according to Google's definition is a data center that is outside the client application computer. One of the features of Google Cloud is the Google Compute Engine which is able to create virtual computing machines in a flexible and scalable cloud system. At this stage, the researcher conducts it with the following steps:

1. Make e-mail (https://gmail.com) as the main requirements required by Google.
2. Enter Google Cloud (https://cloud.google.com) as a developer, so the screen will appear:

3. Create SSH (Secure Shell) key that will be used to enter the virtual machine through the remote shell. Click compute engine => metadata => SSH keys
4. The next step is to create a virtual machine, click Compute Engine => VM Instance => Create Instance => Name (Ubuntu 16.04) => Zone (Data center location) => Machine Type => Boot Disk (System Selection operations and hard disk capacity to be used) => Create.
5. Then check Allow HTTP and HTTPS traffic to allow access to the web server. Other firewall options are in the Network VPC menu => Firewall rules.
6. Now, the virtual machine on Google Cloud is active. External IP (Internet Protocol) is a Public IP from Google Cloud and Internal IP is a Private IP from a virtual machine.
7. To make the public IP address (Internet Protocol) given by Google does not change, the researcher changes the type of IP Address from ephemeral to static.

b. BigBlueButton Installation and Integration

The steps in the installation and integration of BigBluebutton are as follows:

1. Download the putty application (www.putty.org) => Double click putty.exe, enter the SSH login user & password that was created earlier.
4. CONCLUSION
After analyzing and implementing, the conclusions of this research are:

1. The real time communication server is successfully built on the cloud computing (Google cloud) service model IaaS (Infrastructure as a Service), with Ubuntu 16.04 operating system and the domain name https://cloud.stt-ibnusina.com.

2. Bigbluebutton based video conferencing applications can be accessed through the web browser to make video calls, chat and presentations as distance learning media at STT-Ibnu Sina Batam.

5. REFERENCES


