An Implementation of Digital Advertising Board using Mini PC

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Abstract— **Digital engagement can be one of the solutions for improving perceptions of rich user experience. In tourism area, advertising is one of important thing to change traveller's perception. Advertising were become more attractive if we can use many interactive contents. It was proven that there are ads everywhere both in print media or electronics. Also we can find many ads in different places and the media.**

We focus on digital video or electronic advertising with wireless connectivity. Many electronics advertising may cause some problems in efficiency, effectiveness and and customer needs. More expenses must be paid to make a digital advertisement that usually contain of a CPU and digital display. For some digital ads to be placed on some places for tourism information or public transportation their connectivity to contents sources may still use cables.

This paper is a report about developing a new breakthrough in advertising digital system. One or more display advertising will be installed with a mini PC, which can save either fees or place. Advertisement's contents installation can be update using local wireless network . This paper will also report how to make it easier for the replacement or enter ad in various format because they can be integrated in a server computer. So, it will not be difficult to install new kind advertisement.

As result, it was proofed that the system which is digital advertising system integrated and focused with high efficiency and effectiveness was without neglecting aesthetics of a form ad.

Keywords— Advertising Digital; Raspberry Pi; Wireless protocol; Server;

I. INTRODUCTION

1.1 Background

Today advertising in Indonesia has developed rapidly, this can be seen from development of advertising in various media such as the media print or electronic. Sign board also has many benefits such as brand and notices-announcement information. The latter part of the advertisement boards can easily found in public places and even transport facilities. But the system advertising this time was considered as does not have the effectiveness and efficiency that is very much needed in the development advertising.

Digital advertising board usually still using equipment that is considered big and not portable. Cable is still a media transmission between source to display so if it's not be will affect billboard ads diminished aesthetics and will increase in the cost of doing if the distance between source and some how it looks far and it is difficult to an affordable price. Here we saw the need for a system digital advertising that offer reliability and portability.

1.2 Goals and benefits

In general, the goal of the project is to make the system Digital Advertising Board based raspberry pi and is also the system advertising that wireless access and flexible. Without mengidahkan quality networking parameters and have a transition between ad that interesting and can be applied of our daily lives.

1.3 Formulation of problems

In this project, some problems that need to be addressed is as making digital system advertising a centralized and for connecting server computer with raspberry pi with wireless media. This problem is also made a transition and aimed dynamic advertisement can be seen in a server.

1.4 Boundary problem

This, of course, making projects have limitations that must be at look at such as transitional video in one appearance. Burst this device only covers the region in coverage equipment and a wireless device is implemented in public transport. Video formats use Furthermore, to be a major milestone limitation problems and discussion protocol problem - a protocol that is using TCP.

1.5 Methodology

Methodology which will be done in this project preparation is a study literature, design and testing system tools. The stage is studying theories that support, which is about a computer source ad (server), wireless devices, raspberry pi, and appearance in a intranet and internet. At this stage design is made up of the design hardware and software design. Hardware designed diagram block software that made operating system designed by using linux systems, streaming or IPTV (VOD Service) and analysis with software wireshark. Test equipment made more equipment has reliability is good.

II. Implementation Model

2.1 Digital Advertising Board

Figure 1 Street Advertising Board

Digital Advertising Board or board brand is the form Digital electronic screen display information, advertising and any has exodus digital such as in LCD, LED, plasma, or picture that is projected to fall. Ad digital is usually found in public place and, as private shops and retail company buildings but quite often we find them in public transport recent.Ad digital usually controlled by Personal Computer in a way software basic programs that have a license, avoid expenses to control equipment. Ad use a digital brand is a form out-of-home advertising in which the content and the message is displayed in digital display with general purpose message is targeted at certain locations at a certain time. This is often called digital out-of-home or abbreviated DOOH.

Figure 2 an example of web-based Tourism Board

2.2 Raspberry Pi

Raspberry Pi is single-board computer-size of credit card that developed in britain by Raspberry Pi Foundation with early objective to teaching computer science in primary schools. Raspberry Pi have a system BCM2835 Broadcom in a chip (soc) that includes ARM1176JZF-S 700 MHz processor, firmware this includes some turbo mode so users can try to overclocking until 1 GHz (without affecting warranty), have GPU Videocore to IV. At the outset Raspberry

Pi has a capacity of 256 MB RAM, and then upgrade to 512 MB but this does not include hard drive in it but by using SD card for long-term booting and storage.

2.3 Wireless Hosted Network

The wireless Hosted Network is a feature of WLAN series, starting support from windows 7 and windows server 2008 and wireless LAN service inside it. this function implements the two main function :

- Virtualisation from physical wireless devices to more than one virtual wireless devices sometimes called virtual Wi-Fi .

- Wireless Access point- based software sometimes called softap (Soft Access Point) using wireless devices.

With this feature, windows machines can use its wireless equipment both as client or server in an access point network.

2.4 Streaming Protocol

Some protocol that support streaming in the project is described below. Each protocol has advantages and disadvantages respectively, consist of:

1. Transport Control Protocol (TCP)-based

This Protocol is at the top layer (layer) internet that reliable and functioned to avoid congestion. TCP actually refers to a group set protocol which consists of two main protocol Transmission Control Protocol (TCP) and Internet Protocol (IP) . TCP/IP allows for communication between computer that has different characteristics of the hardware or software. Hypertext link located at Transfer Protocol (HTTP) use TCP as protocol to transfer documents that can be trusted.

2. User Datagram Protocol (UDP)-based

User Datagram Protocol is another alternative of TCP. UDP will ignore error correction from TCP and may loss the packet when late or get distructed. When this happen, we will see a lack on video, but streaming process still work. Even when some of data are loss, but this approach is better for continues data transfer.
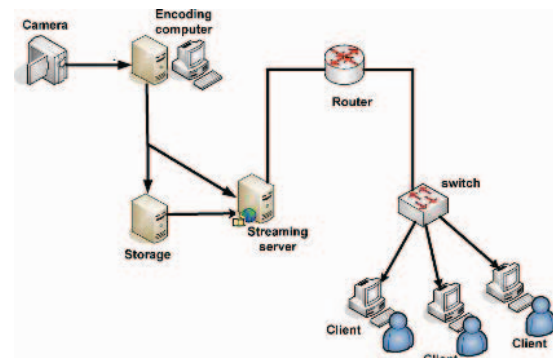

Figure 3 Streaming Topology

2.5 Video on Demand (VoD service)

Video on demand is service end-user with based on user's request, which allows users to choose and see video content that want to to be watched by, where end-user can control's demand on while from video content that was watched by such as did pause, fastforward, rewind etc.

Basic concept video on demand is to keep the program/content and then sent to the spectators when asked by the audience. storage server centralized that use the equipment to send programming simultaneously to audiences, or they can also use other storage distributed to all network. For restrictive storage devices, individual for each audiences can be placed in each set top box. VoD service has some service types, among others:

- True Video on Demand (VOD Service)
- Near Video on Demand (nvod)
- Subscription Video on Demand (svod)
- Free Video on Demand (fvod)
- Everything on Demand (eod)
- Personal Video Recorders (pvrs)
- Network Personal Video Recorders (npvrs)
- Pay Per View (PPV)

III. SYSTEM DESIGN AND IMPLEMENTATION

Before design will be done, understand the diagram block of this system is a requirement that most page. Hardware System in this system in the 2 sections *client side* and server *side.* On server side is the *database* and storing files that will be issued on the client. On the client side, *raspberry pi* has the function process and mengkompresi file server so that it will be from the view in exodus system.
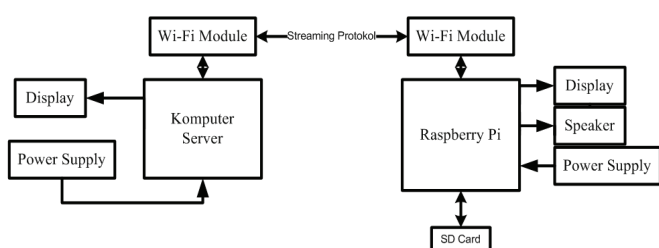
3.1 System Diagram

Figure 4 System diagram

For reliable advertising system, electronic display were place quite far from server but in WLAN's coverage. On transmitter part, a common PC were use to control some ads contents before it broadcast to ads's display at the receiver side. At receiver side the ads were receive by wifi dongle attached to mini PC.

3.2 Block parameters

1. Reliability specification server computer

Server computer must have reliability in running as server or source. Reliability here server computer must have hardware specification that mempuni to run every operation server.
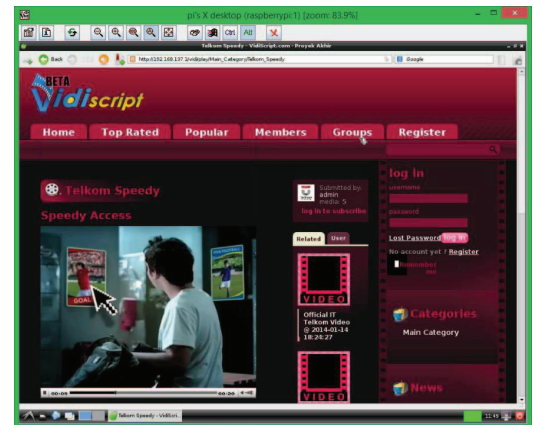
Picture 5 web server test using TightVNC interface

2. Client reliability

Client devices using *raspberry pi* must have reliability especially on temperature effect, because of the system will work for a very long time and constant.

3. Transmission reliability of wireless devices

Equipment needed to transmit data work good on location. Rate and working frequency will need to adjust the needs in accordance with the selected *wireless device type.*

3.3 Testing the network

Testing the network will be done the *ping* to devices with the distance that is different. Because this project has a parameter in distance, it means that the distance is affected network performance in this system. Measures its measuring to do the commandment to the client tools pinging . Ping (*Packet Internet Gopher*) is a program tools that can be used to verify technology-based *Transmission network connectivity Control Protocol/Internet Protocol* (TCP/IP). *Time* in a package *ping* indicate availability *bandwidth that* provided for a package *ping*, if *bandwidth ping* up then statistics from time, the more than. Here are statistics *ping* from server to client computer *(Raspberry Pi).* Testing done in wake up that have interference to build a complex. The following is the result of the test network.

TABLE 1 RESULT OF NETWORK TESTS

Distance (meters)	Byte Sent	Average Time (ms)
1	1	46
10	1	72
20	1	120
30	1	132
50	1	Unreachable

3.4 Distance parameter measurement

Measurements made at some distance in the unit meters will be done in order to know when a computer *server* and client near.

TABLE 2 NETWORKING PARAMETERS MEASUREMENTS

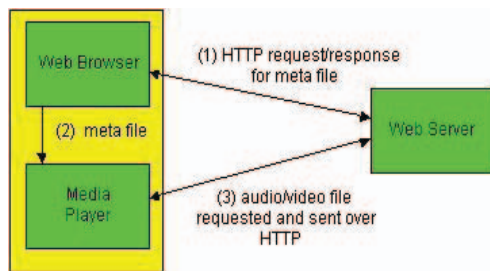| Distance (Meters)	Delay (Seconds)	Throughput (MB /'s)	Packet loss (%)
1	0.00227	4.036	0
10	0.00304	2.864	0
20	0.00311	1.697	0.12
30	0.00447	1.236	0.19

3.5 System Analysis

Figure 4 Working System Network

The process *streaming* in the project is happening in TCP (*Transport Control Protocol)* and did not choose to UDP because TCP more concerned with the packet that is sent that UDP that did not re-verification about data packages during the process *streaming*. Project this time using the technique webserver *software* that provides data service that function accepted a demand HTTP or HTTPS from clients that are known as web browser and send back the results in a page - web pages most of which form is HTML document. Working Mechanism of systems in describing at the bottom of this page.

IV. CONCLUSION AND SUGGESTION

4.1 Conclusion

The signboard digital equipment with raspberry pi proved to be reliable in all testing and will be able to work in a centralized network. Wireless equipment can be used as transport media for advertising media into digital format.

The system works meet the standards - standard networking parameters that can be made as a reference network quality,

such as delay , packet loss and throughput. Exodus system has a transition and startup automatically to repeat and play content ad either centralized as well as independent. Client equipment connected with the server in a Transport protocol Control Protocol (TCP).

4.2 Suggestions

It can be more realible and support diverse video formats and protocol. Have a transitional ad that more seamless without seen syntax in it.

May be simplified in one software unity, so it can make life easier for the installation next.

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