

## Use of Automation Codecs Streaming Video Applications Based on Cloud Computing

Hero Wintolo<sup>\*1</sup>, Anggraini Kusumaningrum<sup>2</sup>, Handoko Widya Kusuma<sup>3</sup>

<sup>1,2,3</sup> Department of Informatics Engineering  
Sekolah Tinggi Teknologi Adisutjipto Yogyakarta (STTA), Yogyakarta, Indonesia  
<sup>\*</sup>Corresponding author, e-mail; herowintolo@stta.ac.id

### Abstract

*Streaming technology is currently experiencing a great progress. Faster internet more users streaming. Streaming services that exist today there are still weaknesses in both the upload speed, streaming speed and limited types of video extensions that can be played. To resolve these problems then made a video streaming service based local area network with a system of cloud computing that can work effectively in terms of upload speeds, streaming and variations in video formats. Video streaming application is classified as a service IaaS (Infrastructure as a Service Cloud) in cloud computing. On the use of streaming applications the user does not need to convert the video, with the purpose of uploading process can be faster and applications can play a variety of video formats.*

**Keyword:** Video Application Streaming, Local Area Network, Cloud Computing, IaaS

**Copyright © 2017 Universitas Ahmad Dahlan. All rights reserved.**

### 1. Introduction

Video streaming, information technology that can be accessed by internet users who want information in the form of video without having to pay when viewing it. Internet users who access it need a high-speed computer network. With the development of computer networking technology and equipment, today's computer networks that can support streaming video can be easily implemented and have better security levels from year to year. One of the computer networks used is the ad hoc network that utilizes wireless computer networks on mobile computing devices, where one computer has changed the performance of the wireless adapter into an access point, so that other mobile computers can connect with ad hoc. With this kind of network, streaming video can be applied even though there are still many problems in terms of security being [1]. In addition to reliable computer network equipment, in providing video streaming services are also needed computers that have large storage capacity, such as cloud computing. The use of cloud computing requires software client side to control it. This software is known as virtual machine that virtual server/ desktop infrastructure such as server consolidation, virtualization performance, virtual machine density (VM), total cost of ownership (TCO), and return on investment (ROI) [2] is carefully calculated.

Cloud computing that can be used to support streaming video can be SAAS. Integration and composition are important components in your architecture Strategies for incorporating successful SaaS as fully participating members of the IT-centered service of your infrastructure [3]. One of the services provided by cloud computing service providers is VM that can be used to control the cloud used by users. VM resource allocation models that dynamically use VM resources to meet the requirements of service-rich mobile cloud or media services [4]. Cloud computing in other form is PaaS, Google App Engine is a PaaS service provided by Google [5] which can be used to store video data enjoyed by users through streaming.

The most inaccurate video streaming process can affect the user's convenience while watching videos, so the service is transferred across the network by implementing local area network services provided in cloud computing, although in other studies related to streaming is done on multi-core platforms. Streaming on multi-core platforms has many advantages: flexible and configurable based on the number of executing cores according to system requirements, fault tolerant, and fitting with future process technologies [6]. So that the need and attention is done when the streaming of a video, among others, where one of them store in the cloud, then

how to access the cloud and VM required, other than the computer network technology to send packets of data, can use the internet, local area computer network, ad hoc and point-to-point (P2P) networks. In P2P, the video that will be enjoyed by its users via streaming will be more efficient if made layered [7]. So in this article we offer a different solution by utilizing a number of PCs in the local area as a place to accommodate network video streams that can be accessed from outside or inside the network.

## 2. Research Method

### 2.1 Cloud Computing

Cloud computing is an evolution of virtualization in the form of a service-oriented architecture using utility computing. The workings of cloud computing is transparent, easily accessible so that users do not need advanced knowledge and just need to know how to access it. Cloud computing is the combined use of computing technology and the Internet in which information is permanently stored on web hosting and temporarily stored in the user device used. There are 5 characteristics that a system can be called cloud computing, namely:

1. Resource Pooling
2. Broad Network Access
3. Measured Service
4. Rapid Elasticity
5. Self Service

In this paper, the building cloud computing that is used to provide services with a video playback codec which is provided on a local area network infrastructure. Codec is short for Code-Decoder (Compressor-DE compressor) and is used to describe everything that transform data into another form for storage or transmission, and change it back so that it can be used. In traditional broadcasting, is in the form of physical equipment that converts analog video and audio data into digital form for transmission. It also has the ability to convert the received digital information back to analog form. One that is widely used codec is MPEG. There are hundreds of codecs on the internet and all have specific functions for specific applications. Many programs like Media Player has a feature that will automatically find a codec needed to play video or audio that is necessary so that users do not bother to look for the codec.

Codecs that exist in cloud computing services is useful to provide convenience for the user when performing the streaming process. Streaming is a technology to play a video file directly or with pre-recorder of a machine server (web server). In other words, the video files are located on a server can be directly after a request from the user, so that the process of running applications downloaded in the form of a long time can be avoided without having to make the first deposit. When video files on stream, will form a buffer on the client computer, and the video data will start downloading into a buffer that has been formed on the client machine. In units of seconds, the buffer has been filled and the video file is executed automatically by the system. The system will read the information from the buffer and keep the process of downloading the file, so that the process remains ongoing stream to the client computer.

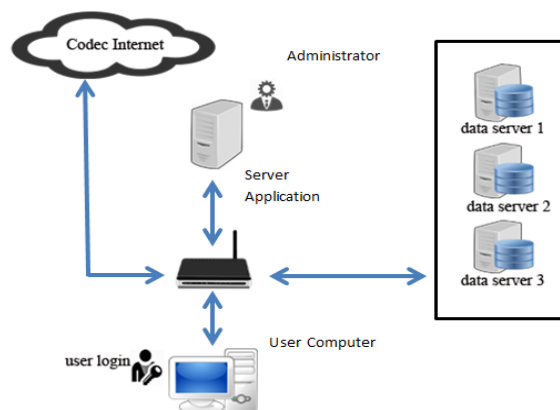


Figure 1. Streaming Video Application System overview

## 2.2 Architecture Design Cloud Computing

Figure 1 shows the concept of video streaming applications are built. This application is a web-based application and have multiple data server that serves as a repository for video. The initial process starts from the user to upload videos on video streaming applications. The video will be stored on the server data. Once the stored video, streaming application will automatically call the data and then play it. Before the video plays streaming application will seek the appropriate codec with the video so that the video can be played.

## 2.3 Diagram Context

Figure 2 is a diagram of a video streaming application context. In the system there are only two entities are user and administrator. The processes are carried out against a system that is user friendly can register members by entering identity data. To be able to upload a video, the user must log member first by entering a username and password. After uploading the video, the video will be rotated and displayed to the user. Processes performed by the administrator entities are doing admin login, see the member data, video data, server data input, data input player, remove members and delete videos.

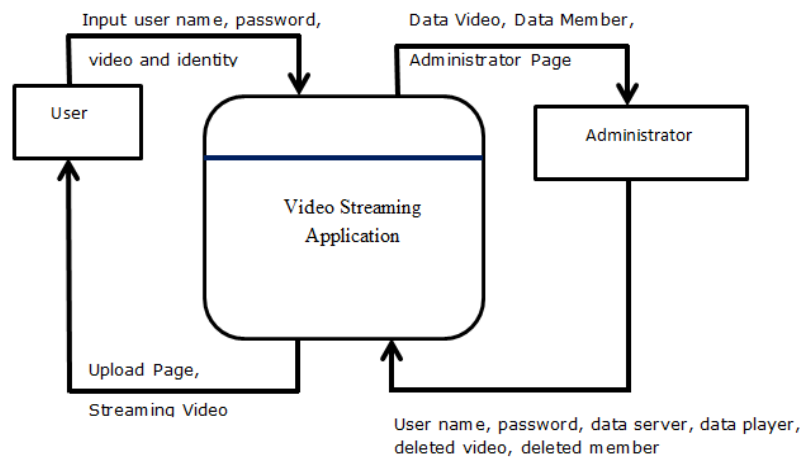


Figure 2. Diagram Context Application Streaming Video

## 3.1 Implementation and Results Analysis

### 3.1.1 Topology Application Streaming Video

In Figure 3, Computer named Web and Application Server is the computer where the attached video streaming applications. A computer user is a computer used to access the streaming video applications. Database server 1, 2, and 3 is the place where the videos uploaded by the user are stored. These applications run on the local network/LAN. The following table shows the IP configuration of each device on the topology shown in Figure 4.

### 3.1.2 Configuration Data Server

Configuration data server is a way to add or connect the computer to be used as a repository for video. All the computers used in Figure 3 using the Windows operating system. Linking the data server with the application server can be done by making a home group on the application server. Then the data server connected to the group home.

### 3.1.3 Explanation Application Streaming Video

Once the configuration is done, then the application named UFILETUBE can be used by the user that will send video files to the cloud, and once the upload is complete, the user can view videos from all computers connected to the cloud designed. Figure 4 is a video upload page. Upload a video made by members by entering the name of the file and the video file.

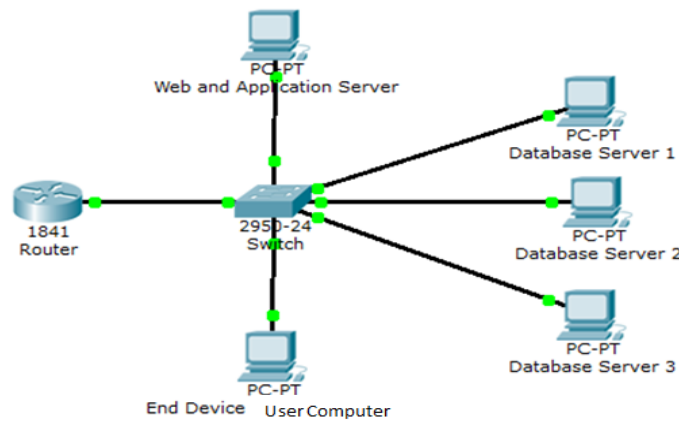


Figure 3. Topology Application Streaming Video

Table 1. IP address configuration on the topology of video streaming applications

Device Name	IP Server	Subnet Mask	Gateway
Router	192.168.10.1	255.255.255.0	-
Web Server Application	192.168.10.2	255.255.255.0	192.168.10.1
Data Server 1	192.168.10.3	255.255.255.0	192.168.10.1
Data Server 2	192.168.10.4	255.255.255.0	192.168.10.1
Data Server 3	192.168.10.5	255.255.255.0	192.168.10.1
User Computer	192.168.10.6	255.255.255.0	192.168.10.1

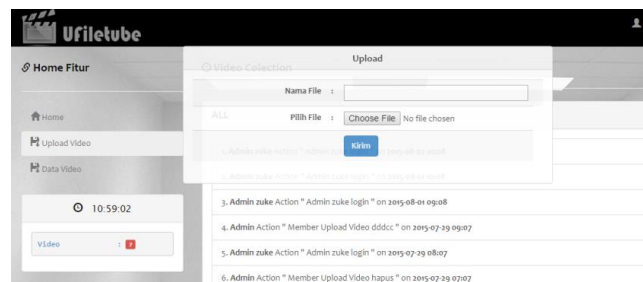


Figure 4. Page Upload Video

Once the cloud computing users to upload video, then the video will be shown on the page as shown in Figure 5. On this page there is a video play menu and delete the video. Facilities delete this video is provided if the user does not want the videos already uploaded is viewed by all users of the cloud.

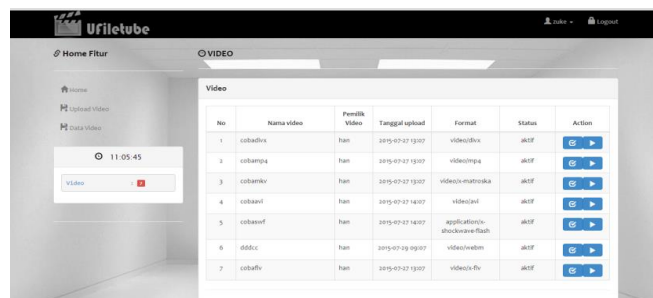


Figure 5. Page Video Member

Besides being used by the user to automate cloud computing codec video, cloud designed also intended for administrators who can perform the process of adding a server to the cloud. Figure 6 administrator can process the data added server by entering the IP address of the server and the server capacity.

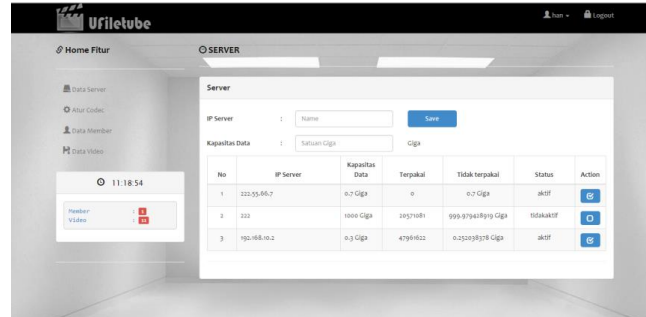


Figure 6. Page Input Data Server Section Administrator

The administrator can also make arrangements for the player to use when the cloud computing process with a set of data streaming existing codecs.

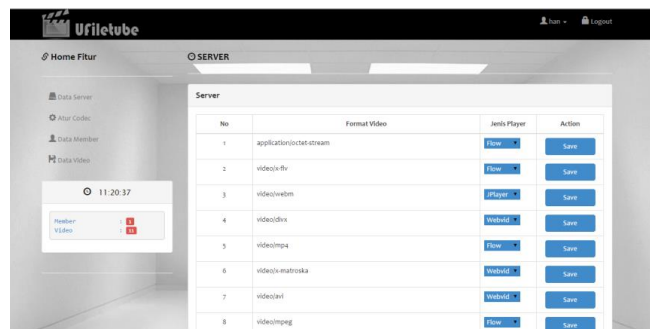


Figure 7. Page Settings Player Section Administrator

### 3.2 Streaming Video Application Testing

Streaming video application is running in a local network (LAN). Its topology is shown in Figure 3. The video formats that can be played by streaming video application is limited. Video formats that can be played by streaming video application is limited to video streaming applications experimental results shown in Table 2.

Table 2. Results of experimental video streaming applications

Format Video	Size Video	Upload Speed (s)
FLV	4.94 MB	23
MP4	5.25 MB	10
VOB	244 KB	02
MOV	3.37 MB	Unsupported
3GP	2.52 MB	06
MPEG	608 KB	01
SWF	1.40 MB	03
WMV	10.9 MB	Unsupported
RMVB	111 KB	Unsupported
AVI	948 KB	02
DIVX	2.95MB	06
WEBM	3.09MB	06

Table 3. Connection Speed (speed test)

Speed Test	Result
Ping	53 ms
Download	0.44 Mbps
Upload	0.04 Mbps

The experiments in Table 2 do with the speed of the Internet as shown in Table 3. For comparison testing performed also at the service Youtube and Dailymotion, the results refer to Table 4.

Table 4. Results of experiments on YouTube and Dailymotion (comparison testing)

ext.	YouTube		Dailymotion	
	Size (MB)	Time (s)	Size (MB)	Time (s)
FLV	4.94	699	4.94	792
MP4	5.25	1243	5.25	711
3GP	783 kb	118	1.25	212
AVI	4.28	971	4.28	845
MOV	3.37	589	3.37	604
WMV	8.43	1481	8.43	1246
MPG	5.3	683	13.9	2358
VOB	4.5	572	8.27	1384
SWF	1.4	185	1.52	Unsupported
RMVB	1.72	315	1.72	322
DIVX	2.95	530	2.95	479
WEBM	3.09	550	3.09	521

With 12 video formats tested as shown in Table 2 with varying sizes yield different speeds with computer network speed conditions in Table 3. As a comparison of the software generated from this study using youtube and dailymotion produce slower speeds, Table 4. For example, FLV video format with size 4.94 MB has access speed on applications designed and made for this research of 23 second. This speed is greatly influenced by the condition of computer network infrastructure that has a speed of 100MB /sec. On comparative software for the access speed of videos with this FLV format are 699 second and 792 second on computer networks with speed of 440 KB/sec. Based upload test, indicating that the application streaming with local area network much faster than at youtube and dailymotion are accessible on the internet, but variations of video format that can be uploaded less than at youtube and dailymotion.

#### 4. Conclusion

Computer networks in the form of local area network (LAN) can be used to cloud computing in the form of IaaS services (Cloud Infrastructure as a Service). Applications were made have been tested can be used for streaming by using computers in the LAN as a data storage medium in the form of video. Streaming speed for applications more quickly than applications that utilize the internal network at LAN speeds of 100Mb/sec. Applications can play video without making any changes or convert video format using codecs services available on the internet. Adding more types of codec in order to plays different types of video formats. Make this application in order to work better on mobile devices. Increase the security level of video streaming applications

#### References

- [1] Ali Azimi Kashani, Hadi Mahriyar. A New Methode for Securely Streaming Real Time in Ad Hoc Network, *Advances In Environmental Biology*. 2014; 8(10): 1331-1338.
- [2] Chang BR, Tsai HF, Chen CM. Empirical Analysis of Server Concolidation and Desktop Virtualization in Cloud Computing. *Mathematical Problems in Engineering*. 2013, Id947234
- [3] Ripandeeep Kaur, Gurjot Kaur. Proactive Scheduling in Cloud Computing. *Bulletin of Electrical Engineering and Informatics*. 2017; 6(2): 174-180.

- 
- [4] Hassan MM, Song B, Almogren A, Hossain S, Alamri A, Alnuem M, Monowar MM, Hossain MA. Efficient Virtual Machine Resource Management for Cloud Computing. *KSII Transaction Internet And Information System*. 2014; 8(5): 1567-1587.
  - [5] Hendra, Jimmy, Publications Repository Based on OAI-PMH 2.0 Using Google App Engine, *TELKOMNIKA Indonesian Journal of Electrical Engineering*. 2014; 12(1).
  - [6] Jun Li, Hong Ni, Lingfang Wang, Jun Chen. Architecture and Task Scheduling of Video Streaming on Multi-core Platform, *TELKOMNIKA Indonesian Journal of Electrical Engineering*. 2014; 12(3).
  - [7] Majed Alhaisoni, Mohammed Ghanbari, Antonio Liotta. Scalabel P2P Video Streaming. *International Journal Of Bussiness Data Commmunication And Networking*. 2010; 6(3): 49-65.
  - [8] Rajkumar Buyya, James Broberg, Andrzej Goscinski. *Cloud Computing Principles And Paradigms*. John Wiley & Sons. 2011: 123-156.
  - [9] Whitten, Jeffrey dan Lonnie Bentley. 2000. *System Analisis and Design Method. 5th Ed*. New York: McGraw-Hill/Irwin.
  - [10] Xua G, Yua W, Chena Z, Zhanga H, Moulemaa P, Fub X, Lua C. A Cloud Computing Based System For Cyber Security Management. *International Journal of Parallel, Emergent And Distributed Systems*. 2015; 30(1): 29-45.
  - [11] Yourdon Edward. 1989. *Modern Structure Analisis*. Prentice – Hall, Inc.