Review of Streaming Server Management Systems

Jaegeol Yim[1]

[1] Dept. of Computer Engineering, Dongguk University at Gyeongju
Gyenogbuk, Korea
{yim}@dongguk.ac.kr

Abstract. A streaming server (SS) is a system that streams out multimedia that is constantly received by and presented to an end-user while being delivered. Darwin Streaming Server, Flash Media Server, Red5, and Wowza Media Server are examples of SS. A SS is one of the most important components of Internet Broadcast Systems (IBS) because a SS streams out programs in the sequence designated by the playlist (a list of programs) that is assigned to it. Therefore, managing SSs is very important in IBS. This paper reviews architectures of streaming server management systems.

Keywords: Internet Broadcast System, Streaming Server, H.264, Codec

1   Introduction

Internet is available virtually everywhere and most of the people in the developed countries can access the Internet. TV is one of the most popular devices to the people. Most of people watches the TV after dinner for awhile before go to bed. A fusion of Internet and TV, i.e. distribution of television content via Internet, is the Internet TV. In the manner of delivering television content, video content can also be delivered through the Internet. In Internet broadcasting, the system streams out programs, multimedia content, in the predetermined sequence. An Internet broadcasting usually provides many channels.

Implementation of an Internet broadcasting system (IBS) is very easy. Installing any one of the streaming servers, Darwin Streaming Server, Flash Media Server, Red5, and Wowza Media Server, is enough. These streaming servers provide an environment in which we can edit a playlist, a sequence of programs. A program is a basic unit of the video streaming and it can be any video file containing a song, an episode of a television serial or a movie.

If we want to make our channel attractive, we have to stream out various interesting content. Therefore, we need huge repositories of multimedia, mostly video, files. In the repository, we store video, audio, computer graphic image, text, and other types of files. In addition, the system also has to provide a convenient environment to edit playlists.

Therefore, we can realize that installing a streaming server is the key of IBS development, even though it is merely the first step of IBS development. This paper

reviews architectures of streaming server management system (SSMS) and proposes our design of our SSMS.

2   Streaming Server Management Systems

Multimedia streaming service can be limited by the various factors such as Internet bandwidth, computing power, and so on. The authors of [1] proposed SMART (Server for Multimedia Applications for Residence community) for the multimedia service.

Peer-to-peer (P2P) based live streaming applications are suffered from the bandwidth bottleneck and the high rate packet loss in Wireless Local Area Network (WLAN). The authors of [2] proposed a new wireless multicast agent mechanism based on the IP multicast scheme for buffer management and scheduling.

The authors of [3] proposed a model that uses cloud computing technology to store and manage large volumes of multimedia services in home networks and in WLANs. The authors of [4] described the requirements imposed on a digital rights management system in distributing live broadcast over a P2P network and presented their design of a system that meets these requirements.
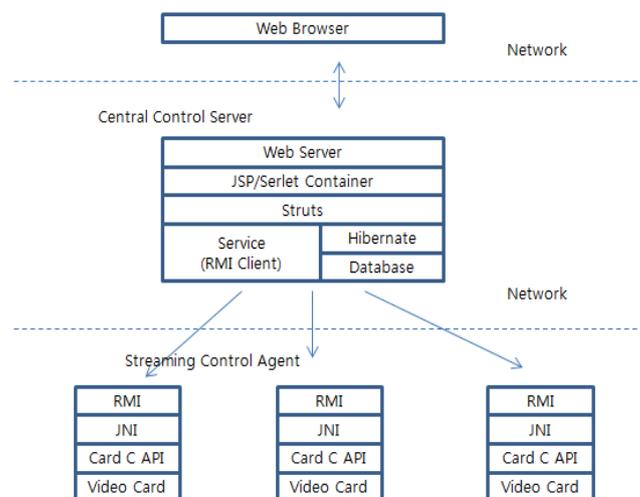
Fig. 1. Overall structure of the Management System [5]

The authors of [5] presented a web-based management system for H.264 live video broadcasting. The system consists of a central control server and multiple streaming control agents as shown in Figure 1. A Java RMI(remote method invocation) client is running in the central control server whereas the RMI methods are implemented in the streaming control agents. JNI (Java Native Interface) methods are layered between RMI methods and the system development kit (SDK) for the video card. The SDK provides application programming interfaces (API) written in C language. The video card is a third party hardware compression card.
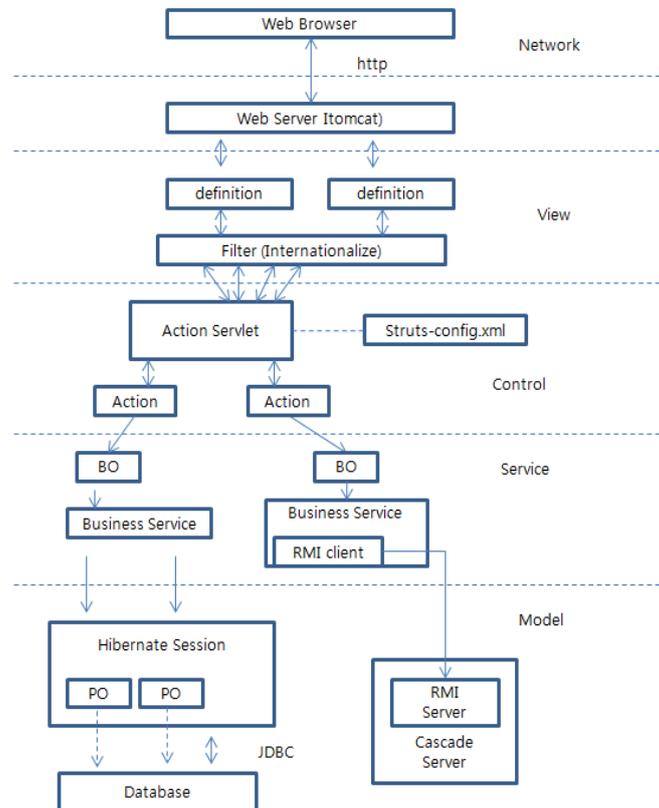
Fig. 2. Web architecture of the management system [5]

Figure 2 describes the architecture of the central control server. This architecture adopts the MVC (Model-View-Controller) pattern. A controller can update the model and change the view's presentation of the model. A model is the data in the database system. PO stands for persistent object and a PO is associated with a row of data in a database table. A view requests information from the model and displays it. The business logic of the system is implemented in the Service layer. A business objects (BO) communication entity between the control layer and the business service. A BO receives input from the actions in the control layer and either accesses database or RMI server [5].

3   Design of our Streaming Server Management System

A streaming server management system should monitor the status of the server and designate the resolution and bit rate. It should also designate images and messages to be displayed on the screen as shown in Figure 3.

Status	Quality	Channel CG
On Air or not	Resolution :	Image file
The number of users	Bit rate :	Location
Live input		Ticker
Live output rtmp HLS rtsp		Priority:
		Image:
		Message:

Fig. 3. A user interface for the Streaming Server Management System

4   Conclusion

This paper introduced a user interface for streaming server management system with which we can monitor the server and designate the resolution and the bit rate of the stream. Through the interface, we can also designate images and messages that can be displayed on the screen.

References

1. Bak, Y., Kim, K., Lee, Y., Sok, S., Kim, C., Kim, H., Kim, M.-J. and Kim, K.: SMART: High Performance Internet Server for High Definition Streaming Service. IJSH Vol. 1, No.1, pp. 1-10, (2007)
2. Jiang, W., Jin, H., Liao, X., Yuan, Z.: A Multicast Based Bandwidth Saving Approach for Wireless Live Streaming System. IJSH Vol. 2, No.1, pp. 65-80, (2008)
3. Cui, Y., Kim, M., and Lee, H.: A Novel Model for Home Media Streaming Service in Cloud Computing Environment. IJSH Vol. 7, No.6, pp. 265-274, (2013)
4. Wang, W., Chang, H., Goodman, A., Wucherer, E., Jamin, S.: Managing Digital Rights for P2P Live Broadcast and Recording on the Internet. IEEE Transactions on Multimedia, Vol. 14, Issue. 6, pp. 1538 - 1545 (2012)
5. Zhou, Y., Hua, X., Xiao, H.: A Web-based Management System for H.264 Live Video Broadcasting. Second International Multi-Symposiums on Computer and Computational Sciences. pp. 481-485 (2007)