An open concurrent NPVR System for an IPTV Platform

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Abstract

IPTV (Internet Protocol Television) is one in every of the most net applications developed in recent years. It provides a new kind of multimedia system services within the variety of streaming media, delivers real time contents to users directly, and supports new services like user interactive TV programs. During this paper, we have a tendency to style and implement a cross-platform net IPTV systems supported the useful definitions of the OIPF (Open IPTV Forum) normal. We have a tendency to implement many multimedia system streaming functions, as well as video transfer, NPVR (Network Personal Video Recorder), VoD (Video on Demand) and live video services.

1. INTRODUCTION

Due to the booming digital technology of the past few years, the convergence of telecommunication, broadcasting associate degree web has become an inevitable trend to market informatics based mostly triple-play services. Among these informatics services, IPTV has attracted wide attentions [1]-[4]. Therefore, plenty of international commonplace organizations are fashioned consequently to develop a series of connected technical standards [5] [6], like OIPF (Open IPTV Forum) [7], HbbTV (Hybrid Broadcast Broadband TV) [8] and therefore the MHP (Multimedia Home Platform) [9].

IPTV might give associate degree new style of multimedia system streaming services and options to finish users directly, like VOD (Video on Demand, VoD), audio and video broadcast (Scheduled Content Service), time shift (Time-Shifting), network personal video recorder (NPVR), net browsing, e-mail and voice phone services. With the advances of mobile network technology and therefore the widespread of sensible hand-held devices, a lot of and a lot of individuals ar looking forward to mobile hand-held devices to switch laptop or laptop computer for general web services likewise as streaming services. It's noted that the multimedia system streaming services need far more information measure than the normal web information services. fortuitously in these days, mobile service suppliers will give glad network bandwidth to support video streaming services, therefore individuals begin to use video streaming service on a hand-held device. For instance, a video show needs streaming information measure of eight to fifteen Mbit / s, whereas the regular digital television show encoded by MPEG schemes might need the stream bit rate of one.5 ~ half-dozen Mbit / s. On the opposite hand, the LTE downlink channel will give ample information measure up to three hundred Mbit / s on paper. We engineered the IPTV system based mostly upon the OIPF commonplace.
There are 2 kinds of IPTV services outlined within the OIPF commonplace, together with the open web services and managed network services. The digital wireless TV broadcast programs are provided by scheduled content services within the OIPF commonplace victimization the multicast mechanisms. These programs are supported underneath the managed network scope laid out in the quality. However, since it’s tough for a hand-held device to receive the digital wireless TV programs with none additional hooked up TV tuner module, we tend to therefore give such services via the Open web Service mode. Any consumer that may activate [the internet|the net|the net] web operate are able to fancy the services provided by this method victimization the foremost common application program mechanism. we tend to implement many multi-media streaming functions, together with video transfer, NPVR (Network Personal Video Recorder), VoD and live video services during this cross platform IPTV system.

2. SYSTEM design AND IMPLEMENTATION

The server system consists of three laptop (personal computers), as shown in Fig. 1. There are 2 Record and Live Servers. One Record and Live server additionally is the net Server and info Server. the opposite Record and Live Server resides at another laptop. The third laptop contains the VoD Server. The Web Server provides interface for users to access this IPTV Service and additionally performs many decision-making functions. The info server is employed to store data associated with IPTV Service. The Record and Live Server not solely performs recording services however additionally provides rendering services of the live television show. That is, it also can support time period live video streaming service whereas activity the recording functions, so the user is in a position to observe TV programs directly immediately. The VoD Server stores the third party uploaded video programs likewise as recorded TV video programs. Therefore, users will transfer video streaming information through VoD Service to observe the video. A. VoD Service The system design of the VoD Service is shown in Fig. 2. The hold on VoD program table and connected data is hold on within the VoD info. once a user needs to observe VoD program, he accesses the VoD webpage of the net server for an inventory of obtainable programs. The associated PHP engine of the net server is triggered to fetch the updated data of hold on VoD programs from the VoD info, and so returns websites back to users. the net page contains an inventory of obtainable video programs with associated universal resource locator and knowledge. The user will therefore choose a VoD program from the webpage, that redirects the request to the acceptable VoD server containing the requested VoD program. Upon receiving the request, the VoD server downloads the requested video streaming to users. PHP
B. Video transfer  Our system, exhibited in Fig. 3, additionally provides the video transfer service, the same as the video transfer service in YouTube. Users might transfer the video clips and associated data to the video clip transfer management unit within the net server, where the connected data is recorded within the transfer information table. The programing system sporadically activates the file conversion unit to convert the uploaded video clip into MP4 format by victimization the FFmpeg program. The regenerate MP4 video clip is then hold on within the VoD server. The associated VoD table of the info is updated likewise.

C. EPG To realize the NPVR system, we tend to should give program schedule contents, which has program name, profile, broadcast time and period, such users might send requests to record their desired programs on demand in step with the provided data. These services are enabled by providing the EPG (Electronic Program Guide) within the system as shown in Fig. 4. The Dvbsnoop program sporadically fetches the MPEG2 stream of wireless digital TV programs from the TV tuner hooked up to the Record Server. The embedded EIT (Event data Table) packets inside the MPEG2 stream is extracted by EIT resolver, and so hold on within the EPG table. once a user requests the EPG net, the PHP Engine obtains the program schedule contents from the EPG table dynamically, updates the EPG webpage and sends it back to the user. With the obtainable program schedule contents provided by the EPG operate, the NPVR system will be made as shown in Fig. 5. There ar 2 Record and Live servers in our NPVR system, wherever every server is provided with many TV tuners. If a user needs to record the TV programs listed within the EPG pages, he might send a recording request message to the net Server. The request message contains connected data concerning the required program. The record management unit of the net server then decides whether or not to simply accept the request or not based mostly upon whether or not the TV tuners ar obtainable throughout the required recording time periods. If the request is accepted, the requested data is written into the Record table. The programing system then activates the recording unit to perform recording operate (by checking the data within the Record table) because the program begins throughout the fundamental quantity once the TV tuner captures video streaming information, the FFmpeg program is additionally activated at the same time to convert the television show (.ts format) into MP4 format in real time. Once the video program ends, the regenerate MP4 program is loaded into the VoD Server, whereas the program data is updated within the VoD tables. This completes the recording progress. E. Live Video Service The Live Video service operate of this method, shown in Fig. 6, is additionally provided by the NPVR system. A live television show list is found within the net server. As a user sends request to observe live TV programs, the associated NPVR functions are activated. The live TV stream obtained from the TV tuner is distributed to the FFserver via FFmpeg program, whereas the NPVR system is activity the recording method. The FFserver converts the video contents into FLV format, permitting the user employing a application program to transfer the live stream and activate the player to observe the live TV programs.

3. SYSTEM DEMO AND COMPARISON
System Demo We have enforced a NPVR system together with the subsequent functions: Video transfer, VoD Service, NPVR and Live Video Service. The UI of the VoD purposeful system is shown in Fig. 7. The video program list webpage lists all the obtainable recorded video programs in step with the sorting index of program name, program period, or quality, once the user clicks on the precise program icon or its name, he might begin to playback the video program, as shown in Fig. 8.

4. CONCLUSION
We have designed and enforced the net based mostly NPVR operate for a cross-Platform IPTV system supported OIPF commonplace. The Apache and H.264 Streaming Module are accustomed build the VoD server for VoD Service. For Video transfer service, we tend to use Apache, PHP and MySQL to create the net Server. The FFmpeg program converts the video streams into MP4 format and so uploads them to the VoD Server for storage. For the EPG operate, the Dvbsnoop is chosen to capture DVB-T MPEG-2 stream, and analyze the program data embedded within the EIT packet. The PHP engine updates the EPG webpage dynamically as a user queries the EPG webpage. The FFserver is the live streaming server to deliver live video service. The JW Player is embedded within the client’s browser because the video player to playback the fetched video program. The JW player is in a position to change between HTML5 or Flash mode mechanically to adapt to totally different platforms for achieving cross-platform characteristics.
REFERENCES