IJCSE International Journal of Computer Sciences and Engineering Open Access
Review Paper Vol.-7, Issue-6, June 2019 E-ISSN: 2347-2693

Home-To-Home Media Streaming System Based on Adaptive Fast Replica

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DOI: https://doi.org/10.26438/ijcse/v7i6.716719 | Available online at: www.ijcseonline.org

Accepted: 10/Jun/2019, Published: 30/Jun/2019

Abstract-Users can enjoy High Definition (HD) video content instead of being satisfied with Standard Definition (SD) video content. Such HD-grade User Created Content (UCC) streaming requires significant bandwidth and download time due to their large sizes. However, the established Internet service environment does not ensure sufficient network bandwidth for directly streaming such high quality content between members of a family or group in different Universal Plug and Play (UPnP) enabled home networks. Hence we design a system that enables a source media server to stream high quality content to multiple renderers in physically separated homes through peer-to-peer overlay paths established between home servers with content distribution and QoS device capability.

Keywords: High Definition, User Created Content, Universal Plug and Play, Standard Definition, content distributor and content collector.

I. INTRODUCTION

With the help of High Definition (HD) camcorders and digital TVs at the receiver end, users are able to create User Created Content (UCC) of gigabyte-sized files [1,5,7,9]. It is basically difficult to stream HD-grade content instantaneously for the devices which are physically separated from each other. So, to improvise this, more scalable technique is required than the traditional UPnP architecture [2,4,6,8,11].

In peer-to-peer distribution technique, resource node will rift the entire content into small parts, and transmit to the varies receiving nodes. At the receiver, each and every small part are summed and played. By doing so, it out performs the lack in the bandwidth and process source node by employing the unemployed resources of the terminal nodes. It's also overcomes the lag in the HD-grade content live streaming for the users those who are located in different location irrespective of the bandwidth lag. Basic definition for HD is described here. HD, video system which is superior than Standard Definition (SD). Resolution will be of 1280×720 pixels (720p) or 1920×1080 pixels (1080i/1080p). SDTV system resolution will satisfy standard resolution. It is not considered neither enhanced-definition television (EDTV) nor HDTV. SDTV is defined for the standard resolution broadcasting [13,14,15]. In general, 4:3 aspects is considered as the SDTV broadcast as NTSC signals. If a product is labeled as SDTV then the resolution will be 480i pattern.

II. PROBLEM DEFINITION

- Conventional technique did not consider about resource-intensive problems [3,10].
- In this paper, home-to-home media streaming system is proposed.
- For massive content over multicast, UPnP AIV device is used.

III. EXISTING SYSTEM

In existing system, Internet service environment does not ensure sufficient network bandwidth for directly streaming such HD content between members of a family or group in different Universal Plug and Play (UPnP) enabled home networks [12,16,17,18]. Furthermore, we cannot estimate the available bandwidth of source or destination home networks because it is dynamically changed by resource-intensive home services requiring high bandwidth. Thus, it is not easy to simultaneously stream HD-grade content to multiple rendering devices located in physically separated homes.

IV. PROPOSED WORK

In this work, peer-to-peer distribution scheme is employed with traffic control mechanism. It will engage multicast streaming service. To make it work, content distributor (CD) and content collector (CC) is added.

In this work, CD will split the massive content into tiny packets and transmits to receiver through different paths. The CC will sum up the received packets from the different paths and stream the large content.

V. MODULES

Our Research paper constitutes the different modules As follows.

- Sender
- Media Server
- Content Distributor
- Content Collector
- Media Renderer
- Receiver

SENDER
First, a user with an enhanced PMCP requests a media server to stream its media file to a designated group. It enables service users to easily search media servers and media renderers located in different UPnP-enabled home networks. This is done by the sender module in figure 1.

MEDIA SERVER
A media server is a device that simply stores and shares media. Access to these is then available from a central location. It may also be used to run special applications that allow the user(s) to access the media from a remote location via the internet. The media server consists of the media files which are requested by the sender. The content distributor will select the media file from the media server.

CONTENT DISTRIBUTOR
The content distributor and content collector are responsible for efficiently distributing media streams between different UPnP networks. The PMCP's content distributor downloads the requested media file from the selected media server. During download of media file from the media server, Upon receiving the file block of predefined size, the PMCP's content distributor splits the file block into as many small chunk files as there are the content collectors in the designated group, and then transmits the small chunk files, the content's description, and the target media renderer's IP address to the content collectors in different UPnP networks.

CONTENT COLLECTOR
After receiving the small chunk file from the content distributor, each content collector forwards it to the remaining content collectors in the group. Upon receiving all the small chunk files, each content collector assembles the received chunk files, and streams the assembled sub-file to the designated UPnP media renderer in the same UPnP network in which they reside. At the beginning, the content distributor has no knowledge about the delivery path of each chunk. However, it learns the information about path quality from the delivered sub-files.

MEDIA RENDERER
The Media Renderer template defines a general-purpose device template that can be used to instantiate any Consumer Electronic (CE) device that is capable of rendering AV content from the home network. It exposes a set of rendering controls in which a Control Point can control how the specified AV content is rendered. This includes controlling various rendering features such as brightness, contrast, volume, etc. Example instances of a Media Renderer include traditional devices such as TVs and stereo systems. Some more contemporary examples include digital devices such as MP3 players and Electronic Picture Frames (EPFs).

All though most of these examples typically render one specific type of content (e.g. a TV typically renders video content), a Media Renderer is able to support a number of different data formats and transfer protocols. For example, a sophisticated implementation of a TV Media Renderer could also support MP3 data so that its speakers could be used to play MP3 audio content. The Media Renderer device template is very lightweight and is easy to implement on low-resource devices such as an MP3 player. However, it can also be used to expose the high-end capabilities of such device as a PC. In our project the assembled media files i.e., data gathered are played by the media renderer in the figure 2.

RECEIVER
The receiver will receive the data given by the content collector and forwards it to the media renderer.

ARCHITECTURE DIAGRAM

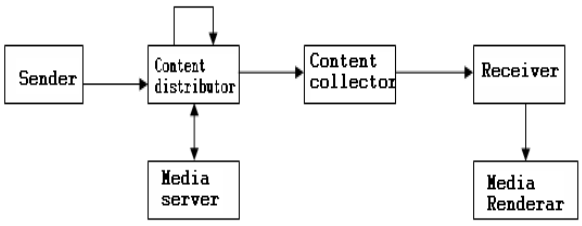

Figure 1. Architecture Diagram

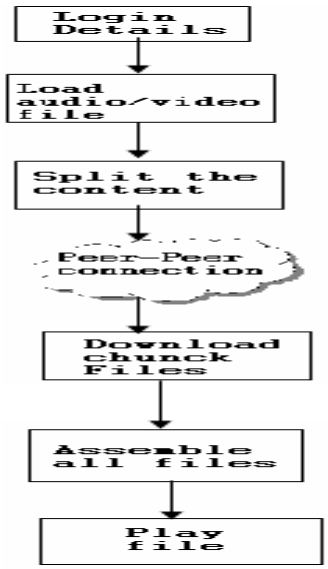

Figure 2 . Dataflow Diagram

SYSTEM IMPLEMENTATION

Implementation is the most crucial stage in achieving a successful system and giving the user's confidence that the new system is workable and effective. Implementation of a modified application to replace an existing one. This type of conversation is relatively easy to handle, provide there are no major changes in the system. Each program is tested individually at the time of development using the data and has verified that this program linked together in the way specified in the programs specification, the computer system and its environment is tested to the satisfaction of the user. The system that has been developed is accepted and proved to be satisfactory for the user. And so the system is going to be implemented very soon. A simple operating procedure is included so that the user can understand the different functions clearly and quickly. Initially as a first step the executable form of the application is to be created and loaded in the common server machine which is accessible to the entire user and the server is to be connected to a network. The final stage is to document the entire system which provides components and the operating procedures of the system.

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective. The implementation stage involves careful planning, investigation of the existing system and it's constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods. Implementation is the process of converting a new system design into operation. It is the phase that focuses on user training, site preparation and file conversion for installing a candidate system. The important factor that should be considered here is that the conversion should not disrupt the functioning of the organization.

VI. CONCLUSION

We designed a home-to-home media streaming system which enables HD-grade content to be streamed to the media rendering devices of several users in different homes. The system controls the unused home servers' resources and network bandwidth on delivery paths between the homes, based on the traffic control mechanism in the UPnP QoS architecture and a peer-to-peer media distribution scheme.

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