



MEDICALMEDIA.EU

SENSITIVE MEDICAL VIDEO STREAMING SYSTEM

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Abstract

The project deals with the distribution of sensitive videomaterials designated for specific group of users – mainly the educational videomaterials for medical students. All videos uploaded to the system are automatically transformed into a generally supported format MPG4.

CESNET servers and broadband transmission lines are used for the protected storage and transfers. Target distribution uses Shibboleth authentication technology and is based on authorizations defined by the creator of the distributed material. Server and service MedicalMedia.eu will be introduced and demonstrated at Mefanet 2011 conference. The system is intended to be used by all interested medical schools.

Key words: medical video, streaming, Shibboleth, H.264

Introduction

Medical faculties usually own large collections of educational video materials in both analogue and digital form. The need to store and distribute those multimedia educational materials to end users occurred at 1st, 2nd and 3rd Medical Faculty as well as at Medical Faculty in Pilsen a year ago. We have been seeking a solution on how to share those videos with students while maintaining a good protection of clinical images with sensitive content. The quality and protection requirement has excluded the use of standard video-sharing applications. Therefore we have decided to develop our own videosever for distribution of free-shared and protected videos using the CESNET infrastructure.



Situation in the World

With fast moving technical development, video format has become a common part of distant medical teaching [1]. Nowadays there is a lot of video-sharing websites like YouTube available. They usually contain general and entertainment materials and some of them even some medical videos [2, 3]. Nevertheless pure medical contents are mainly provided by specialized servers [4] connected to universities across Europe and USA[5]. The H.264 format and its updates [6] is preferred for the video delivery. Encrypting is used for the stream-lined protection[7]. Still the valued protected contents are not available for public as they are to be used by the academic society of the university only. This is the reason we have come up with our own solution for protected content video-sharing.

Defined specifications

- a) Provide a stream-lined HQ videos for precisely defined circle of users
- b) Offer a user-friendly environment (administration, management and distribution of videos) for the authors
- c) Enable distribution of videos to authenticated users
- d) Protect sensitive clinical videos against unauthorized downloads
- e) Use of standard technology available in commercial and academic sphere

Solution description

Our solution lies in development and interconnection of 4 servers:

Encoder – transfers videos into suitable format (encoder.lf1.cuni.cz)

Media – Web service + Token service (medicalmedia.eu)

Shibboleth – authentication service (shibboleth.lf1.cuni.cz)

Streaming + data storage (Cesnet)

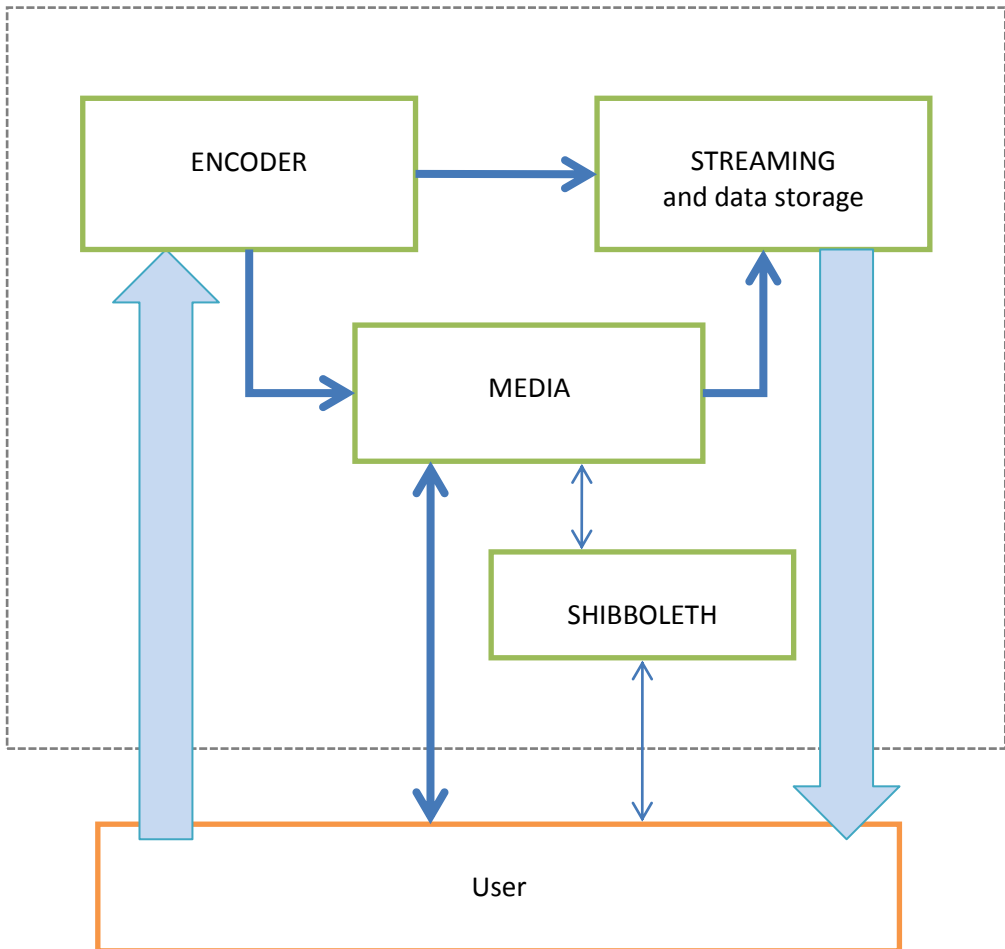


Figure 1: MedicalMedia protected video distribution system scheme

CESNET infrastructure is being used for streaming and data storage and Charles University infrastructure covers authentication using the Shibboleth technology. Technical realization of streaming is done through the Flash Media Server (FMS 3.0 Interactive).

Following roles are used for administration and sharing the data:

USER – public, student or teacher



EDITOR – person uploading the videos

ADMIN – faculty employee supporting designated group of EDITORS

SUPERADMIN – maintaining the whole system, solving problems and update requirements

MedicalMedia.eu system functions

Editor uploads a video through web interface and determines a target group of users. Encoder takes the video and transforms it from any format into H.264 (MPEG-4 AVC) format (4 different resolution quality levels).

Editor then creates metadata, including name, description, authors, category, labels and other specifications.

User is authenticated by Shibboleth and with help of metadata is able to search for relevant video. Server searches for complete as well as partial phrases, generate lists of relevant results. Those can be further filtered. Videos are played differentially, according to defined access rights, either as a free-share or be limited according users authentication.

Playlist function is available for users preferring watching more videos in a row. Separate clips are assembled into a playlist and are played as one video. Those playlists are built by Editor. Thumbnails are generated automatically.

Data-storage contains mainly video images from surgeries, examination procedures, presentations, etc. The layout of the web interface is minimalistic and aimed for simple and intuitive use.

Protection of the video materials

Based on rules defined in administration the video may be played according to access limitation of the logged user, logged user from a different faculty or IP address. Protected videos are secured by „Tokens“ bound for users authentication in Shibboleth system. Only if the user is logged in, the server designates a Token for him to enable him to play the videos. And the same applies for video downloads. No videos can be shown without a Token. No Token is issued unless the user is logged in.



Conclusion

Server MedicalMedia.eu is a complex system for management, storage and targeted distribution of controlled sensitive multimedia educational materials. It is connected with Mefanet portal where the videos can be watched directly. The protection on MedicalMedia.eu is ensured by the Tokens, by authentication of users and in the future also by watermark (a special mark placed in the image information of the video, the mark can help to identify the user of the played video). We are also planning a further development of the server: strengthening of the encoding process, adding applications such as downloading, subtitles, more extensive filters, posts sorting and personal settings.

This project is available on <http://www.MedicalMedia.eu>

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