

A Cloud-based and Social Authoring Tool for Video

Naimdjon Takhirov
Norwegian University of Science and Technology
NO-7491 Trondheim, Norway
takhirov@idi.ntnu.no

Fabien Duchateau*
Norwegian University of Science and Technology
NO-7491 Trondheim, Norway
fabierend@idi.ntnu.no

ABSTRACT

In this paper, we present a cloud-based collaborative authoring tool called Creaza VideoCloud. This authoring tool offers an extensive set of features for document-based video authoring in the cloud.

Categories and Subject Descriptors

I.7.2 [Document and Text Processing]: Document PreparationHypertext/hypermedia; H.5.1 [Information Interfaces and Presentations]: Multimedia Information SystemsVideo

General Terms

Standardization, Documentation, Design, Human Factors.

Keywords

Authoring Tool, Cloud Computing, Collaborative work, Social Video, SMIL

1. INTRODUCTION

Cloud-based services are a relatively recent trend in cloud computing that have attracted a lot of interest lately [4, 2]. The main idea behind cloud computing is that on one hand, virtualized computing resources are used on-demand and on the other hand, user's computer mainly serves as display for processes being executed on the cloud. It implies a greater flexibility, a service-oriented architecture, reduced information technology overhead for the end-user, reduced total cost of ownership, and on demand services [9]. Parallel to cloud computing, various cloud-based services have appeared [6]. A few examples of this kind of services are Dropbox¹, which serves as backup and storage of files backend on the cloud,

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¹<http://www.dropbox.com>

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or Amazon's Elastic Compute Cloud (EC2)², which provides computing power in the form of virtual machines.

The Web is a common environment where social dissemination of information is easier achieved by current innovations [3]. The growth in multimedia documents such as collections of photos, music and videos has been remarkable along with social websites such as Flickr, del.icio.us and Youtube [1]. This rapid development promoted the widespread usage of multimedia systems, i.e., images, sound and animation and these systems can be used in combination with texts and time-based annotations in a variety of settings, providing a platform for a range of story formats combining literary and video elements [5].

Thus, the Web has become a major point of sharing multimedia content including video. More and more devices are increasingly equipped with the HD-quality capability and this results in a significantly increased size of the final content. This increase does not facilitate collaborative video production, which also requires a shared location to version control files and manual change propagation. Additionally, there is a need to publish specific versions for each type of device, i.e. PC, handheld devices, tablet, etc. These limitations make the process of authoring a creative video unnecessarily challenging. We present the system called *Creaza VideoCloud*³ that addresses all of these issues. Creaza VideoCloud includes a set of tools to help users create, edit, reuse and share their productions. The collection of resources that can be used to author videos includes professional and user-generated content. All tools only require a flash plugin installed on the browser and an Internet connection. The content is stored on the cloud and it can be accessed and shared on the Web any time. One of the important features supported by Creaza VideoCloud is social collaboration, which enables members of a project to interact with each other and share their multimedia files.

2. CREAZA VIDEOCLOUD

Creaza VideoCloud is a cloud-based online video service designed to enable users to collaboratively produce, stream, share and store user-generated video. By combining the power of broadcast-quality HD and the vast reach of social media, Creaza VideoCloud is at the vanguard of a rapidly emerging market in which millions of users in thousands of communities are beginning to continually interact via user-generated online video.

²<http://aws.amazon.com/ec2/>

³<http://creaza.com>

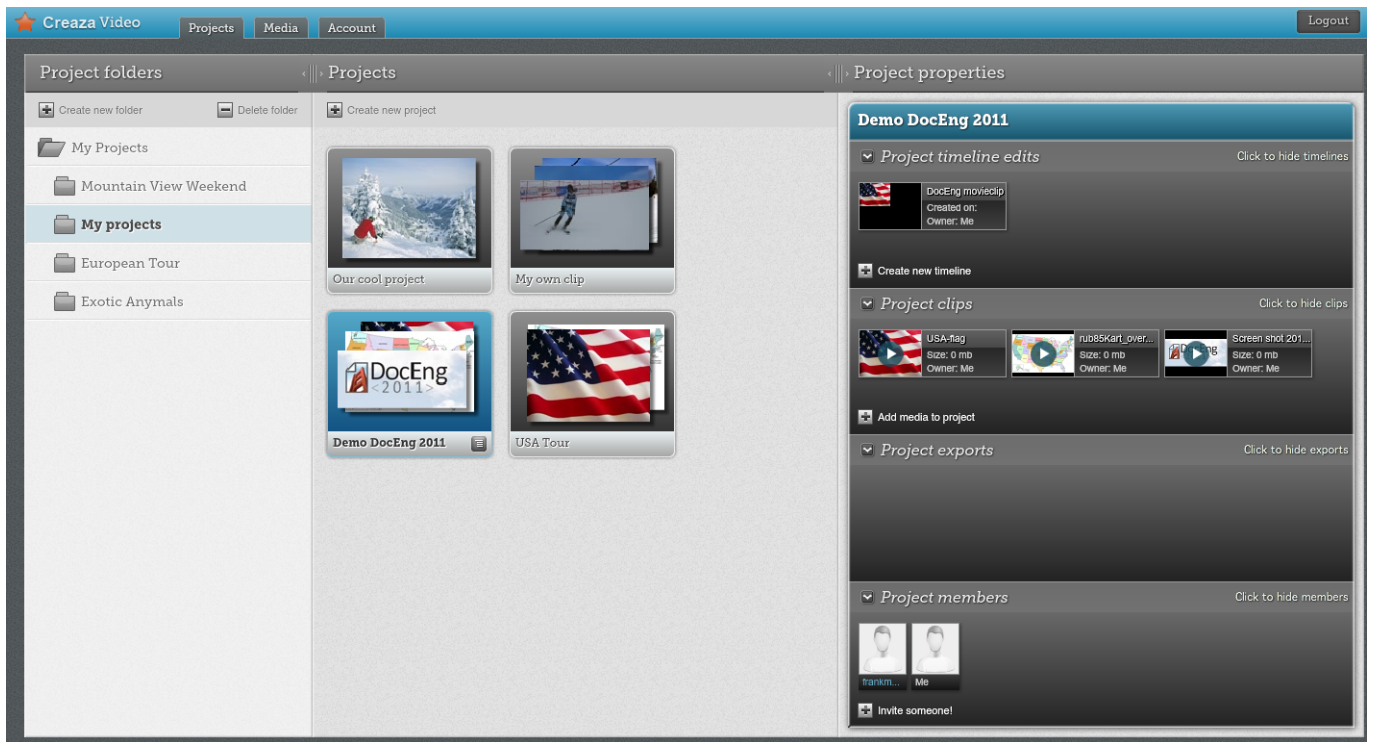


Figure 1: Creaza VideoCloud Dashboard.

The vision of Creaza VideoCloud is to become the premium cloud video service of choice. For instance, football fans want to take their self-generated video and create broadcast-quality produced pieces in HD and then share them with other fans and their social networks.

2.1 The Platform

The Creaza VideoCloud platform consists of a dashboard that includes a rich set of features. The dashboard is the main point of entry to any other functionality. Figure 1 depicts an example of dashboard page. On the top of the menu, there are three tabs, each reminding one visionary aspect of the platform:

- *Projects* tab(collaborative aspect) is a workspace where all projects and project details are accessible. In this tab, the user can create a new timeline, i.e. a set of audiovisual content as well as (still/floating) texts and effects which are put together either in a sequence or in an overlapped manner. The order decides which layer is shown on top of the other layers. A sample timeline is depicted in Figure 2 showing a production about a ski weekend. In the timeline, a user can additionally create a custom audio or video layer. The platform supports direct export of final productions to either Youtube⁴ or as locally exported MPEG-4 file.
- *Media* tab (cloud-based storage aspect) enables the management of the different content (video, images sounds and other file types). The multimedia content can be arranged in various folders for easy management.

⁴<http://youtube.com>

- *Account* tab (social aspect) is where the user can change his/her profile information as well as connect his Creaza VideoCloud account to other social networking sites. This tab includes the integration with other social networking sites such as Facebook⁵, Twitter⁶.

The dashboard is based on the latest RIA application framework, the Flex platform. These platforms use BlazeDS[8] which is the server-based Java remoting and web messaging technology that enables to easily connect to back-end distributed data and push data in real-time to the client side of the Creaza VideoCloud platform. Consequently, this results in a rich interactive feature, directly from the user's browser.

Creaza VideoCloud is powered by Inespera Platform⁷ which together with BlazeDS open source technology facilitates high performance data transfer making the platform's client side a more responsive application. The client side pushes data to the server over standard HTTP protocol, in real-time. Furthermore, the full-scale publish/subscribe messaging approach used in the platform provides a basis for a scalable infrastructure where real-time data delivery is of significant importance. The platform also supports Webdav [10] based communication but BlazeDS integration is far more efficient both in terms of transfer and latency.

No local installation of the application is necessary. The content is stored on the server side and the storage servers support double backup. This redundancy gives possibility for a safe failover and a faster disaster recovery.

⁵<http://facebook.com>

⁶<http://twitter.com>

⁷<http://inspera.com>



Figure 2: Sample Timeline Showing a Production about a Ski Weekend.

2.2 Document Representation

Creaza VideoCloud features multi-layer tracks for audio content as well as graphics, effects (e.g. transitions, watermark) and videos. An interesting issue addressed by the platform is that it enables multiple videos to be played in different parts of the screen, all at the same time. Furthermore, the texts appearing in the productions such as watermark, greeting texts or any other type of informative text are rendered on-the-fly and across the layers. The same applies to the audiovisual content. A *production* is the outcome of a set of audiovisual content along with effects represented in the timeline. The document representing productions is transferred to the cloud-based storage facility as a *SMIL* file. Synchronized Multimedia Integration Language (SMIL) [7] is an XML-based markup language endorsed by World Wide Web Consortium⁸. SMIL facilitates simpler authoring of interactive audiovisual documents. The W3C recommendation specifies the definition of timing markup, animation and layout, visual transition, embedding, etc. Creaza VideoCloud platform makes an extensive use of the latest version of SMIL (v3.0) for documents representing audiovisual content, i.e., the creative content collaboratively authored by users. Figure 3 depicts an example of how these documents are represented as SMIL. An important aspect to mention is that since the actual multimedia content may be stored anywhere in the cloud, there is no fixed absolute reference to the media. For instance, our example has an audio object with reference “A0690016-D12F-3BA3-6E26-5DC9DCDA444F”. The actual address of this object is resolved at runtime as requested. The different *GraphPoints* are objects that appear in the timeline

with the specified start and stop positions. In the above example, audio object with identifier “A0690016-D12F-3BA3-6E26-5DC9DCDA444F” has a position from 1 to 12600 milliseconds in the timeline.

3. DEMONSTRATIONS

In this section, we describe two simple applications of Creaza VideoCloud. Currently, Creaza VideoCloud is in closed beta and only invited users can use the service and provide feedback. An account has been created for demonstration purpose at the following url: <http://www.creaza.com/doceng2011.jsp>. This account will remain active until the Creaza VideoCloud is finally launched, late summer 2011.

3.1 Use Case 1: DocEng’2011 Experience

During a conference, many participants take pictures and record movies of the presentations and conference dinner. As conferences aim at exchanging ideas and promoting collaboration, the participants are interested in sharing their videos and photos with others, listening to presentations that they might have missed or using one or more media during their own teaching courses. A social platform is therefore helpful to fulfill these goals. Let us imagine what could happen at DocEng’2011 using the free Creaza VideoCloud platform for sharing videos. The organizers can propose to participants to upload their media related to the conference in a Creaza VideoCloud project that they have created. A participant needs to login either by creating a Creaza VideoCloud account or by using an existing authentication service (Google, Facebook, Yahoo and Twitter are currently supported). Once logged in, the participant is invited or added as project member and she has access to the shared media

⁸<http://www.w3.org/AudioVideo/>

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<smil ...>
  <head>...</head>
  <body>
    <par>
      <par ins:layerLock="false" ins:layerColor="10581326"
        ins:layerTitle="Effekte" ins:layerType="SVG_LAYER"/>
      <par ins:layerLock="false" ins:layerColor="5953842" ins:layerTitle="Grafik"
        ins:layerType="SVG_LAYER"/>
      <seq ins:layerVolume="100" ins:layerMute="false" ins:layerSolo="false"
        ins:layerLock="false" ins:layerColor="3776464" ins:layerTitle="Musik"
        ins:layerType="AUDIO_LAYER">
        <audio ins:objectType="content_sound" ins:logicalName="fused"
          ins:uid="A0690016-D12F-3BA3-6E26-5DC9DCDA444F"
          ins:volume="1.00"
            ins:mute="false" dur="00:07.640">
              <ins:GraphPoints>
                <ins:GraphPoint ins:time="0" ins:value="1"/>
                <ins:GraphPoint ins:time="7640" ins:value="1"/>
              </ins:GraphPoints>
            </audio>
        <audio ins:objectType="content_sound" ins:logicalName="cool_kille_loop"
          ins:uid="317B6B18-FFDE-96FA-E298-5DCA143605A5"
          ins:volume="1.00"
            ins:mute="false" dur="00:12.600">
              <ins:GraphPoints>
                <ins:GraphPoint ins:time="0" ins:value="1"/>
                <ins:GraphPoint ins:time="12600" ins:value="1"/>
              </ins:GraphPoints>
            </audio>
        </seq>
      ...
    </par>
  </body>
  <markers/>
</smil>

```

Figure 3: Sample SMIL File.

files. When uploading a new content in this shared project, all multimedia metadata (e.g., number of frames, duration) are automatically filled in and the participant should only provide descriptive metadata (e.g., tags, annotation). Anyone can then download, annotate or edit these media. Similarly to other social websites, Creaza VideoCloud enables discussions about a project or media. Furthermore, a video can be directly uploaded to YouTube for easy sharing with people that do not have access to the project. This feature is especially meaningful to release a collaborative work, as described in the next demonstration.

3.2 Use Case 2: Ski Weekend

We now illustrate the cloud-based video authoring features of Creaza. After the DocEng'2011 conference, some participants decide to spend a week-end at the *Bear Mountain Resort* close to San Bernardino CA, for discussing future collaboration and enjoying skiing. These inspiring, fruitful days are generally productive in terms of creating videos. When the participants are back home, they create a new project in Creaza VideoCloud platform to share creatively document and enjoy virtually once again their experience in an easy way. In addition, they want to produce a summary of this week-end to show to their absent friends and colleagues the fun moments they have missed. Creaza VideoCloud is clearly dedicated to this task since it enables a collaborative authoring. The participants choose to produce a new video which contains the most interesting slices of the videos that they have recorded. Because of the use of multiple (overlapping) layers, this task can be divided as follows: one participant is in charge of mixing the video slices, another one selects the various background musics while a last

one could add some texts to describe the scenes. Once all participants have agreed on the editing, the resulting video is finally either exported to YouTube or as a local standalone production file.

4. CONCLUDING REMARKS

In this paper, we presented a cloud-based collaborative authoring tool, Creaza VideoCloud. This tool offers an extensive set of features for document-based social video authoring in the cloud. The combination of cloud technology and video authoring simplifies the collaborative work and provides a seamless range of services for the heavy process of video production. Thus, the Creaza VideoCloud platform is a realization of a “making video social” vision and a demonstration of the fact that video authoring can be made smooth, simple and collaborative.

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