

## **Introducing a Design of a Product Creation System for IPTV Systems**

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### **Abstract**

It is well known that the content management system (CMS) and the broadcast management system (BMS) are the most essential components of an IPTV system. An IPTV system retrieves container files from the CMS and delivers them to the end users through the BMS. Therefore, most of research works about IPTV systems handle container files. However, a container is a mix of video, audio, computer graphic, text and metadata. A container that is created for sale is a product. In this paper, we design and implement a product creation component for IPTV systems.

**Keywords:** IPTV, video, audio, container, content management system

### **1 Introduction**

Content is information and experiences that provides value for an end-user in specific contexts [13]. Video, audio, movies, TV shows, documentaries are typical

examples of content. Video is an electronic medium for the recording, copying and broadcasting of moving images. Audio is an electrical or other representation of sound. In the field of broadcasting, an essence is defined to be an original video, audio, or picture file. An essence is associated with metadata usually written in MPEG-7 or TV-Anytime. A wrapper, or a container, is a MXF, MOV, or AVI file in which many essences and metadata are stored. In this paper, a wrapper that is created for sale is sometimes called a product.

Therefore, IPTV systems should handle essence files. However, most of IPTV related research works handle containers but not essences. This paper describes our design and implementation of product creation system.

## **2 Related works [3]**

Many conventional approaches of IPTV CMS are provider-oriented. The system converts content based on pre-defined device/screen profiles, before publishing [4]. The authors of [4] introduced user centric CMS for open IPTV. The system involves Web TV enablers, a content mediator, a media server, an IPTV profile server as well as an open IPTV platform. Augmented reality is a multidisciplinary technology of computer science which enhances the user's experience with additional computer-generated information superimposed on the real world. The authors of [6] proposed a system framework for augmented broadcasting service.

The authors of [9] proposed a user-participated interactive IPTV service called SayUTV, where the users can participate in broadcasting program by mixing their video and audio sources into provider's content. There are many commercial tools for building up e-commerce websites. However, they are lack of real-time communication feature. The authors of [5] proposed a content management system for e-commerce that allows sending instant messages and short messages. The authors of [8] introduced a prototype IPTV system that recognizes many faces and makes recommendation to a group of users. The authors of [1] introduced an integrated monitoring system for IPTV platform.

The authors of [11] introduced a VOD database system for IPTV systems. The authors of [12] introduced a fast algorithm for IPTV system response time analysis. The authors of [2] proposed a protocol for secure mobile IPTV service delegation to support service level agreements. The authors of [10] proposed channel domain system that logically extends channel allocation capability over limited channel resources. The authors of [7] proposed a handover scheme over standard Mobile IPv6 that provide good quality of service.

## **3 Design of a Product Creation System**

A product creation system receives a specification for a product and create content that meets the specification. Therefore, this system should allow users to register, retrieve, modify and delete specifications. An example user interface for these facilities is shown in Figure 1. We can specify search key words in the 'Key

word' textbox. The element essences of the product - audio, video, text, caption - are listed in the elements field.
































register		modify		delete		Spec. name	Key word	search
<input type="checkbox"/>	Spec. name	description	elements	Mod. date	Reg. date			
<input checked="" type="checkbox"/>	HD Video	Specification for high quality HD ...	   	12012-12-30	12012-12-30			
<input type="checkbox"/>	Audio High Quality	High quality audio ....	  	12012-12-30	12012-12-30			
<input type="checkbox"/>	Audio - High quality	High quality audio ....	  	12012-12-30	12012-12-30			
<input type="checkbox"/>			  	12012-12-30	12012-12-30			
<input type="checkbox"/>			  	12012-12-30	12012-12-30			
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<input type="checkbox"/>			  	12012-12-30	12012-12-30			

Figure 1. An example user interface for specification management

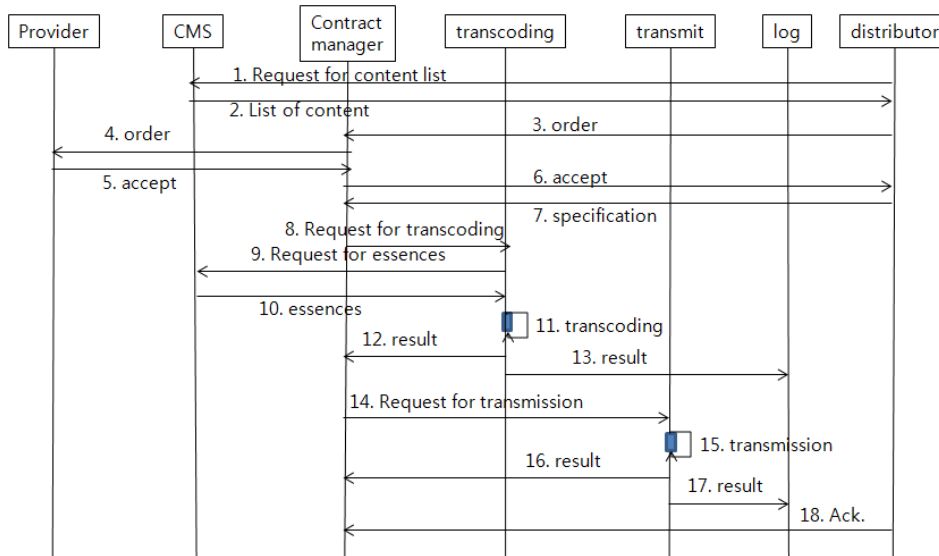


Figure 2. A sequence diagram for the product creation system

During the specification registration, we can specify the directions to create a product. Container format, codec, encoding mode, bit rate, quality, frame rate, transcoding type, and size should be specified for video. A container can be MP4, AVI, or MXF. After registering a specification, we have to send the specification file to the transcoding system. If a distributor places an order of purchase and the content provider accepts the order, then we have to deploy the product to the dis-

tributor.

The sequence diagram in Figure 2 shows the process of our product creation system. Our system interacts with the content management system (CMS), the contract manager, and the log system of the IPTV system. Our user interface for distributors displays a list of content available for circulation. Distributors can place an order by selecting content titles listed on the user interface. If the provider of the content accepts the order, then the distributor issues a specification that describes the product he/she desires. The contract management system of the IPTV system takes the specification and passes it to our transcoding system. Our transcoding system retrieves the required essence files from the CMS and creates a product that meets the specification. After creation, the transcoding system sends out a message representing the result status to the contract manager and the log system of the IPTV system. The contract management system asks our transmitting system to send out the product to the distributor when it receives a 'success' message from the transcoding system. When our transmission system receives a request for transmission, it delivers the product to the distributor.

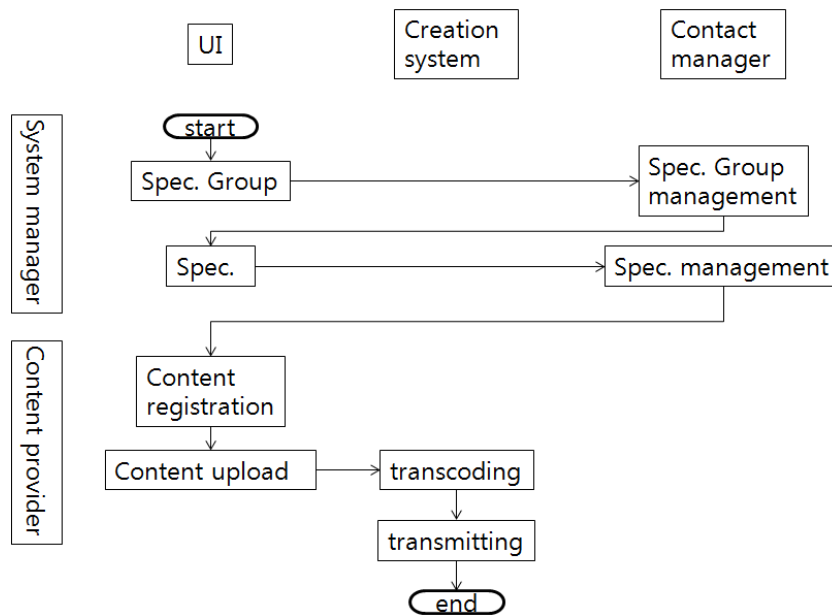


Figure 3. A description of the process of deploying content

There are many types of users. A system manager can retrieve and modify specifications. Since we classify specifications into groups, we have to select specification group before select a specification. Once a specification is determined, the essence files designated by the specification should be uploaded. Our product creation system transcodes the essence files and transmits the produced files to the distributor. This process of deploying a product is described in Figure 3.

In the database of our system, we have many tables: essence, essenceManagement, essenceDetail, deploy, deployItem, deployJob, transSpecifi-

cation, transSpecificationGroup, userProfile, userProfileGroup, and ftpProfile. The attributes of the table 'essence' include essenceSeq, essenceID, contentID, type, fileURI, originalFileName, fileSize, container, videoRatio, width, height, videoFrameRate, videoBitRate, videoCodec, videoPixelFormat, audioCodec, audioSampleRate, audioChannel, audioBitRate, durationTime, imageType, imageFormat, imageColorDepth, imageOrientation, characterSet, captionType, textType, registrationDate, registrationID, modificationDate, modifierID, removedTF, language and detailType.

## 4 Implementation

Our product creation system consists of five modules: deploy, transcode, transmit, video authoring tool, and user interface. We implement these systems in three layers, business layer, data access layer and data layer. In the business layer and the data access layer, essence class, deploy class, deployTransaction class, transcoding class, transmit class, userProfileGroup class, userProfile class, FTPprofile class, and so on are defined.

For the implementation of the database system, an example query sentence for inserting a video essence is as follows (Sentences for inserting an audio, image, screenshot, thumbnail, SMI caption, SRT caption, text are all similar to this example):

```
INSERT INTO essence (essenceID, contentID, essenceState, tyoe, fileURI, originalFileName, fileSize, ... removedTF) VALUES ...)
```

## 5 Conclusions

This paper proposed a product creation system for IPTV systems. A product is a container of videos, audios, texts, captions and metadata and is ready to be broadcasted by a distributor. A product can be played on a TV set, a desktop computer, a smartphone, or a tablet PC. Our product creation system provides convenient environment to an IPTV system operators. Using our system, they can easily select essence files, create products and send products to distributors.

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