The Design of a Web Portal for IPTV System

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Abstract. One of the most successful convergences of telecommunications, information technology and broadcasting is IPTV and IPTV market is rapidly growing. A web portal allows the user to navigate within the different IPTV services, such as the VOD catalog. We introduce 'Open IPTV System' that allows subscribers to easily upload their own contents and open their own IPTV broadcasting station. Then we design and implement a web portal for 'Open IPTV System'.

Keywords: IPTV, Web Portal, VOD

1 Introduction

IPTV (Internet Protocol Television) is a convergence of telecommunications, information technology and broadcasting. Using IPTV, we can send a message out while watching TV program, enjoy internet chatting to discuss their strategies while watching world cup football games, and visit e-commerce markets and purchase the clothes the actors are wearing while watching a video.

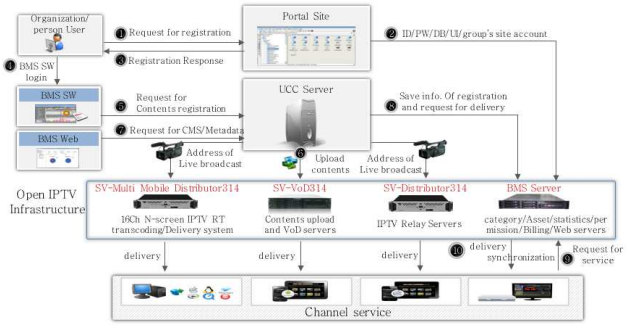

Figure 1. Typical service scenarios of the 'Open IPTV'

An IPTV system is usually composed of real-time encoders, editors, content upload and VOD (Video on Demand) servers, IPTV relay servers, VOD relay servers, and

web servers. An example IPTV service scenario is shown in Fig. 1. ① represents that a subscriber can be an individual person or an organization. A user accesses an IPTV system through the web portal of the system and gets subscribed in the system. ② represents that the user's ID, password, database, and user interface are created in the database system. ③ represents that the IPTV system sends a notice that the user is successfully registered. ④ represents that a user accesses broadcast management system in order to register contents or metadata. These requests delivered to the UCC servers (⑤). The UCC server uploads contents to the content upload server (⑥) and sends information of registration and request for delivery to the broadcast management server. ⑨ represents that an end user of this system can request for a service via a mobile device, a computer, a TV (through a set top box), or a digital information display (through a set top box). ⑩ represents that live TV, time-shifted TV, and VOD can be serviced by the IPTV system. This paper designs and implements the portal site shown in Fig. 1.

2 Related Works

This paper develops a web portal for 'Open IPTV System'. While existing IPTV systems produce contents for themselves or purchase content rights, 'Open IPTV system' allows subscribers (a person or an organization) to upload their contents and open their own IPTV stations (called 'branch IPTVs' from now on). In these sorts of open systems, management of content, repurposing content based on consumer and device capabilities, protection of rights, protection from unauthorized access/modification, and protection of privacy of providers and consumers are important issues as they are discussed in [1].

The web portal that this paper develops supports subscribers to open their own IPTV stations. This implies that the web portal helps subscribers to build up their own homepages. As RIA (Rich Internet Application) is becoming main technology of the user interface [2], our system allows users homepage RIA-based.

The authors of [3] identify that uploading high definition video content, categorization, distribution, play and assign to playlist of scheduled broadcast are the essential functions that educational IPTVs should provide. Then, they design and implement an IPTV system by combining components that provide the essential functions. The web portal we are implementing also provides all the above listed essential functions.

A Service Delivery Platform (SDP) is a platform that provides interfaces that enable third-party application developers to easily create applications. An SDP should consist of a web adapter, a broadcast adapter and a communication adapter. The authors of [4] analyze the functional requirements of a web adapter and propose a design idea of a web adapter. We use Really Simple Syndication (RSS), REST (Representational State Transfer), web services in our implementation as they suggest.

The major features of web 2.0 include supporting interactive capabilities. The authors of [5] argue that IPTV services should use web 2.0 techniques such as syndication, content tagging, user generated contents, AJAX, and mash-up. In our implementation, we use those web 2.0 techniques.

In the current 'One Source Multi Use' IPTV content market situation, content is king. In order to address this problem the authors of [6] propose a web content syndication platform. The platform consists of a content collector, a media mediator (converts and stores collected contents), and a syndication portal (interface to providers). Our portal allows user upload their contents and transcodes uploaded contents into IPTV format.

	Function	Description
General Users	Subscription	Citizens/Foreigners: Authentication with name/e-mail address
	Find ID/PSWD	Using ID or e-mail address. Send out a temporary password
	Service guide	For general users and branch users
	Useful info	Copyright Acts, Broadcast Acts
	Main page	Consists of categories
	BMS admin	Administration for service providers
	Culture, tourism	VOD service
	Korea TVs	Live TVs, Radios, VOD
	K-Stars	K-Stars' information and contents
	Clip DB	Clip contents
	Education	Educational contents from subscribed elementary and high schools
	Open IPTV	Branch IPTVs opened by subscribers (person or organization)
	Community	Bulletin, FAQ, 1:1 Question, References,
Admin	Manage illegal contents	Detects illegal contents upload and notifies through SMS
	Manage subscribers	Search, registration, update, delete subscribers (person, organization)
	Manage contents	Broadcast/Contents management
	Manage bulletin	Manage posted items
	Statistics	Number of content items, subscribers

Figure 2. Functional user requirements of the 'Open IPTV'

3 Functional User Requirements for the Portal

The required functions of the portal are enumerated in Fig. 2 and are categorized into two groups: 'General Users' and 'Administration'. General users require 13 functions

listed in the figure. The first four functions are clearly explained in the figure. The fifth one is Main page. The main page should display images representing categories (culture and tourism, Koreans TVs, K-Stars, …) of all services provided by the IPTV.

BMS (Broadcast Management System) Admin provides useful functions to the administrators of the branch IPTVs where a branch IPTV is an IPTV opened by a subscriber (a person or an organization) and running in the 'Open IPTV System'.

4 Design

Our portal system has to frequently handle a lot of user and content information. We design our database system as shown in Fig. 3. The DB system consists of K-star DB, Contents DB, Subscriber DB, Bulletin DB, subscribed organization DB, and forbidden words (swear) DB.

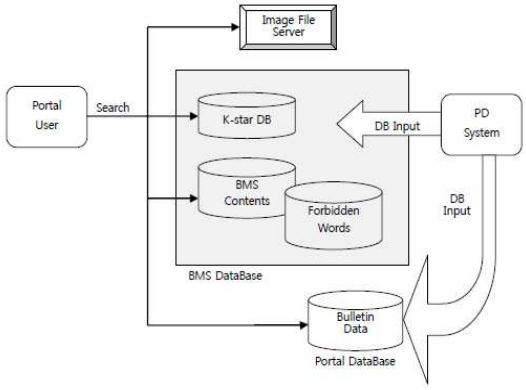

Figure 3. A schematic diagram of our database system

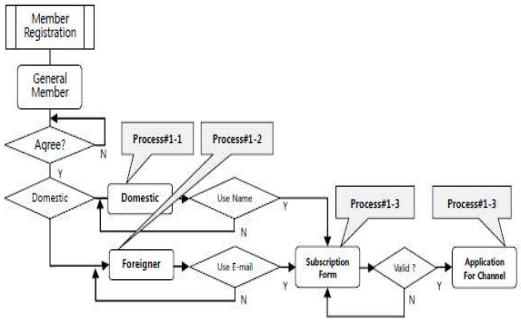

Figure 4. The process of our subscription module

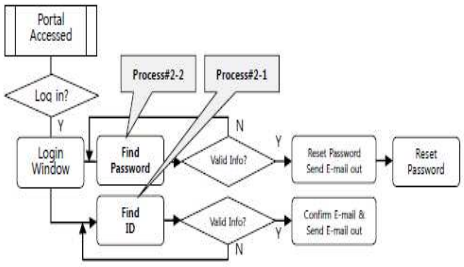

Figure 5. The process of 'Find ID/PSWD

Our subscription module handles both domestic and foreign users as shown in Fig.4. When a domestic user/foreigner wants to subscribe to the 'Open IPTV', the procedure authenticates the user with the user's name/e-mail address. After subscription, a user can ask for a branch IPTV.

'Find ID/PSWD' module returns ID after asking a question if a user clicks 'Find ID' button or returns a temporary password after asking a question when a user clicks 'Find PSWD' button as shown in Fig. 5.

'Service Guide' module checks the user's information such as the user's mother tongue and opens the 'service guide' page written in the user's mother tongue. From the page, a user can open subscription, mypage, or open TV page as shown in Fig. 6.

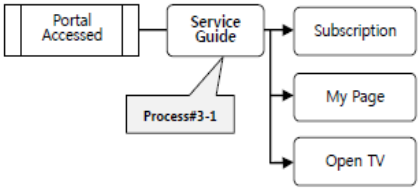

Figure 6. The process of 'Service Guide'

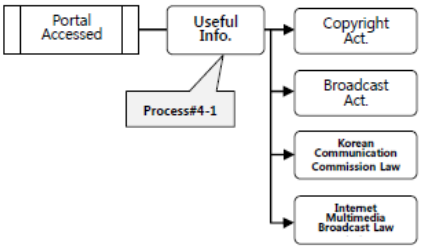

Figure 7. The process of 'Useful Info' module

'Useful Info' checks the user's mother tongue and opens the 'Useful Info' page from which the user can open 'Copyright Act', 'Broadcast Act', 'Korea Communications Commission Law' or 'Internet Multimedia Broadcast Act' as shown in Fig. 7.

'Main Page' displays images representing categories (culture and tourism, Koreans TVs, K-Stars, …).

As is shown in Fig. 1, a broadcast management system (BMS) is installed in the 'Open IPTV'. 'BMS Admin' opens the BMS web page. Similarly, 'Culture and tourism', 'Korea TVs', 'K-Stars', 'Clip DB' and 'Education' modules just open another designated page.

5 Conclusion

This paper introduced a web portal system for the 'Open IPTV System'. We analyzed user requirements of the system and designed the system that meets the requirements. Therefore, our system provides comprehensive set of functions.

One of the most distinguished features of the portal is enabling subscribers open their own branch IPTV station. That is, this system provides a template homepage for a branch IPTV. A subscriber can easily create a homepage by filling up the items in the template.

Another one of the distinguished features is that the hyperlinked page can be dynamically determined during the runtime depending on the parameter values. Language, step, mode, main, and sub are examples of such parameters used in our system.

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