# A Web-Based Platform for Creation of IPTV Contents

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**Abstract:** With the introduction of Interactive Television (iTV), many digital services have converged to this communication form. In particular, the use of Web based technology as a platform for content creation of iTV transmissions. This paper describes a platform proposal for creation of interactive content for iTV trough the Web.

**Keywords:** iTV, IPTV, MHP, Web.

## 1 Introduction

Nowadays our televisions have become an important part of our lives; through television (TV) many people know what is happening in the world and provides them fun and entertainment.

The TV is a common device with a high household penetration, and has a huge impact on virtually all areas, from information to entertainment and education. Therefore, we could argue that TV plays a major role in our society.

However, every day are emerging new forms of digital entertainment, these digital contents are using the Web as delivery platform. Blogs, video blogs, photo blogs, games, chats, news, online journals and instant messaging are some examples of Web applications that provide online content for entertainment and information [1]. With these new tools, users (especially the younger ones) seek challenges (as in games) and participation, therefore, a passive medium as the traditional TV cannot achieve it.

With the advent of the interactive television (iTV), viewers become from being passive players to take a more active role. The iTV term refers to the TV with interactive content and digital enhancements.

iTV combines traditional TV with interactive digital applications that are developed for use in a television set [2].

## 2 Interactive television in Mexico

The current state of Mexico with respect to the analog-digital transition, is a plan to have the analog switch for 2021 (currently the Mexican president tries to move the date to 2015). Therefore bring the iTV service via digital terrestrial television (DTT) is no viable in the country, that is why this work propose the use of IP Television

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(IPTV), because the transmission is held by IP networks and this kind of networks are already operating on Mexico, particularly those provided by cable providers that offer the service called triple-play (view Fig. 1).

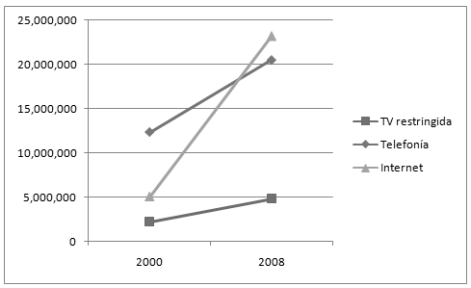


**Fig. 1.** Percentage growth of triple play users in Mexico.

This paper presents a research in progress which aims to provide a technological solution that allows using the Web as a platform for creation of interactive television's programming, particularly for IPTV.

## 3 IPTV

Among the different ways to bring interactive content to users via the TV we have the IPTV.

IPTV is digital TV distributed over an IP network instead of a traditional cable network. IPTV is not watch videos on websites, but refers to the way in which information is sent.

The video is sent as IP packets to reach the users [3], [4]. That is, the TV programming is encoded and converted to IP packets. Then, IP packets are distributed through the network to the end user, which with a decoder (set-top box) converts the digital data into analog television signals [3], [5].

The IPTV architecture (see Fig. 2) consists of the following functional components [6]:

1. **Content Source:** A device that receives, encodes and stores (in a database) video content or other sources.
2. **IPTV service node:** A device that receives the video stream and encapsulates it for properly transmission. These nodes enable the delivery of video to the clients.
3. **IPTV client:** It is a set-top box located in the client, which allows the processing functionality.

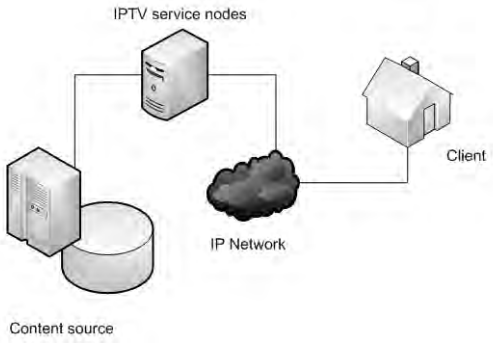


**Fig. 2.** Generic architecture of an IPTV system

## 4 The Web as a platform

Although the current set-top boxes provide Web browsers, most of them do not allow users to navigate freely on the web, some of them can only do it in a predefined list of sites that were previously tested for its use in an IPTV environment and those who allow it, may provide a poor user experience due to technical reasons (e.g. resolution of the screen) and lack of capabilities on the Web browsers.

The purpose of this work in progress is to design and develop a Web-based platform that will provide the tools for creating content, as well as a tool to automatically convert our web content to a subset of the XHTML language.

For content creation we propose to develop a multimedia content management system, which should be supported by a multimedia server (MMS) to perform the automatic indexing of the digital files required for the transmissions.

Once the contents have been created and are ready to be transmitted, we propose the use of a tool that is responsible for automatically convert our HTML content to a subset of the XHTML language, which will allow the proper display on a TV set, this tool will serve as a gateway between our CMS and a set-top box. A set-top box is a device that enables a TV set to become a user interface to the Internet and TV. It is the gateway to provide digital information to the home. Its primary function is to decode broadcasted video stream and transmits it to the television set. It also manages interactive applications placed in the video stream beside audio and video signals. The set-top box controls the interaction between the end user and the outside world. It handles user's requests and communicates with content provider through the return channel. In the set-top boxes we can find a technology called Multimedia Home Platform (MHP). The main objective of this technology is to provide interactivity with the transmitted audio/video. This means, MHP is a generic interface between interactive digital applications (those received from the XHTML conversion) and the set-top boxes in which these applications run.

## 5 Extended architecture

In order to achieve the system functionalities described above, we are proposing the following architecture as it is described in figure 3, the extended architecture includes the XHTML conversion process in order to display correctly the content on a TV set and the content is being transported through the MHP standard, which also serves to provide a return channel for the interactive applications running on the set-top box at the client location.

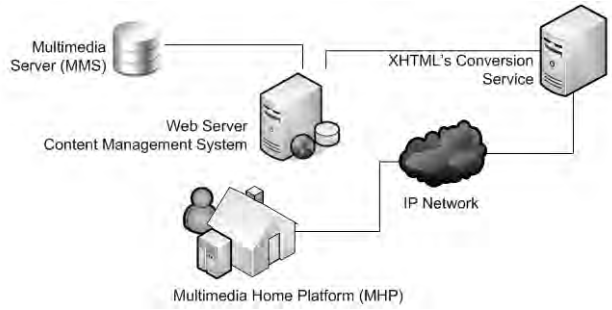


**Fig. 3.** Proposed extended architecture of an IPTV system.

The extended IPTV architecture (see Fig. 2) consists of the following functional components:

1. **Multimedia Server (MMS):** We will need a strategy in order to manage different multimedia documents (video and audio). Thus, we require a multimedia server component (MMS) to manage the documents used by transmissions. When the CMS requires retrieving a document, it will send the request to the MMS that will act as a gateway to the actual repository that maintain the files.
2. **Web Content Management System (CMS):** The trend of using Content Management Systems (CMS) to manage web content is gaining momentum with the introduction of automated publishing tools that facilitate the publishing process and improve the user experience and usability [7]. We will build our CMS on AJAX and PHP technologies. The Ajax engine, will allow the user to interact with the CMS synchronously by using a web based interface. We also need to implement and API (Application Programming Interface), this API will be using the Service-Oriented Computing (SOC) paradigm [8]; thus, we will use services as the fundamental elements for developing applications. This responds to the need of providing a uniform and ubiquitous information distributor for a wide range of computing devices (such a Tablet PCs, PDAs, mobile telephones, or appliances) and software platforms (e.g., LINUX or Windows).
3. **XHTML's Conversion Service:** The HTML's content generated by the CMS will be transformed into standard XHTML data; since well-formed XHTML documents can be easily managed by low end set-top boxes. Then, media objects, such audio

and video will be transformed in order to be made it MHP compliant before delivering the content to the client.

4. **IPTV client:** It is a set-top box located in the client, which allows the processing functionality of the interactive applications.

# 6 METODOLOGY

In order to provide adequate support for this platform proposal, we have to understand, from the perspective of those using TV and the Web. Consequently, for the design of our solution we propose to adopt an empirical approach and based it on a combination of interviews and in situ evaluations. The experience designing this system will give us not just a set of well-grounded requirements but, more important, a good understanding of the phenomenon experienced by those TV and Web consumers.

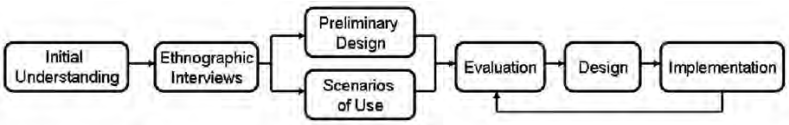


**Fig. 4.** Research methodology

Therefore, to achieve the research objectives we have selected a methodology based on the user-centered design (see Fig. 4).

## 6.1 Initial context (understanding, interviews and scenarios of use)

The inquiry to derive the design of the system must be oriented towards understanding the needs of the TV and Web users. We wish to gain knowledge about their experiences in regards to the following main aspects: internet use, TV use and digital content consumption.

We plan to elaborate several scenarios of use to illustrate the systems functionality and conduct interviews to inform the scenarios and to envision a preliminary design of the system.

## 6.2 Preliminary design

Using the literature review and the scenarios of use, we need to design a software architecture for the development of the system.

## 6.3 Prototype

In order to evaluate the design, we will build a prototype of the solution that would be evaluated by potential users.

Results of the prototype evaluation will enable us to improve the design and consolidate a final and more complete solution.

### 6.4 Evaluation

We propose to evaluate a functional prototype by potential users to gain feedback from all perspectives. The goal of the evaluation would be to explore the feasibility of the solution as well as its appropriateness. We will expect that participants, while evaluating the prototype, will raise more specific issues that would serve to refine the solution and, in general, the understanding of the challenges they face in their day by day.

### 6.5 Design and implementation

Based on an analysis of the data collected during the evaluation we will identify results both with respect to the system and with respect to potential users. Finally, we plan to redesign and develop the final system using the data collected on the evaluation.

## 7 Conclusions

This work in progress is proposing the design and development of a Web platform that facilitates the creation of interactive content for iTV transmissions, this contents will be distributed towards the Multimedia Home Platform standard in order to achieve interactivity in addition to facilitate the use of the return channel.

## 8 References

1. A. Gil, J. Paz, C. Lopez, J. Lopez, R. Rubio, M. Ramos, R. Diaz, “Surfing the WEN on TV: the MHP approach”, in Proc. of the International Conference on Multimedia and Expo, Lausanne, Switzerland, 2002.
2. C. Herrero, P. Cesar, P. Vourimaa, “Delivering MHP Applications into a Real DVB-T Network, OtaDigi”, in Proc, of Telecommunications in Satellite, Cable and Broadcast Service (TELSIKS 2003), Serbia – Montenegro, 2003, 231-234.
3. J. CORREA. UNE-EPM, “con TV por Internet desde marzo”. Portafolio. El Tiempo. Bogotá, 21, febrero, 2007.
4. J. WALKO. “I love my IPTV”. IEEE Communications Engineer. Vol.3, Nº 6. dic. 2005; p.16-19.
5. R. WARD. Internet Protocol Televisión. New Tech Briefs, dic. 2004.
6. JL Mauri, MG Pineda, FB Seguí, “IPTV: la televisión por internet”, Editorial Vertice. ISBN: 8492647221
7. Pedro C. Santana, Victor M. Gonzalez, Marcela D. Rodríguez. “Codice CMS: Towards a Multimedia Weblog Content Management System for Supporting Mobile Scenarios”. In the proceedings of the 4th Latin American Web Conference, Cholula, Mexico, October 2006.
8. Papazoglou, M.P. Service -Oriented Computing: Concepts, Characteristics and Directions. in Fourth International Conference on Web Information Systems Engineering. 2003: IEEE Computer Society.