# Management and publishing of digital content on the iTVP Platform*

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*Abstract* – **The iTVP platform consists of several systems supporting content providers in the management of digital repositories, content production, effective distribution and delivery, secure access and content presentation as well as digital rights management. The iTVP platform enables the deployment of new generation services based on rich media resources. The paper describes the approach to content management and publication on this platform.**

**Keywords:** Multimedia content management, Portals, content description

## I. INTRODUCTION

There are thousands of hours of audio-video content collected in national and public broadcasters archives. This content is a valuable resource which thanks to the development of digital media and networking technologies may be provided to the end-users.

However, this idea to be enforced requires a development of tools and services that will support content digitalization and production, description and searching as well as storage, provision and end-user access. For the best user experience of viewing high quality multimedia content there is also a need to provide dedicated content distribution and delivery system that will enable large scale provision of such network-demanding application. Moreover there is a need to ensure content security mechanisms that will enforce copyright holder rights preservation and control of usage in a strictly defined way.

The iTVP project focuses on providing access to live and on-demand high quality multimedia resources using IP networks covering all these mentioned areas.

In this paper we will focus on content management and publication processes that are executed during the whole lifetime of digital resources present on the iTVP platform. First we provide the general overview of the iTVP platform. Next we outline the content management issues and then focus on tools dedicated for Content provider and Access portals that will enable access to published multimedia resources. We summarize by pointing important issues covered in the paper.

## II. iTVP PLATFORM OVERVIEW

The iTVP project aims at providing a platform that will support digital content management and publishing allowing deployment of interactive TV services. The iTVP platform will consist of Content Management Tools (CMT) for Content providers, a system for content delivery (CDS) over IP networks, Access portals presenting the content to the users and offering value added educational services as well as License Management System enforcing the copyrights preservation.

The Content Management Tools will support content provider in digitalization of archives, new content creation, content description, rights management and publication processes that will allow establishment of a digital content repositories suitable for Internet delivery.

The dedicated system for high quality large scale digital content delivery, by means of caching and proxying functions, will allow us to bring content near to the end-users and will provide iTVP platform users with best possible experience in viewing multimedia streams.

The users will gain access to published resources through Access portals which will be responsible for providing catalogue and search functions. Additional services that will enable e.g. educational use of resources, communication and information services as well as

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community building and collaboration services will also be provided by Access portals.

iTVP platform will include the copyrights protection system that will enable, using Digital Rights Management technologies to control the usage of published resources.

## III. CONTENT MANAGEMENT ON iTVP PLATFORM

Let us consider that the digital content may originate from different sources available at Content provider site. It may be acquired from content provider's archives, live broadcast or a virtual studio. It may also be produced using content production tools allowing reusage of multimedia components and create new valuable content. In general we can name all of these as multimedia objects. Each of these multimedia objects has to be described with extensive set of metadata for easy search and retrieval. The MPEG-7 standard will be used for content description. The content acquired from analogue sources has to be digitized and stored in high quality eternal copy for the purpose of future transcoding to the publication format. If needed, the reconstruction process may be performed in order to achieve better content quality. All the copyright owners must be identified and legal agreements with them have to be signed, if needed. It should assure that all the license grants have been collected. Next, the content must be secured by the Licensing System. After all of these steps have been taken the content may be published on iTVP platform according to the decision of editors. They are responsible for maintaining the catalogue of multimedia resources that are published by the Content provider.

The published content may be presented to the end-users. To do that, the Access portals are used. The Access portals operators are able to view and search the Content providers' catalogues and build their own content offer for the end-users. This approach enables gathering the content from different Content providers on every Access portal, and in reverse the offer of a Content provider may be published on many portals. The appropriate mechanisms for Content providers allowing them to force removal and update the content description in Access portals have to be provided.

The Content Delivery System is also engaged in content management process. The Content providers may request the content, previously distributed in the system, to be removed or updated, which allows them to control the multimedia resources delivery process.

## IV. CONTENT PROVIDER ASSET MANAGEMENT

The Content provider will be equipped with several tools for content management and publication.

First, the content provider will use the repository management tool which will allow him to add, edit and remove rich media. This tool will provide the mechanisms for describing the content with metadata which will be used for search and retrieval. This tool will also allow the storage of the information concerning the copyrights holders and manage the status of the media.

Basing on repository information the editors on the Content provider side will be allowed to decide on publication of the media. The editors may publish separate media objects or build media bundles. This will enable the Content provider to programme the VoD service in a manner of daily or weekly published media choices.

The editors will have a possibility to request pre-distribution of the published content in the CDS system. This will cause then the immediate content distribution in CDS system which will shorten the access time and will be extensively used for VoD programming. The CDS system will also provide in-time distribution on user request.

The editors may specify the timeframe in which the publication is valid so that the automatic removal of content offer from the Access portals may be done as well as invalidation of the content in CDS system may be performed. Independently, the editors may decide on content removal which will cause immediate action on Access portals and CDS system.

The Content provider will also be able to decide on content usage policy. Basing on the specified policy the Licensing System will be able to issue licenses for the end-users to use the content.

## V. ACCESS PORTAL SERVICES

Access portals will provide users with content catalogues and search tools. They will allow presentation of the content acquired from many Content providers giving a choice of these resources in different e.g. thematic views.

The Access portals' editors will gain access to the multimedia catalogues, published by Content providers, and will be able to choose the media resources or media bundles they want to present in Access portals. They will also be provided with a tool for automatic programming that will allow them to specify automatic publication criteria. Based on defined criteria the Content providers will inform the portals on new resources fulfilling these rules.

The content published in the Access portal will be presented and used by different portal services. This will include services for presenting the resource catalogues, frequently viewed content and recommending valuable content which will be based on user preferences. The Access portal will also allow users to create their own viewing lists which will enable easy access to frequently used multimedia. Users will be able to search for interesting content on the basis of metadata description.

The Access portals will also provide additional services that will support users' communication. These services will enhance the user experience providing tools for sharing users' ideas, comments and discussion on provided content allowing them to build subject-oriented communities.

The users will also be supplied with several tools supporting the creative use of provided content which is very important to enhance the education process. These tools will enable easier choice of published content,

sharing it among groups of users and providing own presentations including this content.

The Access portal will provide rights management mechanisms that will allow granting the rights to content and services to the users.

## VI. SUMMARY

The iTVP platform supports the content management process at Content provider side, provides scalable Content Delivery System, Access portals and Licensing System. These systems enable control of the way the content is provided to the system, processed at the Content provider and then distributed.

The Access portal is responsible for gathering the content offers from different Content providers and presenting the metadata descriptions to the users. Moreover it provides value added services which power the usage of content in more active way.

The platform supports the process of removal of the content giving the guarantee to the Content provider that none of the multimedia resources is accessible without control.

We believe that iTVP platform will strengthen the use of digital media in education and entertainment allowing the users to access the multimedia resources owned by many Content providers and use them creatively.