

Video on Demand Service for Next Generation Networks

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Abstract—This paper discusses the deployment of a Video on Demand (VoD) service for a Next Generation Network (NGN). VoD is proposed as an effective service that will not only keep Telcos as active players in the telecommunications industry but also allow them to be instrumental in leveraging television over IP (IPTV) with satellite television (TV). This paper also discusses various challenges facing the deployment of VoD. It briefly presents an overview of standardization efforts, as well as areas of future work.

Index Terms—VoD, Interactive TV, EPG, DRM

I. INTRODUCTION

TELCOS are looking for ways of staying active in the telecommunications industry. They are looking for alternative means of generating profit due to the diminishing revenue from the fixed-line phone market. There has been a number of suggestions as to how Telcos should proceed facing such a challenge. Currently, deploying Internet Protocol Television (IPTV) is believed to be the most promising enterprise for Telcos [1]. IPTV is a package of services such as Internet TV, video telephony, video multicasting, Video on Demand (VoD), Interactive TV, and video websites (e.g. YouTube).

VoD is the delivery of video as initiated by a client [ibid. 1]. A VoD service allows users to play trick modes on video streams. Trick modes include pause, rewind and fast-forward operations. A modern VoD service includes options for downloading a video and an Electronic Program Guide (EPG) for selecting content. A next generation VoD service will offer interactive content features (e.g. gaming), integrated services (e.g. VoIP, presence) and incorporate user contexts (i.e. favourite movies, series, etc) to enhance the VoD service experience.

There are numerous challenges regarding the successful deployment of VoD. Section II discusses the various requirements for successful VoD deployment, while Section III discusses VoD standardization efforts. Section IV discusses the proposed VoD solution and the conclusion is presented in Section V.

II. TOWARDS SUCCESSFUL DEPLOYMENT OF VoD

A. Efficient Content Platforms

Significant research and development has to be actualized by researchers and developers in designing efficient content platforms for VoD. These platforms will generate and store video content that is appealing to many consumers. They will be effective enough to attract many television users into

the VoD market. Support for the service provider content, 3rd party video content, Internet and home videos, and personalized video storage has to be incorporated into the content architecture.

B. Content Protection

Content protection is obligatory for protecting media copyright. Digital Rights Managements systems have to be employed to protect content generated and delivered over an IP network. This will not only protect business objectives of VoD service providers but also encourage strong business partnerships between VoD service providers and major video content providers.

C. Interactive TV and Integrated Services

Interactive features should be added to the VoD service to enhance user experience and service package options. EPG is believed to be the first step towards the realization of interactive VoD as it allows users to interact with the service when selecting content [2]. Various content manipulations (download, search, and transfer) should be possible to effect in a state-of-the-art VoD system. Interactivity features could also be added to content for entertainment and education (e.g. gaming and comprehension tests respectively) [ibid. 2].

III. VoD STANDARDIZATION

A. IPTV-VoD Standards

There are various bodies working on standardizing VoD for NGN platforms. Standards are necessary to ensure interoperability between various implementations and to reduce installation cycle times and related costs. Taxonomy of different standardization bodies at different levels of the IPTV-VoD market chain (i.e. user equipment, transport, service and content production) is shown in Figure 1.

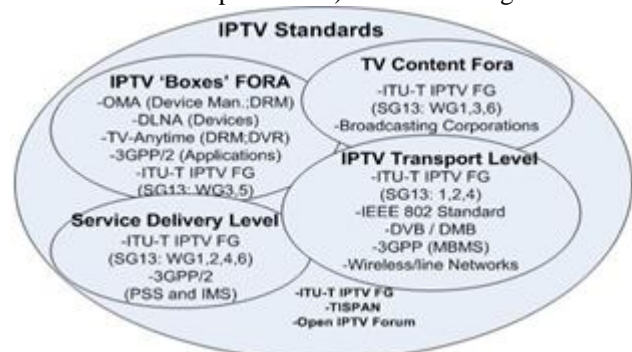


Figure 1: IPTV (VoD) Standards

Standards enable different players on the VoD market chain to mutually participate in the proliferation of new services and aggregation of content that is attractive to VoD subscribers [3].

There are three main standardization bodies for IPTV: Open IPTV Forum, TISPAN and the ITU-T IPTV Focus Group (FG). Open IPTV Forum is a consortium of companies

(about 26 members to date) that has formulated and published an open IPTV standard [4]. TISPAN is a European Telecommunications Standards Institute (ETSI) core competence centre responsible for all aspects of standardization for present and future converged networks including the NGN [5]. ITU-T IPTV FG coordinates and promotes the development of global IPTV standards taking into account the existing work of the ITU study groups as well as Standards Developing Organizations, Fora and Consortia [6].

B. VoD over the IP Multimedia Subsystem

1) IP Multimedia Subsystem (IMS)

The IMS is a service delivery platform for NGN multimedia services such as Video telephony, presence, VoIP and VoD. The IMS was developed by Third Generation Partnership Project groups (3GPP and 3GPP2). The IMS allows service providers to use a unified all-IP network to deploy new services with the least cost and risk. Quality of Service (QoS), fair charging schemes and integrated services have been touted to be niche service enabling technologies provided by the IMS.

2) The IMS-VoD Solution

Service enabling technologies in the IMS offer a number of advantages when a VoD service is deployed over the IMS. QoS can ensure high quality video provisioning; a charging system can be used to price VoD clients fairly; and a unified all-IP platform will be central in developing interactive and conversational services that could be integrated with the VoD service. ITU-T, TISPAN and Open IPTV Forum use the IMS as an NGN platform for deploying video services. Given that all these main IPTV standardization bodies support the IMS platform, the NGN VoD service should thus be deployed over the IMS platform to achieve *interoperability* and efficient deployment.

The IMS uses the SIP protocol for session control. Trick mode functionality is however not fully supported by the SIP protocol [7]. A widely used and effective protocol for trick mode playing is RTSP [8]. RTSP was designed to do session control. There is thus a need to investigate the usage of both protocols without duplicating session management operations.

IV. PROPOSED IMPLEMENTATION

VoD architecture (Figure 2) that solely employs the use of the SIP protocol for session management and media trick playing is proposed. Performance tests will be performed to measure latencies experienced when requesting a trick mode operation using SIP.

Past solutions invariably incorporated the RTSP protocol into the IMS-VoD solution [9] [10]. There are two approaches for incorporating RTSP into the IMS-VoD architecture. The first one is to use RTSP for both media (stream) session management and media operations *on the media plane*. SIP is still used for session control and signaling on the signaling plane.

The second approach is to use SIP for all session management operations on *both* planes and RTSP is strictly used for media trick mode playing.

A comparison will be performed between SIP based trick playing and RTSP-based trick playing.

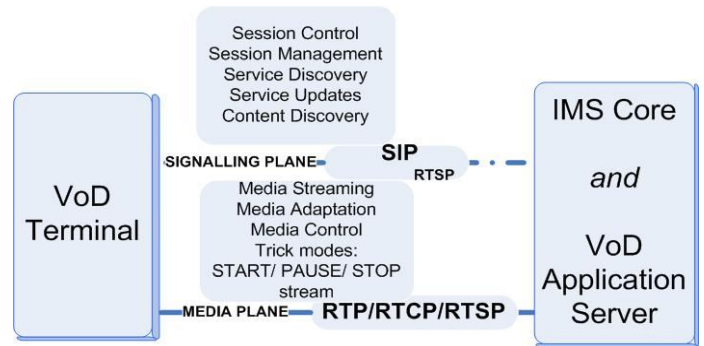


Figure 2: VoD Architecture

V. CONCLUSION

This paper presented an evolution of the VoD service and discussed the various requirements for successful deployment of VoD. It discussed several IPTV (and thus VoD) standards and platforms. It presented the IMS-VoD solution that solely uses SIP for trick playing. A performance analysis will be done to compare this solution with other RTSP-based trick playing solutions.

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