IMS IPTV: An Experimental Approach

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Abstract. IMS has been widely recognized as the control and signaling framework for delivering of the rich communication & multimedia services to broadband users. Amongst others, it's deploying as the service (middleware) platform for interactive and personalized IPTV services. The goal of this paper is to provide a short description and analysis of the (IPTV) use cases that have been selected for design and implementation at Hanoi University of Technology (HUT) in scope of its initiatives for NGN researching program. Major use cases, or we called intelligent features, are the advanced electronic service guide, video on demand (VoD), (IPTV) session continuity, and parental control. Development results for each of the use case are depicted.

Keywords: IMS; IMS IPTV; enhanced EPG; Parental Control; Blending Service, Intelligent Features.

1 Introduction to the IMS Based IPTV Testbed

In the scope of a joint-research program between Hanoi University of Technology and Fraunhofer Institute of FOKUS, we was setting up a next generation Test-bed in our lab for purpose of prototyping of new multimedia and rich-feature communication services using IMS framework. The test-bed consists of all three layers: media layer for transportation of media traffic in the modes of unicast, multicast and broadcast. The core layer of signaling and session/service control, that uses the FOKUS' open source IMS Core [3][4][5], consisting of CSCF servers and a light user profile database (HSS). Our project main focus is on the application layer in which we specified and developed prototypes for value added services to IP Telephony and IP Television using the open source platform (Sailfin). A Media Server was also developed at our lab using VLC (VideoLAN) media stack. Besides that we had developed a comprehensive framework and prototype of IMS IPTV Client that based on the open source IMS Communicator. Finally, several IMS interfaces, namely, Sh, Mw, etc are implemented on our own effort. Figure 2 depicts high level view of our Test-bed setup.
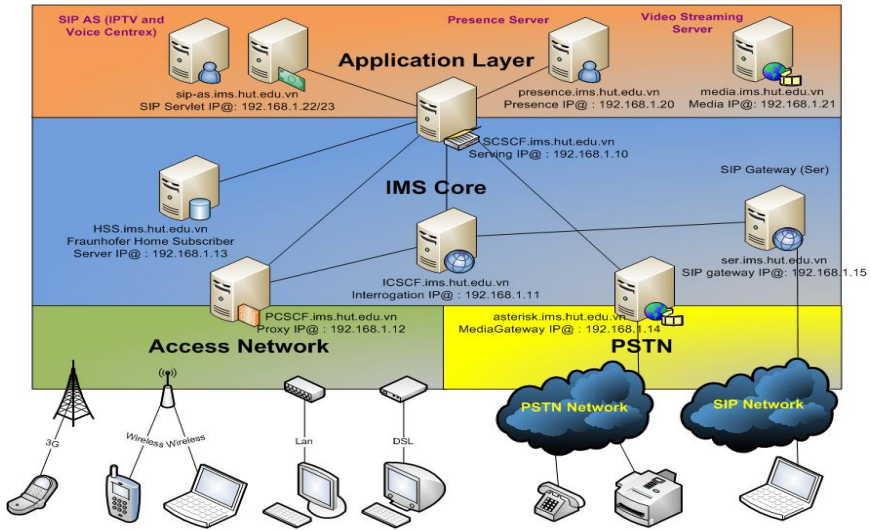
Fig. 1. The HUT's Next Generation Test-bed

2   IMS IPTV Use Cases

In our research, we focus on design and implementation of special use cases for IPTV services that utilize the strength of IMS framework, like User Interaction, Service Authorization and Authentication and Session Blending. In particular, we considered and implemented following use cases (we call Intelligent Features): *Standard Video on Demand, Parental Control, Enhanced EPG and Session Continuity.*

Standard Video on Demand
We considered a scenario in which an IMS user initiates a call to a specific content (a movie, a song or other resources) at the content provider through an IMS domain. The request would be routing through different SIP servers (CSCFs) and at S-CSCF a suitable Trigger(s) would be invoked to forward the request to IPTV AS, the AS will then proxy the request to MRF (Media Server). Media Server, after accepting the request, will send back the successful responses (via AS) as well as the RTP streams directly to Emulated STB.

Parental Control
A special feature, called Parental Control, had been designed and implemented which allows the parent to control their child from requesting and viewing classified contents. The control could be provided based on the registered (IMS) identity or the time slot of requesting.

Enhanced EPG
Personalization is a key feature in the IMS IPTV solution. In this sense, we have complemented the user profile with a new XML-formatted [9] service profile for each

IMS identity to contain the personalized information. That leads to another intelligent feature for IMS-based IPTV, we called Enhanced EPG. With this feature viewer will be classified in to different groups (via subscription) with different service levels and will receive the different channel list from the portal. The user also will receive the different channel list when requests at different time slots.

Session Continuity

The issue of session continuity is also studied in our test-bed, in which we investigated a new approach [10] that allows handing over of an on-going IPTV session between different access heterogeneous environments. We propose a new component in the IMS domain, namely an proxy based on mSCTP (mobile Stream Control Transmission Protocol) that acts as an anchor point for soft vertical handover of mobile nodes, which have multiple physical interfaces (e.g., WLAN/UMTS). The mSCTP-based proxy also supports QoS provisioning and adaptation for the mobile nodes when moving in a heterogeneous wireless environment. Our simulation results show that the signaling cost for handover in our approach can be up to 23 times smaller than that in the conventional approach.

Example Result

Figure 2 illustrates a personalized user portal that provides a different content meta-data (channel list) to registered user from different groups.
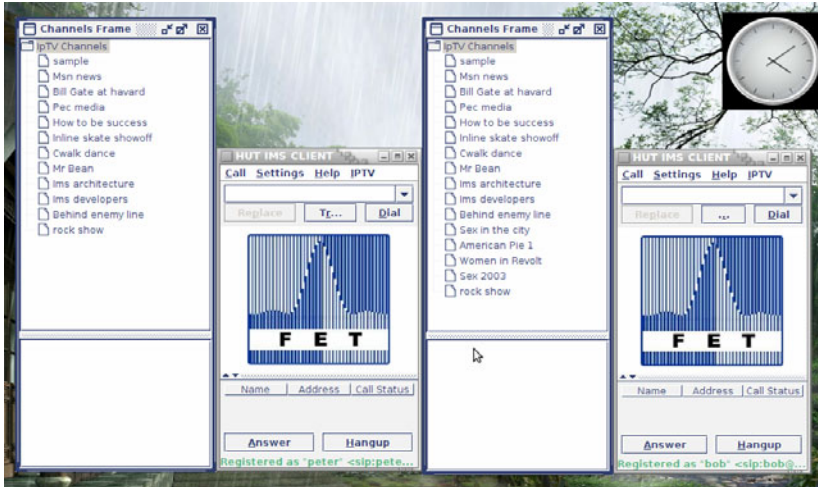

Fig. 2. Channel List for different User Categories of Enhanced EPG feature

3   Conclusions and Further Discussions

This paper presents our investigation, in experimental perspective, of using IMS framework to provide intelligent features for IPTV services. In particular, it focuses on the

video on demand, remote parental control, blending services, session handover without interruption and other interactive features which some of the use cases were discussed and presented here above. It shows how SIP [2][7] signaling and IMS can be used to provide the Interactive and Blending features for the entertainment video services.

The initial results promise the great potential of those IMS-based TV interactive and differentiated features, which offer attractive and rich multimedia experiences to the end user. We are currently investigating and developing several other intelligent features of IMS-based TV, namely, the context-based session continuity that allows to seamlessly handover the IPTV sessions across different screens/terminals on different access networks.

References

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