Using the Presence Technology for Mobile TV

Daniele ABBADESSA, Telemaco MELIA

Abstract

With the increasing development of 3G packet switched based networks, combined with the availability of advanced multi-mode terminals, a wide variety of new applications is becoming available. A fundamental requirement for a mass market adoption is an easy to use user interface. This paper introduces an innovative user interface for mobile TV. This new concept, which relies on the well known presence technology, provides notification and personalization as key features. The Mobile TV user is therefore able to enjoy new broadcast services (e.g. DVB, DVA) just by customizing preferences. We argue this opens new business opportunities and share revenue for Mobile Operators. The paper also describes an implementation prototype showing how the technology could work in a real deployment scenario. A business model, supporting the above considerations, is also provided.

Keywords

Presence, Mobile TV, Broadcast technology

1. Introduction

Recently there has been a growing interest from mobile operators, content providers, TV broadcasters and other business entities in mobile TV. In the past months the leading mobile operators in Western Europe have conducted mobile TV consumer trials based on the DVB-H technology and some of them have launched their mobile TV commercial services in conjunction with the start of the 2006 Football World Cup[3, 4]. The results of these trials[1] are very promising and CIBC forecasts that mobile TV users will reach about 170 million by 2010[2].

One of the key challenges that mobile operators face when a new technology is introduced to the market is ensuring a compelling and easy user experience.

This paper illustrates how the "Presence" technology[6-9] can be applied to the mobile TV domain in order to provide a mechanism of notification and personalization for end-user.

The authors focused on the Presence technology since applications such as Yahoo or MNS Messenger or Skype are all presence-based. Moreover there is a growing interest in the mobile industry to consider "presence" enriched address-books.

The feasibility of the proposed solution has been demonstrated by the development of a prototype based on the NEC commercial IP Multimedia Subsystem (IMS)[10] and a J2ME commercial handset.

2. Mobile TV Concept

The Mobile TV concept, presented in this paper, provides a way of creating customized "Presence buddies" related to broadcast content. The aim is to make users aware (using the presence technology) only of content being broadcast which match user preferences.

"Presence buddies" can be related to a specific broadcast channel, or to a "personalized" TV channel. To each of these new presence buddies a "TV Presentity" and a related "Status" list is associated. Statuses can assume different forms (based on service providers wishes) and they need to contain information such as:

- Content being broadcast
- Source of the broadcast (e.g. specific DVB-H frequency)

Once a TV Presentity, related to a specific broadcasting channel or to specific user preferences, is created, it is registered to a "Presence" service and the related TV buddy is automatically added to the users' presence list.

This paper focuses on two particular aspects, namely "notification" and "personalization." Notification is here presented as the native mechanism provided by the presence technology enabling users to receive real time up to date information about broadcast content. Personalization is about the capability to create virtual TV channels.

Fig. 1 depicts the "notification" mechanism: one specific TV Presentity is associated to one specific broadcast channel. The same TV Presentity is associated to several users (i.e. watchers).

Fig. 2 depicts the "personalization" mechanism: one or more user-specific TV Presentities are created based on each user

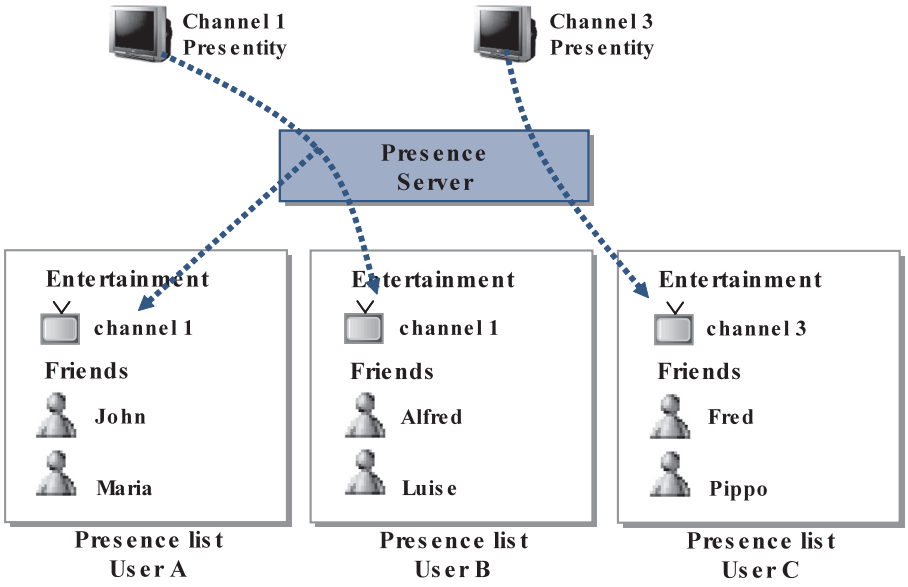

Fig. 1 Notification mechanism.

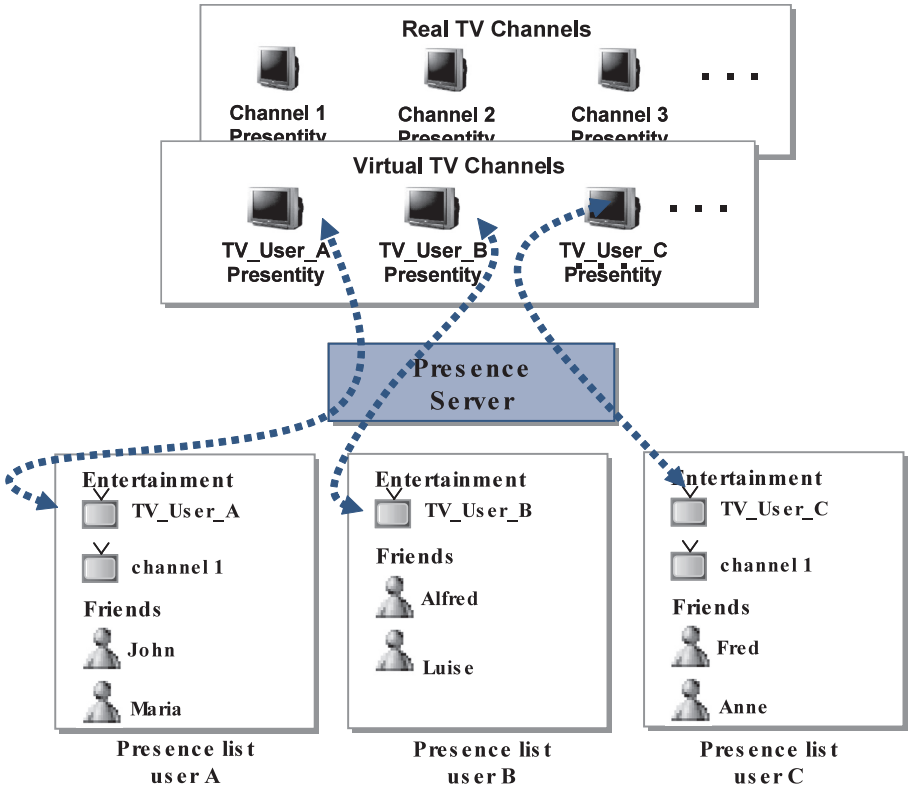

Fig. 2 Personalization operation.

specific preferences (e.g. specific broadcast programs, specific topics, etc...). These related TV buddies are then added to each user presence lists.

The fact must be stressed that there is usually a relationship 1:1 between personalized TV Presentities and end-users. However, aggregation schemes might be considered to improve scalability.

Once the user sets his preferences, the Presence buddies (related to the broadcast content) are created and added to the users' Presence list. Changes to the delivery of the broadcast content are automatically reflected in changes to the related buddies' status. Notifications of these changes are delivered via the Presence technology. Users can choose the way to be notified according to the features provided by the Presence list (e.g. pop-up windows, sound alerts, etc.) client.

Information about physical broadcasting channels is also included when TV presentity statuses are created. This will enable "on-click" tuning, as depicted in Fig. 4.

3. Implementation Prototype

The implemented prototype consists of five main components, as illustrated in **Fig. 3**:

- Mobile TV Client (MTV-C)
- Mobile TV Portal (MTV-P)
- Mobile TV Database (MTV-DB)
- Mobile TV Application Server (MTV-AS)
- Presence Server (PS)

3.1 Mobile TV Client (MTV-C)

This is an application that consists of a SIP protocol stack and an enriched presence application, which handles people buddies and TV buddies.

As shown in **Fig. 4** the developed user interface resembles the traditional presence-based user interface common to many applications such as MNS Messenger or Skype.

The main difference is that this client is able to differentiate between TV and people buddies. This differentiation is needed in order to associate different actions to each type of buddy. With regard to the TV buddies only a limited set of action has been defined (see Fig. 4):

- Launch TV - initiates the streaming of the select TV program
- Program Info - opens the web browser and connect to a specific page containing the program information
- TV Portal - opens the web browser and connect to the MTV-P main web page

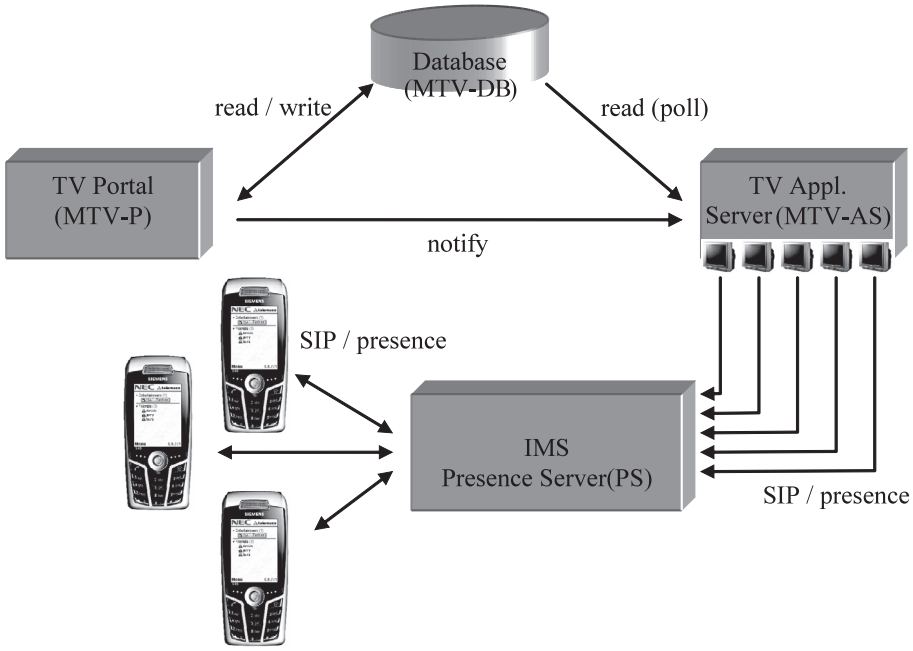

Fig. 3 Prototype components.

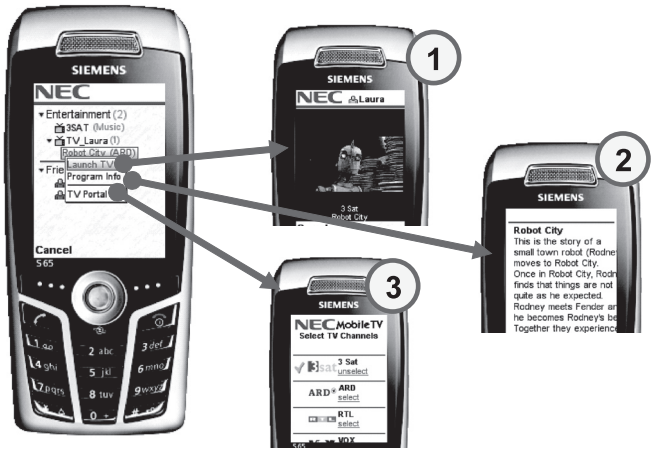

Fig. 4 MTV-C TV buddy action menu.

Finally, the MTV-C filters received IM since IM send by the MTV-AS contains commands to modify the mobile TV portion of the end-user's presence list.

This client has been developed in J2ME and it runs on a standard 2.5G handset which supports MIDP2.0.

3.2 Mobile TV Portal (MTV-P)

The MTV-P is the place where end-users can set their mobile TV preferences and, consequently, configure the entertainment part of the presence list on their handsets. Only a limited set of functionalities (e.g. selecting TV programs) have been implemented for demonstration purpose.

End-user selections are communicated to the MTV-AS which in turns automatically updates the MTV-C and the PS.

In a commercial implementation the MTV-P could either belong to a third party service provider or to the mobile operator.

3.3 Mobile TV Database (MTV-DB)

In this prototype, the MTV-DB is the central point of information about end-users, TV channels and TV programs. With regard to end-users' information the main function of the MTV-DB is to hold end-users' usernames, passwords and current mobile TV settings, i.e. which channels and TV programs have been selected by each specific end-user. Additionally, this database stores the information about TV channels and the related TV programs.

3.4 Mobile TV Application Server (MTV-AS)

This is the key element of the proposed solution. Its main functionalities are the handling of:

- the "Presentities" related to TV channels and personalized TV channels
- the control communication with the end-users' clients

End-users' preference, which are set via the MTV-P, are communicated to the MTV-AS. TV channel and Personalized TV channel Presentities are responsible for handling the presence status list that is associated to specific TV channels and specific end-users' personalized TV channels. These Presentities are responsible for sending TV-related information as SIP PUBLISH[11] messages to the PS when a new TV program starts. It is then responsibility of the PS to forward these updates to the relevant users' clients.

Adding or removing a TV buddy from the end-user presence list is also transparently managed by the MTV-AS. In order to perform these tasks the MTV-AS communicates with the PS and the MTV-C on the handset. The communication with the PS takes places using the HTTP presence API of the NEC's PS. Instructions to remove or/and add a TV buddy to the user's presence list are carried out by sending special Instant Messages (IM)[11]. This particular solution has been chosen since the EMUN functionality was not available in the installed IMS system and the MTV-AS is only knowledgeable about an end-user's SIP address.

3.5 Presence Server

The presence server utilized in this specific implementation is NEC's MX7840-PR product which runs on top of the NEC's commercial IMS platform.

The fact must be stressed that NEC's IMS presence server was utilized without any modifications. This is a very important point since it proves that the presented technology can be easily deployed on existing platforms.

4. Business Model

The use of presence for mobile TV does not only make the use of mobile TV easier for the end-user but it also offers potential economical benefits to the mobile operators. For example, Mobile operators could deliver advertisements when the end-user click on a TV buddy and decide to start watching a program. Since mobile operators have precise information about their end-users, they are in the unique position of being

Mobile Subscribers	15,000,000	
Mobile TV Active Users	1,500,000	
	Monthly ARPU	Yearly ARPU
Direct Revenues		
Subscription	€ 300,000	€ 3,600,000
Advertisement before watching	€ 900,000	€ 10,800,000
Total Direct Revenues	€ 1,200,000	€ 14,400,000
Indirect Revenues		
ARPU Downloads	€ 3,000,000	€ 36,000,000
ARPU Premium Messaging	€ 3,000,000	€ 36,000,000
ARPU M-Commerce	€ 1,500,000	€ 18,000,000
Total Indirect Revenues	€ 7,500,000	€ 90,000,000

Fig. 5 Generic business case.

able to deliver diverse advertisements to different segment of users. Mobile operators can use their network to deliver this specific advertisement to their end-users by by-passing broadcasters. This is a competitive advantage of mobile operators over broadcasters. This is also a very interesting proposition for advertisement companies since they can pay only for the advertisement delivered and really watched by the end users ("Pay-as-you watch" model).

Stimulated by the easier user interface based on presence, end-users will spend longer time watching mobile TV. As result of this higher usage of mobile TV, there will be a correlated higher usage of additional services such as additional downloads, premium messaging, m-commerce, etc. In **Fig. 5**, we refer to these revenues as "Indirect Revenues."

5. Conclusion

Currently, mobile TV is a hot topic in the mobile industry since it is seen as a potential source of new sustainable revenues.

This paper addresses the problem of service usability and illustrates an innovative solution based on the Presence technology to provide mobile TV-related notification and personalization mechanism to the end-user. The use of the presence technology ensures the scalability of the solutions. Presence-based applications such as MSN Messenger prove that the presence technology can support million of users.

A prototype was developed using the Presence server of the NEC's IMS platform. No changes to the presence server were required proving that the proposed solution can be deployed on existing platforms ensuring considerable capex and opex advantages. Finally, a simple business case is provided showing the economic advantage of the introduction of this technology for mobile.

References

1) Source: 3G.co.uk http://www.3g.co.uk/PR/March2006/2736.htm
2) "TV Lights Up The Small Screen", CIBC World Markets, Nov. 2005
3) Hutchinson 3G, Italy, Press Release, February 20th, 2006
4) http://www.3g.co.uk/PR/March2006/2739.htm, March 9th, 2006
5) Yankee Group, "European 3G Market Gains Momentum", Aug. 2005
6) IETF RFC 2778, "A Model for Presence and Instant Messaging"
7) IETF RFC 2779, "Instant Messaging / Presence Protocol Requirements"
8) Wireless Village, the Mobile Instant Messaging and Presence Services (IMPS)
9) 3GPP TS 23.141 V6.8.0, "Presence Service - Architecture and functional description", 2005
10) 3GPP TS 23.228 V6.9.0, IP Multimedia Subsystem (IMS), 2005
11) 3GPP TS 24.229 V5.15.0, "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP)", 2005
12) Frieda Vanparijs et al., "Social Television: Enabling Rich Communication and Community Support", CIN 2004.
13) With Amigo TVNIST SIP, http://www-x.antd.nist.gov/proj/iptel/

Authors' Profiles

Daniele ABBADESSA
Chief Consultant,
Network Laboratories,
NEC Europe Ltd,

Telemaco MELIA
Research Staff Member,
Network Laboratories,
NEC Europe Ltd.