Chapter XXXI
Advanced Mobile Multimedia Services with IMS

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ABSTRACT

Although promised for some time now, advanced multimedia services for mobile devices were not yet a reality. With IMS (IP Multimedia Subsystem), the fundaments for advanced multimedia services based on IP will be laid. However, there are still a lot of confusions about IMS that may hinder its success. In this chapter, a comprehensible presentation of IMS together with its potential regarding the development of advanced services is given. The chapter starts with a justification of the existence of IMS. The necessary adaptations of SIP (Session Initiation Protocol) are explained. A concise description of IMS will be provided. Next, the deployment of IMS in fixed – mobile environments will be examined thoroughly. The heart of the chapter is the presentation of the strengths of IMS, that is, what can IMS be used for. A few advanced multimedia service scenarios are given as illustration. The chapter will also consider the most important but yet neglected component of the whole IMS, namely the IMS client. The chapter concludes with a summary of the challenges that must be resolved.

INTRODUCTION

IMS (IP Multimedia Subsystem) was initiated by 3GPP (Third Generation Partnership Project) (3GPP, 2005; 3GPP, 2007) in the late 90s in the attempt to extend IP over the mobile networks and realizing the "all-over-IP" vision. Since its birth IMS has encountered many metamorphoses and has evolved from being a subsystem of 3G mobile networks to be a VoIP technology for next genera-

tion wired network. As the ultimate fixed-mobile convergence solution IMS becomes once again a hot topic that everyone is talking about.

Unfortunately, due to its constant evolution, knowledge about IMS is rather limited. Indeed, IMS has become a myth full of mysteries and promises. In this chapter, we try to clarify and provide a comprehensible presentation of IMS. The chapter starts with a justification of the existence of IMS. A concise description of IMS will be given. Next, the deployment of IMS in fixed –mobile environments will be examined thoroughly. The heart of chapter is the presentation of the strengths of IMS, that is, what can IMS be used for. Several advanced multimedia service scenarios are given as illustration. The chapter will also consider the IMS client that although crucial, is until now the most neglected component of the whole IMS. Indeed, the IMS client is what the user perceives of IMS and without a powerful, reliable and user-friendly client IMS is doomed to failures. Before concluding the chapter walks briefly through all the challenges that must be resolved to ensure the success of IMS.

THE NEED OF IMS

Short about the Session Initiation Protocol

With the advent of the Internet, the users get the opportunity to experience both fancy and useful services such as email, messenger, information services, banking, ticketing, e-commerce, and so forth. As the popularity of the Internet increases, the need for telephony or more generally communication services on the Internet arises.

To meet this, the Session Initiation Protocol (SIP) (IETF, 2003) allowing the establishment of soft real time communication sessions between two or several parties has been specified. As known the Internet is a packet-switched network meant for computer communications. Computers

are equipped with functions to receive packets whenever they arrive. Users as human beings are not. In order to offer telephony or voice communication, users need to have assistance from SIP user agents. The agents have the responsibility to communicate with each other and with the users to establish a session between the users.

If the agents know the IP address that is assigned to its counterpart they can communicate directly with it and invite for a session. But, telephony is supposed to be available for any user and it is therefore not possible for a SIP user agent to know the IP address of all other SIP user agents in the world.

As shown in Figure 1 a SIP server is introduced to provide the mapping between users and the IP addresses of the user agents. A user is allowed to move and make use of one or several devices. With SIP, *personal mobility*, also called *user mobility* is supported. To make a call or to receive calls, a user may register to one or more devices. When moving the user may later on deregister and register to new devices. Several users may also register themselves to the same device.

However, SIP is not made for mobile networks and does not support *terminal mobility,* that is, enable calls when a terminal or device is moving. Indeed, the device may move to another IP subnetwork and acquire a new IP address without the awareness of the user agent and the SIP server.

Extension for Mobile Devices

In order to support terminal mobility, when the device is moving the following conditions must be satisfied:

- Before the termination of the former connection, a new connection must be established, that is, an IP address has been allocated to the device and it is connected to the Internet.
- If there is an ongoing session, handover must be performed such that the media flow is changing the route and arriving to the new IP address instead of the former one.

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