Context-Aware Management Scheme for Service Continuity

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Abstract— As wireless access technologies grow rapidly, the of roaming across different wireless networks in a seamless manner thus offering seamless mobility. The different characteristics of each wireless technology with regard to Quality of Service (QoS) brought many challenges for provisioning the continuous services (audio/video streaming) in a seamless way. The paper proposes Context-Aware Management Scheme (CAMS) which facilitates service continuity in real-time application su video and audio streaming. Unlike previous research efforts which focuses on session continuity only while handover and does not account for the characteristics differences between the networks, this work focuses on improving QoS and user experience by adapting the session parameters after Vertical handover (VHO) according to the new environment and available resources. The new scheme would improve users experience and allow the network to admit more users at the same time compared to non-context aware solutions. In this paper, the architecture of proposed scheme is presented. In addition, detailed signaling messages of the VHO and Context-Aware Management from WiFi to WiMax and vice versa are discussed.

Keywords—context awareness; service continuity; Vertical Handover (VHO); session adaptation.

I. INTRODUCTION

In recent years, the wireless access technologies as well as can be connected anywhere anytime". That is achieved by Next Generation Wireless Networks (NGWN) which provide a ubiquitous environment, including the integration of various different characteristics such as IEEE 802.11(WLAN), IEEE 802.16 (WiMAX), GPRS, UMTS using the Internet Protocol (IP) to offer a various range of high data rate multimedia services to end users. The limited coverage range of WLAN makes it difficult to provide "always-on" connectivity services anywhere and anytime. 3G technology offers universal network access but the access rate is very limited. WiMAX can provide high speed internet access in wide area. Therefore, the solutions of WLAN and WiMAX integrated networks can combine their best features while mediating weakness of both networks to provide a complete wireless scheme for offering high speed Internet access

The integration of NGWN brought many issues. The most challenging one is providing consistent and continuous

seamless services while considering Quality of Service (QoS) requirements during the mobility between two different access maintain service provisioning and avoid flow interruptions while users are roaming is known as service continuity. However, the heterogeneity of wireless networks make service continuity a complex task due to hard issues, such as bandwidth fluctuations and temporary loss of connectivity. This calls for the need of context awareness which claims the full visibility of all characteristics describing service execution environments and enables management operations to adapt service provisioning to current system conditions [1]. To satisfy user needs and improve his/her experience, different context information should be considered. Examples of such information include; user preferences (e.g. preferred network), application requirements, and network conditions.

SIP (Session Initiation Protocol) [2] is a signaling protocol widely used in real-time applications that allows creation, modification, and termination of sessions among one or more users. It is used for both voice and video applications, for instance, Skype and IP PBX. Moreover, SIP is the protocol used in promising multimedia architecture such as IP Multimedia Subsystem (IMS).

In this paper, we present a proposed Context-Aware continuity by taking different context information into consideration in WiMAX/WLAN integrated networks. Since the characteristics of the two networks differ significantly in terms of the achievable data rates and QoS, session adaptation is needed. In our scheme, we propose to use SIP protocol along with SDP (Session Description Protocol) [3] for this task. Thus, mobile node provides real-time application server with the new parameters which will modifies its parameters to adjust to the new network characteristics. For context messages exchange, we employ UDP (User Datagram Protocol) [4] due to its lightweight messages.

The reminder of the paper is structured as follows. Section II summarizes some of the solutions existing in literature which tackled different context awareness methods. In section III, our proposed scheme is presented in details. Finally, section IV