Considerations of supporting seamless mobility to mobile user in Mobile IPTV environments

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Mobile IPTV 환경에서 모바일 사용자에게 끊김없는 이동성 제공을 위한 고려사항

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Abstracts

Mobile IPTV lets mobile users transmit and receive multimedia traffic, such as TV signals, audio, text and graphics, through IP-based networks with the support of quality of service(QoS) and quality of experience(QoE), mobility and interactivity [1]. To provide service feasibility, QoS and seamless mobility to mobile users, we consider mobility prediction, link stability, service requirements to develop resource reservation scheme in mobile IPTV environments. Thus, we study for mobility prediction and QoS-guaranteed mobile IPTV service prior to develop the resource reservation scheme.

1. Introduction

Mobile IPTV lets mobile users transmit and receive multimedia traffic, such as TV signals, video, audio, text, and graphics, through IP-based networks with the support of quality of service (QoS) and quality of experience (QoE), security, mobility, and interactivity. In short, mobile IPTV extends many IPTV services to mobile users [1]. IPTV defines the way of provisioning real-time television services over IPTV networks with various mechanisms implemented to ensure the appropriate level of quality. Originally, IPTV was proposed to serve the users of fixed terminals, such as set-top box and desktop computer. As the requirement of mobility rises up, it is an inevitable trend to extend IPTV technology from wired networks to wireless networks. In this paper, we investigate the mobile IPTV deployment in WMNs, which enables roaming users to receive TV programs anywhere on their handhelds or laptop computers [2].

Success of mobile IPTV services relies on QoS guaranteed IP multicast. Corresponding metrics include packet loss rate, delay, jitter, channel zapping time, and so on [2].Thus, we study for mobility prediction and QoS-guaranteed mobile IPTV service prior to develop the resource reservation scheme.

2. Seamless Mobility and QoS-guaranteed mobile IPTV service

In order to receive a data from sender to mobile user in the wireless mobile networks, mobile user reserves the resource including bandwidth and session to seamless provide service. In this case, we need mobility prediction and QoS provisioning mechanism.

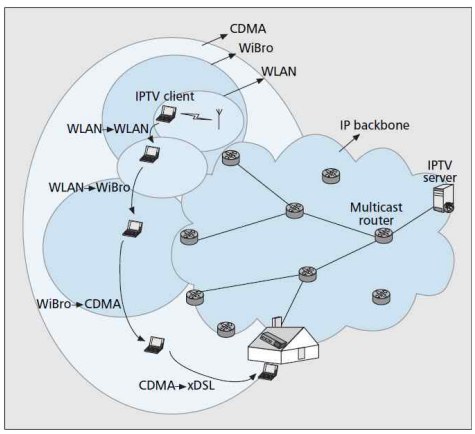

Figure 1. Handover scenario of a mobile node using Mobile IPTV services. [3]

A. Seamless Mobility

In mobile networks, we can predict the mobile user's location using RSS(Received Signal Strength) and GPS(Global Positioning System). Mobility prediction is very important to support seamless mobility and resource reservation. We need a vertical/horizontal handover process for mobility mechanism shown as fig. 1 [4]. In mobility mechanism, movement detection is a critical factor because it decides handover delay and mobility capability.

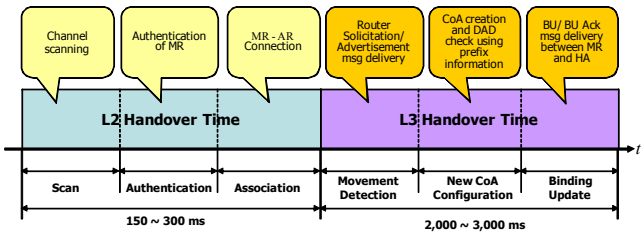

Figure 2. General handover process(L2+L3).

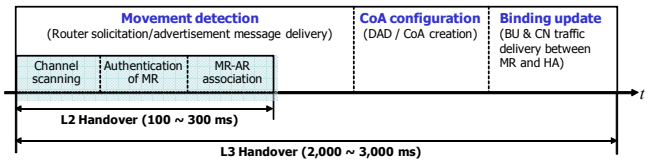

Figure 3. Fast handover process(L2+L3).

To provide more seamless mobility, we should use the fast hanover mechanism not general mechanism. In fast hanover mechanism, IPTV session is persistently connected with IPTV source and receiver(mobile user) because hanover process is occurred in L2 and L3 coincidently shown as fig. 3. To provide above mechanism, we need mobility prediction mechanism. Existing mobility prediction such as fuzzy theory is used for that of mobile network by somewhat modified. Thereafter, we will develop the resource reservation scheme for Mobile IPTV based on the enhanced mobility prediction mechanism and fast handover method.

B. QoS provisioning for mobile IPTV service

For high-quality mobile IPTV services, supporting key QoS factors, such as packet loss, bandwidth, delay and jitter, and packet-error ratio, is important. Mobile IPTV delivery systems must be able to handle such factors through careful system design (for example, over-provisioning or use of NGNs), careful traffic control in the network (such as traffic engineering and service differentiation), and optimized buffering and error-correction at the receiver. In particular, reacting quickly to varying conditions in the wireless link is critical [1]. Supporting user-perceived QoE by providing a resource-aware mobile IPTV service is also important –for instance, increasing or decreasing the transmission rate according to the user's expectation [1]. QoS support is crucial for successful mobile IPTV business. In the mobile environment, mobile IPTV services can frequently suffer from an unreliable network connection and insufficient bandwidth. Thus, service continuity requires an awareness of varying wireless-link conditions, such as shadowing and fading [5].

In the first stage, a wireless interface enables communication between the access network and the receiver in Fig. 4. In the second stage, the wireless section extends to the sender, giving the sender's and receiver's devices mobility. (NGN:next-generation network; IMS: IP-based Multimedia Subsystem) [6]

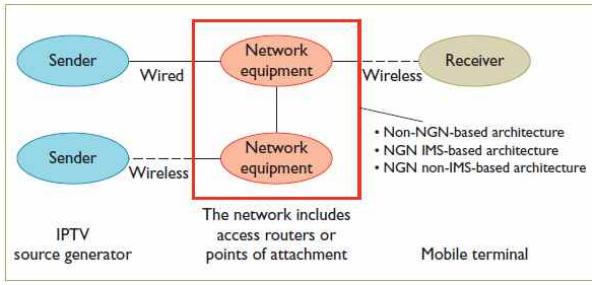

Figure 4. Mobile IPTV architecture in next-generation network.

3. Conclusions

In this paper, we introduce the mobility prediction and Qos provisioning to provide seamless mobility to mobile IPTV users. These methods have already proposed for IP-based wireless and mobile networks. In this point, we should develop hybrid resource reservation scheme to serve mobile IPTV service to mobile user. Also, we indicate QoS-provisoning factor that is most important method after mobility prediction. Thus, we are going to make a better resource reservation scheme for seamless mobility in mobile IPTV environments.

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