

An Effective Solution for the Multimedia Telephony Services in Evolving Networks

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Abstract

In the process of a mobile network evolution to the All-IP, it is inevitable to experience a transient period embracing both circuit and packet based data traffics. At the stage of those hybrid networks, it is important to build them in an efficient manner in terms of resource utilization which is closely related to the overall system operation cost. Especially, the multimedia telephony is one of the essential services in the advanced packet based mobile networks. In this paper an effective method of system operation is proposed for building up the multimedia telephony service while the legacy network co-exists. The proposed solution is based on the careful investigation of the usage pattern of the multimedia services in the evolving networks. This method is also expected to be a useful guideline for the network resource planning.

Key words: Mobile multimedia service, network resource, network evolution

1. INTRODUCTION

Recent mobile networks are being evolved to accommodate the explosively growing data traffic. Significant portions of the total traffic are being occupied by multimedia services due to the advancement of mobile devices and rapid increase of user expectation of the quality of mobile services [1]. Mobile devices such as smart phone, tablet and laptop PC are already penetrated to almost everyone's daily life and now able to support various types of multimedia functions. This is possible due to the integration of various top-notch technologies into the mobile equipment which include advanced data processing and transmission unit, high-quality camera, high precision display and high capacity data storages. The increased bandwidth and versatile mobile terminals in turn attracts interest in new services from both service providers and end users' sides.

The multimedia telephony is one of the representative and essential services provided by the advanced mobile networks. This paper proposes an effective solution of the system operation for implementing the multimedia telephony service. Detailed procedures are discussed to handle the multimedia telephony call in an efficient manner [2].

2. PROPOSED METHOD

The multimedia telephony service is one of the data services whose conceptual service flow can be summarized as shown in Fig. 1. The first step in this service flow is to request the corresponding service. The set-up stage of the data traffic session is followed. The multimedia telephony service application receives and sends the data traffic over the PPP session. The disconnection request is issued when all the data transmission is completed. The mobile device releases the data traffic set-up and moves to the dormant state.

In the proposed scheme usage patterns of subscribers for the multimedia services are monitored. If the subscriber does rarely use the service within the monitoring window

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period, related systems delete the information of the corresponding subscriber. The proposed method can help the network to handle more number of subscribers with less system capacity.

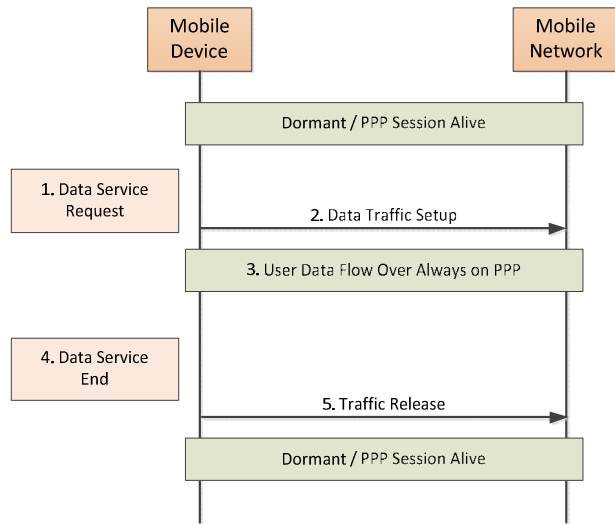


Fig. 1. Service flow of the multimedia data service

Although the information is deleted for infrequent users the proposed method still provides the way to handle the incoming call to them [3]. If a multimedia call which has no information in the system is generated, a request message is sent to HSS (Home Subscriber Server). The HSS sends the registration message to the UE (User Equipment). The UE processes the registration and it also registers to the CSCF (Call Session Control Function). The BSD (Billing Subdivision Device) has a function of analyzing data packets and the PCF is a packet control function system [4]. The block diagram for the multimedia data service subsystems are shown in Fig. 2 [5].

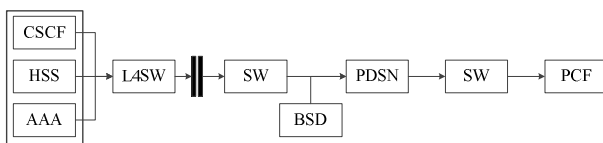


Fig. 2. Block diagram for multimedia data service subsystems

3. RESULTS

Simulations are done to assess the effectiveness of the proposed method. In this simulation, the conventional and the proposed methods are compared based on the required system

resources to build up the target service. The number of subscribers is assumed to grow from 8.3Million to 9.9M and the capable device rate is 50%. Also the usage rate of the service is assumed 40% of maximum capacity which is equivalent to 0.8M for HSS, 2M for AAA, 0.5M for PDSN, 0.6M for CSCF and 0.5M for BSD. Here the operation rate is assumed to be in the range of 60~90% which varies depending on the subsystem. Comparison of the resource possession rate for the conventional and the proposed solution is summarized in Fig. 3. As shown in the figure the number of occupying user is significantly reduced by applying the proposed management method which is equivalent to the reduced scale of the subsystems required for the stable network operations.

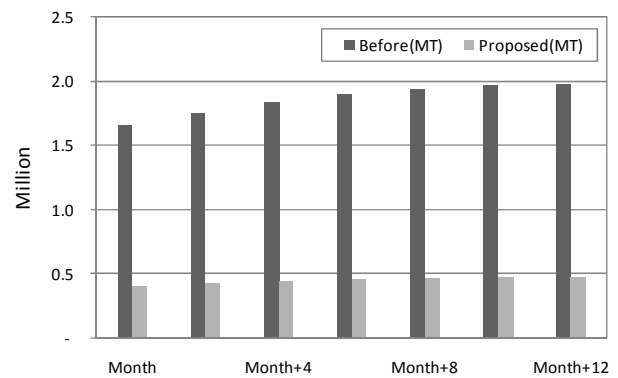


Fig. 3. Number of subscribers occupying network resource

4. CONCLUSION

An effective solution for the network operation is proposed for building up the multimedia telephony service. This scheme is especially effective on the transient stage where the usage pattern of the subscriber is varied. In this scheme a detailed procedure is provided as a guideline for deleting database information for the dormant equipment. Also provided is the multimedia call process for those subscribers. From the operator's point of view this method helps them make a gradual on-demand based investment in the new mobile services. Simulation results show that the core building blocks required for the multimedia telephony service can be scaled down while maintaining compatible quality of service level.

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