Chapter 3

Future Multimedia System:
SIP or the Advanced Multimedia System

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ABSTRACT

In future multimedia systems, seamless access to application services on different devices available to users in their vicinity, will be commonplace. The availability of these services will change as the mobile user moves. Current 3G multimedia systems do not support access to multiple applications operating on multiple different devices in context of a session or indeed seamless device session handover. Considering these requirements, the authors outline two multimedia communication platforms which potentially solve this problem. This paper describes a backward compatible architecture based on the widely adopted Session Initiation Protocol (SIP) and also outlines a clean slate approach from ITU-T SG 16 called the Advanced Multimedia System (AMS). For each of these solutions the paper describes in terms of architecture, signalling, and capability negotiation, what are viewed as the most critical functions in future multimedia systems design. The result of this comparison displays the advantages and disadvantages of each approach, and outlines solutions to satisfy challenges of current and future multimedia systems based on the service access requirement in ubiquitous environments. Furthermore, this comparison is used to suggest approaches that are best suited for future multimedia system design.

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INTRODUCTION

Future multimedia networks will be a ubiquitous communication platform that allows users to enjoy continuous multimedia services in any location on any device. The user needs to be able to discover devices, discover services and capabilities, set up sessions, negotiate session characteristics, transmit data, adapt media, and modify sessions including seamless session handover, to enable best in class communication experience based on the context. A modular framework is needed to satisfy these requirements and to allow for independent evolution and development. Future multimedia communication will be based on Service Orientated Architecture (SOA) principles. Service composition will involve the collective use of multiple multimedia applications of different devices. To achieve this, it is necessary to "logically separate applications from the user’s network interface device" (Jones, 2007). The separation of base session signalling from applications means application developers do not need to be concerned with session signalling. The result is an ease of development and the deployment of new applications.

The use of the Internet for voice communication has increased significantly in recent years. Using IP will allow the convergence of video, voice and many new applications in a manner not possible on traditional networks. This will enable the provision of arbitrary, new applications and services to users. As users have become accustomed to high quality of service for voice communication, the same expectations will be demanded for multimedia communication over the internet. A multimedia communication system will be required to provide the platform for these services. The question that arises is whether a backward compatible approach with extensions based on SIP is that platform or if a clean slate approach like AMS is required.

SIP has been adopted by most telecommunication standards as the de facto signalling protocol for Voice over IP. It is an IETF standard and was designed to be a generic framework to set up and tear down multimedia sessions. SIP provides a number of principal functions including; user location, user availability, endpoint capabilities and session set up and session management. RFC 4485 clearly states that SIP was not designed to emulate telephony. However, due to the universal acceptance of SIP by telephony providers, voice has become the only real application of SIP, with video being used sparingly. Through use with other existing protocols it can currently handle many other types of multimedia communication, namely; white boarding (Xiaotao & Schulzrinne, 2004), desktop sharing (Xiaotao & Schulzrinne, 2004), file transfer (Xiaotao & Schulzrinne, 2004; Zhang, 2009), but use of SIP based solutions with these applications has been minimal. Support for these has evolved through industry, academia and the many working IETF working groups like SIP, MMUSIC, SIPPING, SIMPLE. Further technological advances are required for it to become the future, all embracing platform. Based on the extensibility of SIP such an approach is possible, but the ability to control complexity in supporting current and future applications is the fundamental challenge for SIP. The Session Description Protocol (SDP) (Handley & Jacobson, 1998) has been used in conjunction with SIP to describe multimedia sessions. To extend its initial scope and address issues viewed as limiting, like the ability to advertise capabilities, SDP has undergone significant changes in recent years..

ITU-T SG 16 is in the process of defining the AMS network and terminal architectures to support future multimedia communication. In contrast to SIP, it is a "clean slate" approach. One of its primary goals is "to create a new multimedia terminal and systems architecture that supports distributed and media rich collaboration environments" (ITU-T Study Group, n.d.a). With recommendation number H.325 for the main specification, the current status described here is work in progress. As part of the design,
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