MOMENTS – Multimedia Services in a Narrow-Bandwidth Cellular Environment

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Abstract. With the rapid success of the Internet and the World Wide Web on-line access to distributed multimedia data became feasible to experts, but also to regular customers of commercially available Internet- services. At the same time relatively inexpensive and widely available wireless data communication services became available to the mass market. Within the coverage of cellular networks the vision of multimedia information access for "everyone, anytime, anywhere" became reality. This paper describes concept and implementation of MOMENTS (MOBILE Media and ENTertainment Services) - a complete WWW on-line service for mobile customers. MOMENTS is a joint project of 10 leading European companies. The project is partially funded by the European Union ACTS program. MOMENTS' client-server architecture employs cellular GSM/DCS-1800 telephone networks for data connection. MOMENTS provides several information services specifically designed for mobile low-bandwidth applications, e.g.: automatically adapted third party on-line service providers' content, determination of customers geographical location, dynamical provision of location dependent content. Dynamic SMS alert of events to be specified within the service, specifically processed and distributed Video/ Audio material, variety of specific premium services especially designed for the mobile professional. Enhanced animation/3D presentation techniques. Additionally, MOMENTS provides a unique micropayment technology which employs the mobile phone SIM card for purse purposes. Charges for services are automatically deducted from this purse. The purse can be "filled" by on-line withdrawal from the customers bank. The MOMENTS-service also provides specific secure authentication capabilities. On clients site the usage of the system within a narrow-bandwidth environment is supported by a number of specifically designed browser plugins. Capabilities of plugins include audio/video decompression, visualization of vector data and VRML data, acquisition of mobile phone cell information. The complete system was successfully installed and tested on trial sites in Italy, UK, Germany.
1. Introduction

In his famous book 'Hitchhiker's Guide to Galaxy' [ada94] Douglas Adams provides Ford Perfect, one of his main characters, with a special electronic travel guide. Whenever Ford Perfect needs any particular information he just types in a keyword and gets all the desired data. Sometimes even more. The combination of a mobile terminal and WWW based information services for mobile customers and cellular GSM/DCS-1800 telephone networks is almost the same. Actually it is more!

The WWW provides a huge variety of information services. Only to mention a few: global search engines, entertainment programs based on images, sounds and movies, electronic newspapers, electronic commerce, virtual traveler guides, interactive games etc. The global community that accesses to such services grows continuously and can only be counted by the millions.

But still the majority of these services is dedicated to be connected to the Internet via fixed networks. But, with on-line services especially designed for mobile customers, widely available wireless data communication services and inexpensive mobile terminals the vision becomes reality: "everyone, anytime, anywhere".

Currently, there are already approaches to address the problem [mob97]. Within the European Community the Advanced Communication Technology and Services (ACTS)- Program supports activities in order to develop Internet Protocol (IP) based mobile multimedia services. In this regard, MOMENTS (MOBbile Media and ENTertainment Services) is just one leading-edge ACTS joint project of 10 European companies.

This paper focuses on concept and implementation of MOMENTS. The overall objective of MOMENTS is to demonstrate the technical feasibility and business viability of an on-line service for mobile users. The aim of the project is to contribute significantly to the understanding of the users' perception of wireless multimedia services, identify how commercial exploitation of the services using the WWW can be accelerated, create new technologies and make valuable contribution to standardization.

MOMENTS is an integrated on-line service for mobile users based on GSM/DCS-1800 cellular networks. From the architectural point of view MOMENTS consists of the server platform, a client running on top of a commercial Internet browser and the connecting cellular network with feeds to various other networks. The general architecture of the system will be explained in chapter 2. On clients site the usage of the system is supported by a number of specifically designed browser plugins. Capabilities of plugins include audio/video decompression, visualization of vector data and VRML data, acquisition of mobile phone cell information. Additionally, MOMENTS provides a unique micropayment technology which employs the mobile phone SIM card for purse purposes. Charges for services are automatically deducted from this purse. The purse can be "filled" by on-line withdraw from the customers bank. General features of the payment system are described in chapter 2 to.

Complementary to the technical platform MOMENTS provides various premium information services for mobile customers. These services are especially designed to fit into the GSM specific low-bandwidth requirements and to match the information needs of mobile customers. They are based on an extended HTML-protocol and are