Multimedia Transport for Mobile Video Applications

FP7 MEDIEVAL addressed the inadequacies of the current mobile Internet, which was not designed for video, by developing specific enhancements to be introduced at all layers of the protocol stack where needed. It presented a cross-layer design that, by exploiting the interaction between layers, can raise the performance to values unattainable with individual developments.

PROJECT WEBPAGE URL
http://www.ict-medieval.eu/

Main Project Team

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Funding Agencies

EU	450,000€
Start Date	01/07/2010
Ending Date	01/10/2013

Indicators

Journal Papers	23
Conference Papers	56
Patents	6
Concluded PhD	2
Concluded MSc	6

Two Main Publications

D. Corujo, B. Santos, C. Guimarães, R. L. Aguiar, **Using an Open-Source IEEE 802.21 Implementation for Network Based Localized Mobility Management**, IEEE Communications Magazine, Vol. 49, No. 9, pp. 114 - 123, September, 2011

E. Rocha, D. Corujo, R. Aguiar, **Implementing and Evaluating Improved MAC Efficiency in 802.11n Networks through Payload Extension**, IEEE International Conference on Communications (ICC) 2013 - 3rd IEEE International Workshop on Smart Communication Proto, Budapest, Hungary, Jun 2013

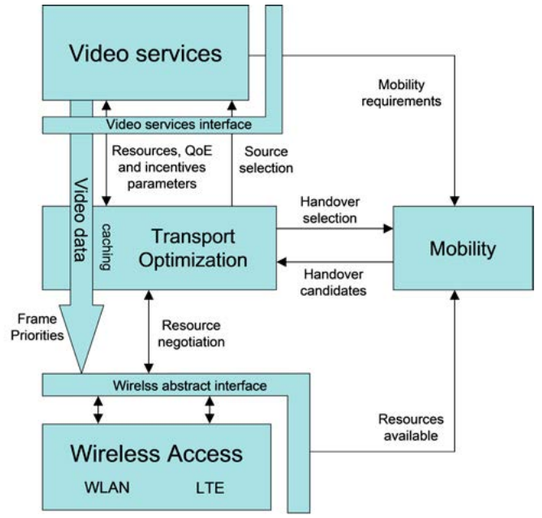

Fig. 1 MEDIEVAL Personal Broadcast Scenario.

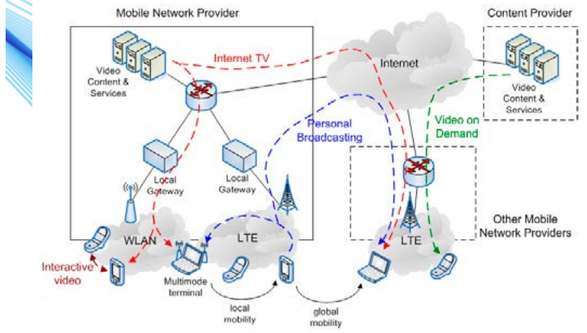

Fig. 2 The Medieval Vision.

GENERAL MOTIVATION AND OBJECTIVES

MEDIEVAL aimed at evolving the Internet architecture for efficient video transport. The proposed architecture followed a cross-layer design that, by exploiting the interaction between layers, could raise performance to values unattainable with individual developments. Moreover, Internet utilization in increasingly being done by multi-interfaced mobile terminals (i.e., smartphones with Wi-Fi and Celular technologies). In this sense, optimization mechanisms towards better video support in the Internet must take into consideration this fact, and should be tailored with mobility support in mind. In MEDIEVAL, this mobility support considered as well optimization opportunities that involved mobility, such as the ability to move flows from one interface (i.e., cellular) to others presenting better conditions (i.e., WiFi) without disruption to the video. Also, optimizations at the video transmission itself (i.e., adjusting the quality based on the current performance of the network) were also developed. The technology developed by the project was designed taking into account the requirements of network operators for commercial deployment, and aimed at improving the Quality of Experience by users as well as reducing the costs for operators. MEDIEVAL technology was developed in a testbed that serves as a proof of concept of the project results as well as a basis for future commercial deployments.

CHALLENGE

Video is a major challenge for the future Mobile Internet which was not designed with video requirements in mind. Video is a major challenge for the future Internet. This traffic type has started to account for close to 90% of consumer traffic from 2012. However, the current mobile Internet is not designed for video and its architecture is very inefficient when handling video traffic. The vision of this project considered that the future Internet architecture should be tailored to efficiently support the requirements of this traffic type. Specific enhancements for video were introduced at all layers of the protocol stack where needed. Moreover, Internet access for video has started to become more used by mobile terminals which further increases the complexity of any kind of optimization mechanism. As such, this challenge needs to consider that content requesters are mobile and can be reachable via different kinds of access networks simultaneously. Finally, the increasingly social component of the Internet, mirrored by the success of social networks such as Facebook and YouTube, has created complex new scenarios where the mobile users evolve from consumers into producers of information. When this kind of content is video, especially in the real-time kind, the way that the mobile network supports this feature needs to be rethought, allowing optimized broadcast capabilities to mobile users and their consumers. Scenarios such as Personal Broadcasting could enable a new era in different areas, such as using the Internet to broadcast news and events.

WORK DESCRIPTION AND ACHIEVEMENTS

The project focused on a set of aspects, namely: i) Support for network mechanisms optimally customized to the specific needs of video services. This is provided by means of the specification of an interface between video services and underlying network mechanisms that allows video services to optimally customize the network behaviour, thereby improving user experience; ii) Enhanced wireless access to optimize video performance by exploiting the features of each available wireless technology in coordination with the video service requirements; iii) Design of a novel dynamic mobility architecture for next generation mobile networks, adequate to video traffic; iv) Optimization of the video delivery by means of Quality of Experience (QoE) driven network mechanisms, including Content Delivery Networks (CDN) techniques adapted for the mobile environment; and v) Support for broadcast and multicast video services, including Video on Demand and Personal Broadcasting, by introducing multicast mechanisms at different layers of the protocol stack.