



MITSU

Project ID: C2012/1-5

Start Date: 1 December 2013

Closure date: 30 September 2016

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Project Websites

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next generation Multimedia efficient, Scalable and robUst delivery

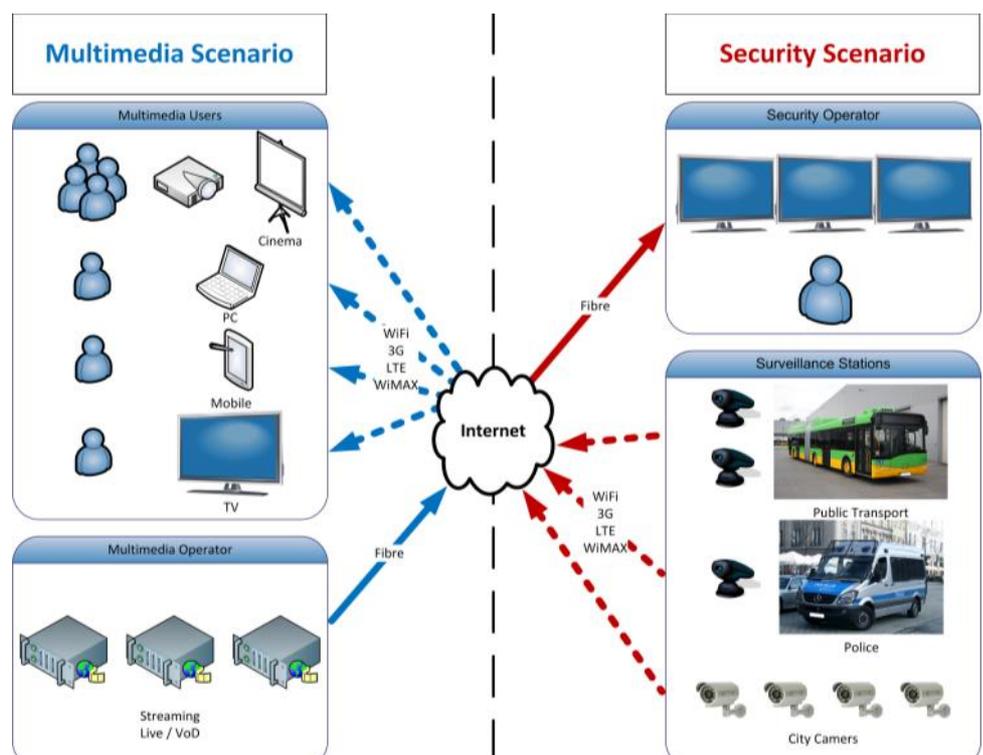
The objective of **MITSU (next generation Multimedia efficient, Scalable and robUst Delivery)** has been to study and develop the **next generation of multimedia streaming systems** to be used **over wireless networks**.

Main focus

Seamless and continuous video delivery to users wherever they are and whatever network connection they are using is one of the major challenges for telecom operators and content providers. Market opportunities are pushing toward a very fast deployment of video solutions that are not interoperable and imply an increasing processing complexity. This often causes a decreased quality of delivered video, especially over wireless networks. MITSU has developed a set of technologies that optimize video transmission over hetero-

geneous wireless networks. Thanks to MITSU end users can get better video quality.

MITSU has focused on the full chain of video delivery, from video sources through encoders, transmission channels, wireless networks and up to end user devices. It has developed algorithms and methods optimizing encoding and transmission processes that can dynamically react to the changing network parameters. The project has taken into account video delivery over WiFi, LTE and WIMAX networks. Two main video delivery scenarios were studied: the multimedia scenario where multiple users watch the same video content and the security monitoring scenario, where multiple video sources are delivered in uplink direction and presented to end user.



Approach

MITSU has proposed a robust, efficient and interoperable video streaming solution by studying and implementing the following key elements:

- ◆ Video codecs
- ◆ Video streaming protocols and format interoperability
- ◆ Video transcoding and transrating
- ◆ Video quality metrics and probes
- ◆ Robustness enhancement
- ◆ Context aware video streaming adaptation
- ◆ Management of heterogeneous networks
- ◆ Cross-layer optimisation
- ◆ Privacy, security and content protection
- ◆ Latest-generation mobile communication system
- ◆ Implementation of multimedia and security application use cases
- ◆ Field trials
- ◆ Cloud Computing management

Two main demonstrators have been realized in MITSU, one for multimedia and one for security applications.

The Multimedia Scenario focused

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

on the full chain of delivery of video content to end users. It was tested with real users in Spain, where the last mile connection was done over wireless networks. The test-bed contained video encoders and DRM media storage deployed in a cloud environment. The end users received set-top-box devices allowing them to watch videos on their TVs. A monitoring system visualises both the cloud, wireless links and end users devices providing information that can be used to adapt the streaming parameters to optimize the quality.

The Security Scenario has been tested in Poland, where monitoring cameras have been placed in different locations in the city of Poznan. Video streams from the cameras were sent to a monitoring centre. The system monitors the link state, the quality of the stream's content and can take the viewer's preferences into account in order to assign more bandwidth to a specific stream in order to increase its quality. Additionally, a mobile monitoring robot has been integrated with the platform, gaining the interest of public authorities.

Achieved results

The MITSU project has achieved various levels of technical innovation either as component (software

or hardware) or as technologies for various usages:

- ◆ Convergence of Broadcast, Telecom and Web technologies within a common set of components and tools, in special for cloud services
- ◆ Minimisation of processing complexity regarding video transport and adaptation
- ◆ QoS and QoE for better video encoding and transport
- ◆ Converging technologies to be used in multimedia and video surveillance application
- ◆ Constant QoE monitoring at the end user's premises and introduction of content- and QoE-awareness to the system
- ◆ Modular architecture allowing to separately introduce evolutionary improvements to existing solutions
- ◆ Video quality assessment methods - standardization
- ◆ Cloud and network monitoring and end to end content delivery
- ◆ Cross-layer optimization algorithm for adaptive media streaming over cellular networks
- ◆ WIMAX trace collector for performing drive tests

Impact

The main innovation of MITSU is the constant QoE monitoring at the end user's premises and introduction of content- and QoE-awareness to the system. This steps beyond the state-of-the-art, where only QoS information is gathered and used and allows for a novel approach to various decision processes, which can benefit from a more complete set of information. This is however not the only possibility, as various MITSU components can be used separately to introduce evolutionary improvements to existing solutions. The companies taking part in the project, besides introducing new products based on MITSU, have also improved some of their existing solutions. The work done by the project has also resulted in contributions to two Quality of Experience related standards and many scientific publications. This underlines the high exploitation potential of MITSU and the benefits for end users, telecom operators, content providers and authorities.

or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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