

MONALIS

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Monitoring and control of QoE in large-scale media distribution architectures

In MONALIS, we have developed techniques and tools for QoE (Quality of Experience) evaluation of the overall customer satisfaction in large-scale media distribution architectures, as well as measurement platforms making data available from all levels around MONALIS integrated ecosystem, which has been brought to the European market in terms of different components.

Main focus

MONALIS has focused on managing the QoE in the content distribution on Internet communications of future networks. To this end, user-based management capabilities have been provided by monitoring, analysing, measuring and estimating the quality of the Over-the-top (OTT) multimedia content experience. On the other hand, mechanisms for its implementation in content distribution networks have been established in order to efficiently manage services with maximum user satisfaction.

The components of MONALIS ecosystem are:

- ◆ **Component 1: Monitoring of large scale multimedia from players:** QoE evaluation to measure the Mean Opinion Score (MOS)
- ◆ **Component 2: Monitoring of mobile multimedia data traffic:** analysis of the QoS from mobile network
- ◆ **Component 3: Monitoring of commercial OTT video services:** performance management from streaming servers and delivery appliances
- ◆ **Component 4: Monitoring of users feedback:** analysis of the QoE from customers evaluation of multimedia contents

Approach

The MONALIS project has targeted heterogeneous QoE that covers a wide range of multimedia contents, which are im-

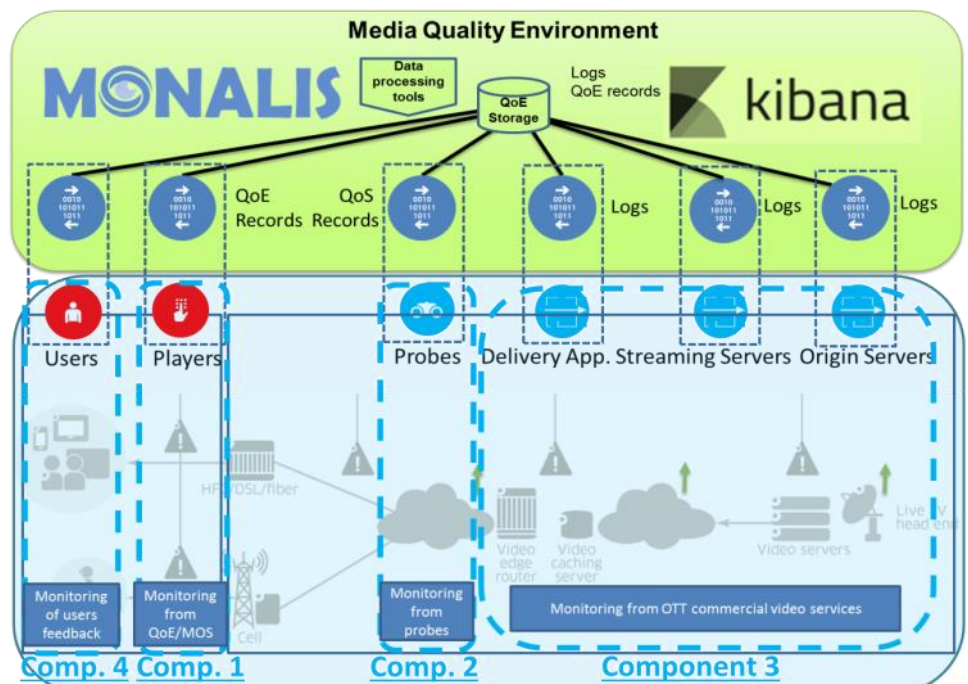


Figure 1: Ecosystem of MONALIS project and its four components

portant for content broadcasting over future communication networks. The gradual migration of applications, communications, and network systems to cloud-based architectures impose new challenges, especially to large-scale media distribution systems. In this context, MONALIS has tackled these challenges by providing a QoE-based management through understanding, measurement, analysis, monitoring, and estimating QoE on a large-scale networks. This will help heterogeneous cloud-based media distribution providers to adapt, control, and manage the services in an efficient way with a high user satisfaction.

Achieved results

The MONALIS ecosystem has contributed to Future Service Platforms development paradigm. The scalable, efficient and QoE-controlled open environment for multimedia content delivery is a key factor for future services deployment, which strongly rely on high quality media experience. It is crucial to provide it in the OTT manner, which will support the concept of global service delivery and enable third-party applications deployment.

The main achieved results of MONALIS project have been:

- ◆ To provide new evolved monitoring techniques and tools for QoE evaluation and analysis relevant

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

for overall customer satisfaction specifically for large-scale technologies, where network-aware supervision methodologies are applicable

- ◆ To provide measurement platforms making data available from all network levels, from low level packet information up to data about end user experience: MONALIS integrated management ecosystem
- ◆ To provide an experimental evaluation of an over-the-top video on demand distribution system with underlying network management technologies for QoE assurance

MONALIS has generated 12 products that have been impacted by the project and five contributions to standardization bodies (TM Forum, VQEG and ITU-T). In addition, several papers (16) have been accepted in journals, conferences, workshops and posters; exhibitions and events (6) and PhD theses (2) plus Master theses (5) completed. In addition, we have made several commercial presentations, disseminated project details within our companies and on the Internet –website, twitter and leaflet.

Furthermore, the close collaboration within the consortium has also strengthened links between companies and partners and resulted in further cross-border collabora-

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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tions in CELTIC-Next projects such as 5G-PERFECTA and UNICRINF.

Impact

The project MONALIS has developed the technology to monitor the QoE in large-scale media distribution architectures, by estimating the quality of the OTT multimedia content experience from the user perspective. In addition, the mechanisms for its implementation in content distribution networks have been developed in order to efficiently manage services with maximum user satisfaction. The impact of MONALIS is to have brought to the European market an ecosystem for quality assurance of next generation large-scale multimedia services, as well as several contributions to academic arena (16 scientific publications and seven PhD and master thesis) and standardization bodies (five contribution to standards). Twelve products from the four components of MONALIS (users, players, devices and networks) have been created and improved. In addition, we can emphasize that all the partners report that MONALIS has significantly improved their business position in comparison with their direct competitors.

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