

*ADAMANTIUM Project:
Enhancing IMS with a PQoS-aware
Multimedia Content Management System*

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ADAMANTIUM

- ICT – 214751
- Started on March of 2008
- Duration 30 Months
- Partners:
 - NCSR Demokritos, Greece
 - University of the Basque Country, Spain
 - University of Plymouth, United Kingdom
 - Rohde & Schwarz, Germany
 - Thomson Grass Valley, France
 - Vodafone, Greece
 - Ericsson, Spain
 - Viotech Communications, France
- Project Coordination:
NCSR Demokritos, Greece
- Technical Management:
Ericsson, Spain

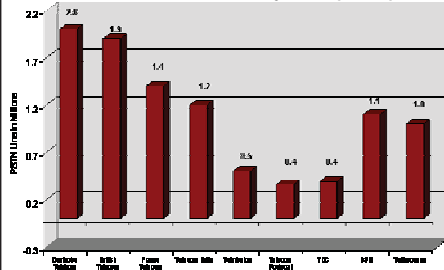
Convergence

The emerging multimedia opportunity



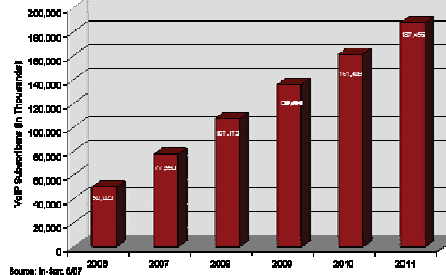
Multimedia Telephony is booming...

2006 PSTN line losses at major European operators



Source: Company Annual Reports.

Global VoIP subscribers - Forecast



Source: In-Stat, E&T

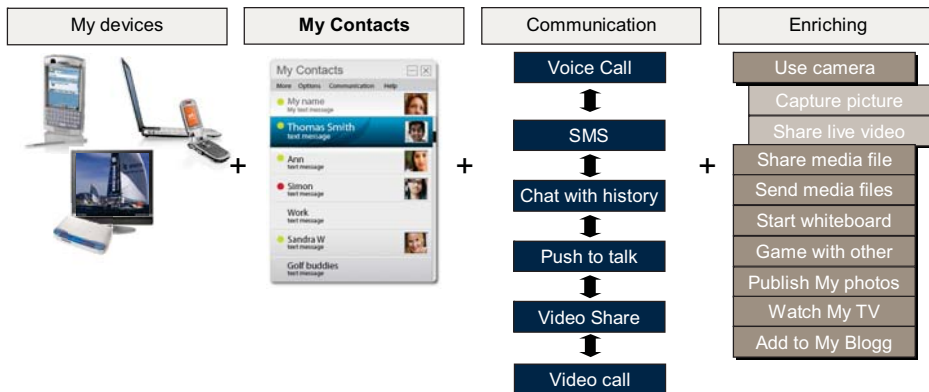
Driving forces:

- Legacy PSTN rates, especially for international calls
- Naked DSL
- Cable and VoIP competition
- Wireless substitution
- NGN and converged services from incumbents

- 15 million VoIP subscribers added in Europe in 2006, from 4.3 to 18 million
- Converged and multimedia add-ons (presence, IM, video) will secure growth
- Web interface to manage user services will trigger usage of features

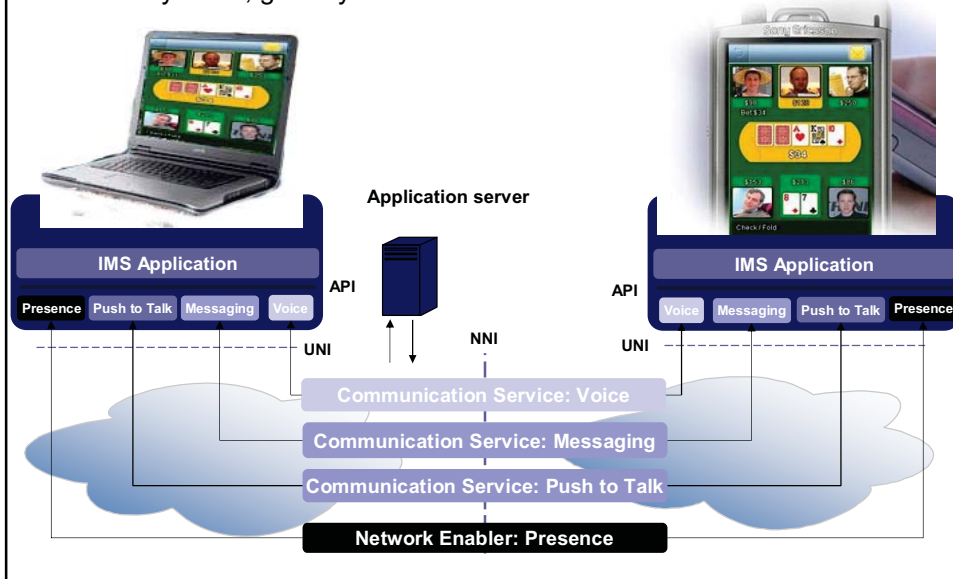
...but IMS delivers a richer end user experience

From purpose driven communication to context







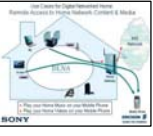







Personal Communities increase communication

Multitude of differentiating applications
Enabled by a few, globally standardized communication services



IMS Service Exploration

Ericsson References - Examples

Information		Entertainment		Management	
					
Content Body	Presence based Alerts	Converged multimedia services	Java games with presence	Remote Access	Video doorkeeper and tele assistance
Communication					
					
Location based buddy list	Community broadcast	Converged Communication Suite	Seamless Messaging	Call flagging	Mobile portal video sharing

From IMS... to ADAMANTIUM

- IMS entails novel business opportunities
 - IPTV
 - VoIP video call
- Lack of user-centric management mechanisms.

ADAMANTIUM proposes an IMS-compatible Multimedia Content Management System (MCMS) focused on performing dynamic cross layer adaptations for optimization of the user experience in terms of perceptual quality for media services.

User-Centric/Service-Driven Design

QoE (Perceived QoS)

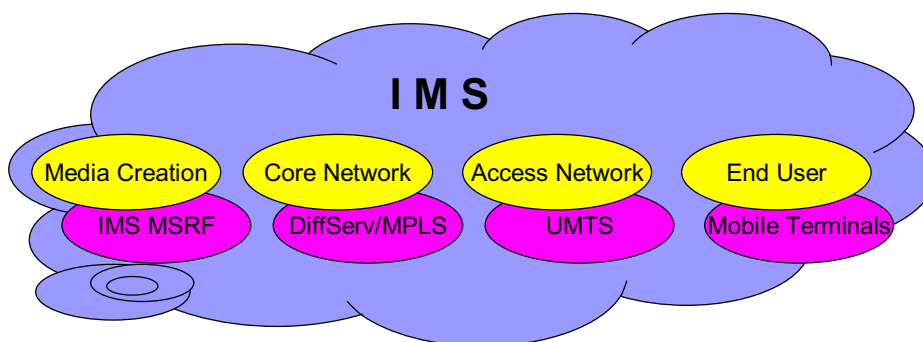


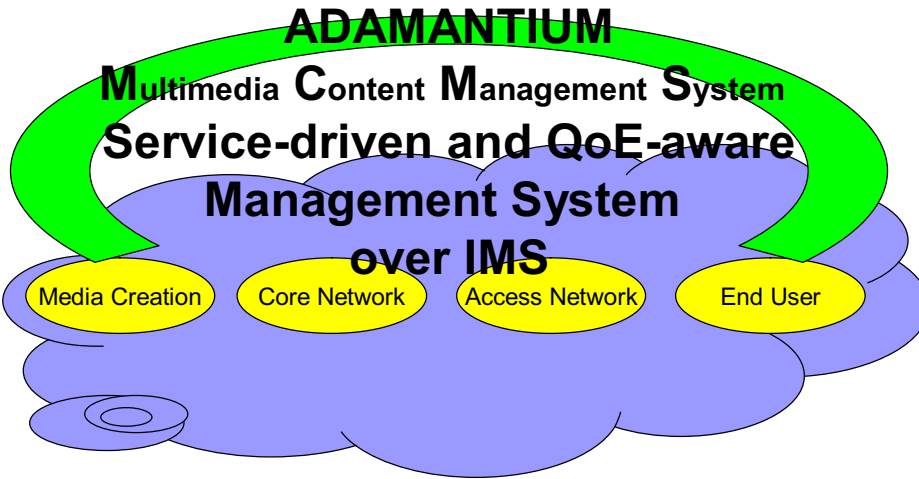
Network QoS



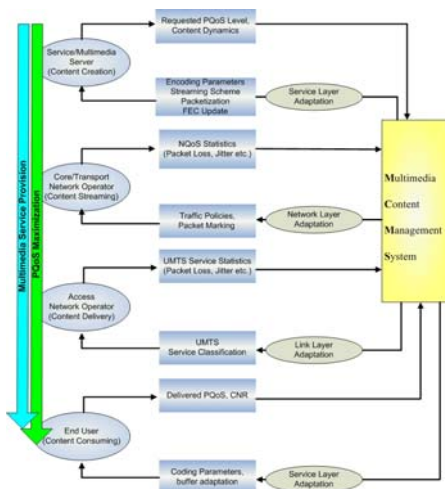
Network Design

Media Delivery Chain



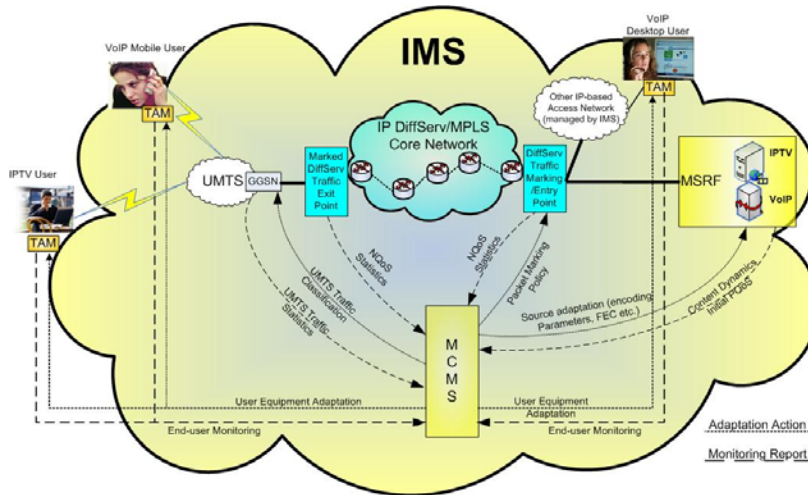


Conceptual diagram of the MCMS

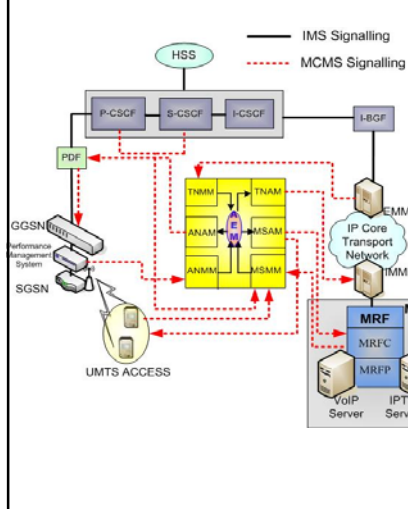


MCMS interacts with each element in the service provision chain via real-time monitoring and adaptation/control mechanisms to achieve end-to-end Perceived Quality of Service (PQoS) maximization.

The overall architecture of ADAMANTIUM



MCMS and NGN IMS architecture



- Multimedia Service Monitoring Module (MSMM)**
 The MSMM performs monitoring of the service session through the P-CSCF and S-CSCF modules of the IMS.
- Transport Network Monitoring Module (TNMM)**
 The TNMM module is used during the dynamic cross layer adaptation procedure for monitoring network statistics like packet loss, jitter etc. at the DiffServ/MPLS core transport network.
- Access Network Monitoring Module (ANMM)**
 The ANMM module monitors the UMTS access network statistics, based on the exploitation of historical data, which are updated in near real time by the UMTS performance management system at frequent time periods.
- Multimedia Service Adaptation Module (MSAM)**
 The MSAM performs adaptation actions at the end-user terminal device and at the service generation entity (i.e. the MSRF for IPTV services or the end-user terminal for VoIP applications) relative to the decoding (i.e. buffer scheme) and encoding (bit rate, packetization etc.) parameters, as well as FEC value adaptation towards enhancing the error resilience of the delivered service.
- Transport Network Adaptation Module (TNAM)**
 The TNAM applies the adaptation actions to the DiffServ/MPLS-enabled core transport network through the Internal Marking Module (IMM), which will be developed and integrated at the ingress router of the core network.
- Access Network Adaptation Module (ANAM)**
 The ANAM applies the adaptation actions, decided by the AEM of the MCMS, to the UMTS access network through the IMS PDF module.

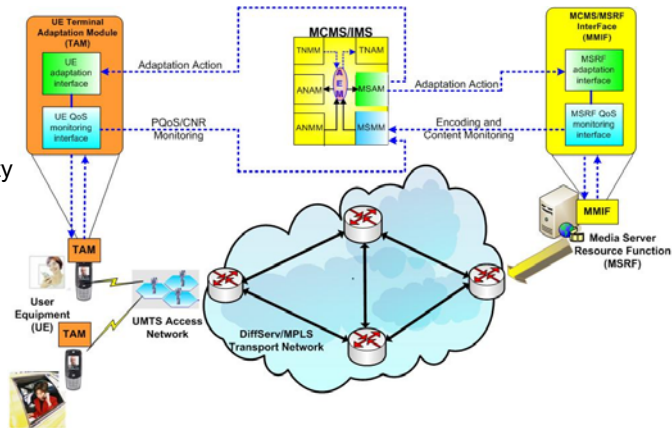
The Modules Interaction with MSRF and User-Terminals

Monitoring Data

- Content Dynamics
- Encoding Settings
- Delivered PQoS
- Signal Reception Quality
-

Adaptation Actions

- Encoding Parameters
- Buffer Size
-



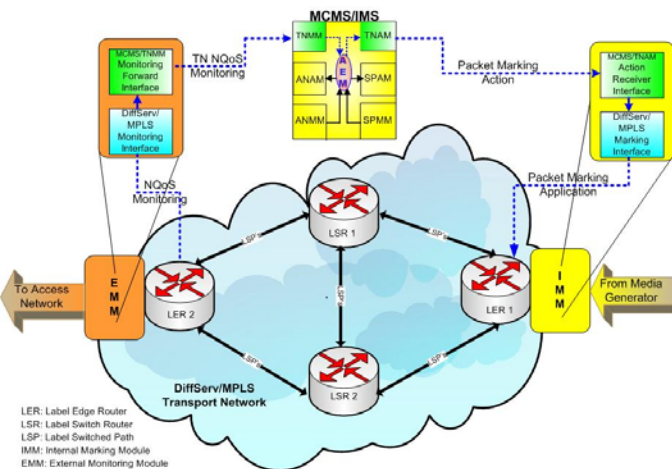
MCMS Interaction with Core Network Modules

Monitoring Data

- Packet Loss
- Jitter
- Delay
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Adaptation Actions

- DiffServ Classification
- Traffic Differentiation
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MCMS Interaction with Access Network Modules

Monitoring Data

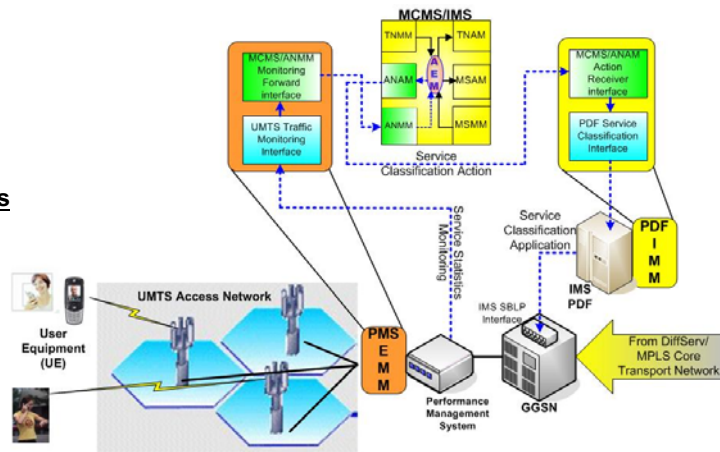
- SBLP Statistics

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Adaptation Actions

- UMTS Classes

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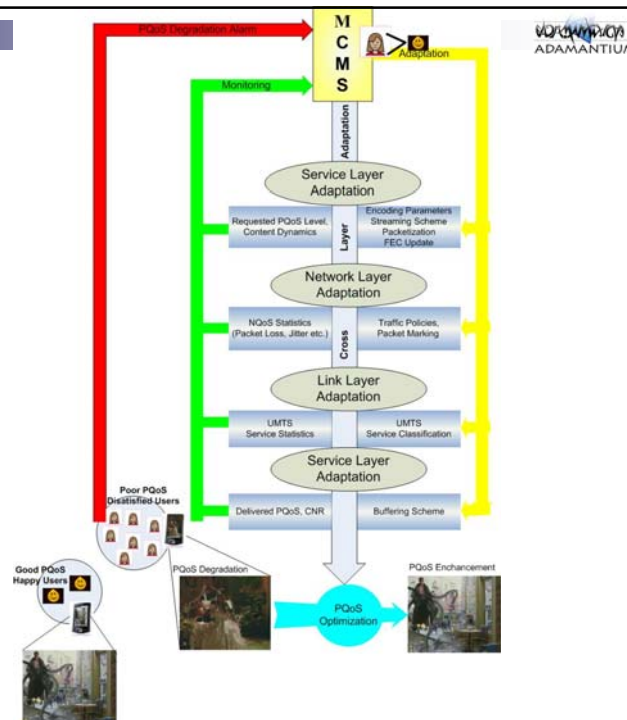
Use-case Scenario

Unicast

- VoIP
- IPTV

Multicast

- IPTV



QoE Research Challenges of ADAMANTIUM

- Network QoS to QoE mapping
 - DiffServ/MPLS Classes
 - UMTS Classes
- Encoding Parameters to QoE mapping
 - IPTV (video)
 - VoIP
- Spatiotemporal Classification of the Content
 - Preparation of video content at various quality levels
- Subjective and context-aware QoE evaluation algorithm
 - Converge various metrics
 - Considers the service impact on user perception

Engineering Research Challenges of ADAMANTIUM

- QoE-aware IMS
 - Enhancement of P-CSCF
 - Standardization Activities
- QoE-aware terminal devices
 - Terminal Adaptation and Monitoring (TAM) Module
- Multicast IPTV service over IMS

Concluding remarks

- ADAMANTIUM will create the conditions for a new generation of media services and technologies.
- The outcome of the project will include:
 - Enhancement of existing IMS architecture with QoE-aware mechanisms
 - Design and development of an IMS-based MCMS that monitors and adapts across the media delivery chain, the NQOS and QoE parameters
 - Development, evaluation and demonstration of QoE-aware dynamic cross layer adaptations for VoIP and IPTV services within a real IMS infrastructure.

Contact details

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■ Thank you...