

INVITED TALK @ TEMU 2008



2008/03/03

The MPEG-21 Multimedia Framework for
Integrated Management of Environments
enabling Quality of Service

The aim of this invited talk is to present and review of the concepts of the MPEG-21 Multimedia Framework and how it can enable Quality of Service (QoS) through the integrated management of heterogeneous contents, networks, and terminals (i.e., environments).

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THE MPEG-21 MULTIMEDIA FRAMEWORK FOR INTEGRATED MANAGEMENT OF ENVIRONMENTS ENABLING QUALITY OF SERVICE

Summary

The information revolution of the last decade has resulted in a phenomenal increase in the quantity of content (including multimedia content) available to an increasing number of different users with different preferences who access it through a plethora of devices and over heterogeneous networks. End devices range from mobile phones to high definition TVs, access networks can be as diverse as GSM and broadband networks, and the various backbone networks are different in bandwidth and Quality of Service (QoS) support. In addition, users have different content/presentation preferences and intend to consume the content at different locations, times, and under altering circumstances.

In order to become the vision as indicated above reality substantial research and standardization efforts have been undertaken which are collectively referred to as Universal Multimedia Access (UMA). An important and comprehensive standard in this field is the MPEG-21 Multimedia Framework, formally referred to as ISO/IEC 21000. The aim of MPEG-21 is to enable transparent and augmented use of multimedia resources across a wide range of networks, devices, user preferences, and communities, notably for trading (of bits). In particular, it shall enable the transaction of Digital Items among Users. A Digital Item is defined as a structured digital object with a standard representation and metadata and is the fundamental unit of transaction and distribution within the MPEG-21 multimedia framework. A User (please note the upper case "U") is defined as any entity that interacts within this framework or makes use of Digital Items. The MPEG-21 standard currently comprises 17 parts which can be clustered into six major categories each dealing with different aspect of the Digital Items: declaration (and identification), digital rights management, adaptation, processing, systems, and miscellaneous aspects (i.e., reference software, conformance, etc.). The talk will present and review these concepts with the emphasize on providing universal access to multimedia contents independent of the User's location, time, and other usage environment conditions.

Several projects funded by the European Commission (EC) – among them are DANAE and ENTHRONE worth to mention – have implemented and integrated (parts of) the MPEG-21 standard in order to demonstrate its feasibility. The aim of the DANAE Specific Targeted Research Project (STREP) was to develop scalable coding formats and an MPEG-21-based end-to-end architecture comprising a server, client, and adaptation node (all MPEG-21-enabled) which allows for dynamic and distributed adaptation of scalable media formats. On the other hand, the objectives of the ENTHRONE Integrated Project (IP) are to provide an integrated management solution enabling QoS within heterogeneous environments based on MPEG-21 and to demonstrate the ENTHRONE solution in a large-scale pilot. Therefore, the talk will review ENTHRONE's contribution to the UMA issue and will demonstrate how the MPEG-21 concepts are adopted on a broader scale.

Presenter CV

Christian Timmerer received his M.Sc. (Dipl.-Ing.) in January 2003 and his Ph.D. (Dr.techn.) in June 2006 (for research on the adaptation of scalable multimedia content in streaming and constraint environments) both from the Klagenfurt University. He joined the Klagenfurt University in 1999 and is currently a Assistant Professor (Ass.-Prof.) at the Department of Information Technology (ITEC) – Multimedia Communication Group where he also chairs the IT administration group.



At the university, he has been working on coding-format agnostic resource adaptation within the MPEG-21 Multimedia Framework. Other research interests include the transport of multimedia content, multimedia adaptation in constrained and streaming environments, distributed multimedia adaptation, and Quality of Service / Quality of Experience. He has published more than 30 papers (incl. book chapters and tutorials) in these areas and he has been a chair of the “Special Session on UMA (WIAMIS 2006) and the “Workshop on End-to-End QoS for UMA” (AXMEDIS2006). Furthermore, he is the general chair of WIAMIS 2008 to be held in Klagenfurt. He has been actively participating in several EC-funded projects, notably the FP6-IST-DANAE (2004-2006), FP6-IST-ENTHRONE (2006-2008), and FP7-ICT-P2P-Next (2008-2012) projects. For the FP6-IST-ENTHRONE, he serves as a work package leader and chairs the End-to-End QoS Management Committee. Additionally, he has been appointed as an expert member of the FP6-IST-AXMEDIS User Group and as an external expert board member for the same project. Furthermore, he participated in the work of ISO/MPEG for several years, notably as the deputy head of the Austrian delegation, coordinator of several core experiments, co-chair of several ad-hoc groups, and as an editor for Parts 7 and 8 of MPEG-21, Digital Item Adaptation and Reference Software for which he received ISO/IEC certificates. Publications and MPEG contributions can be found under <http://research.timmerer.com>.

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