

Fully Interoperable Streaming of Media Resources in Heterogeneous Environments

m16695

Michael Eberhard, [Christian Timmerer](#), and Hermann Hellwagner

Klagenfurt University (UNIKLU) ♦ Faculty of Technical Sciences (TEWI)

Department of Information Technology (ITEC) ♦ Multimedia Communication (MMC)

<http://research.timmerer.com> ♦ <http://blog.timmerer.com> ♦ <mailto:christian.timmerer@itec.uni-klu.ac.at>

Acknowledgement: This work is supported in part by the European Commission in the context of the P2P-Next project (FP7-ICT-216217). Further information is available at <http://www.p2p-next.org/>.

Outline

- Motivation and Introduction
- List of Technologies / MXM Engines
- Architecture and Dataflow
- Demo Video
- Conclusions / References

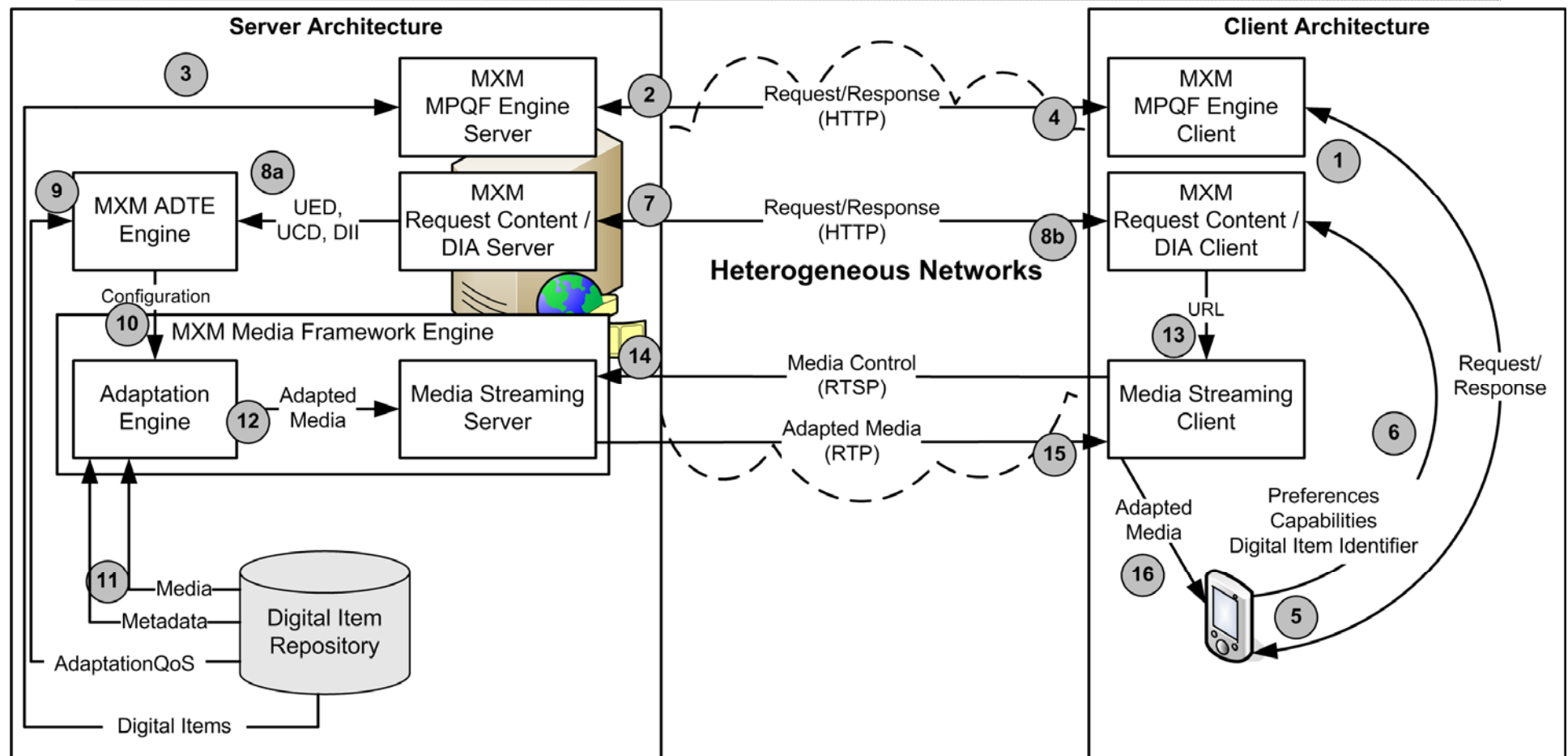
Motivation and Introduction

- Still an issue!
 - Streaming of multimedia (i.e., audio-visual) content over heterogeneous, best-effort networks
 - Quality of Service, Universal Multimedia Access
 - Mismatch between content and context
 - Interoperability
- Our contribution
 - Framework for adaptive streaming of (scalable) media resources according to dynamically varying usage environment conditions
 - Fully interoperable thanks to MPEG, IETF, and W3C
 - Open source and accessible through the MPEG Extensible Middleware (MXM): <http://mxm.wg11.sc29.org/>

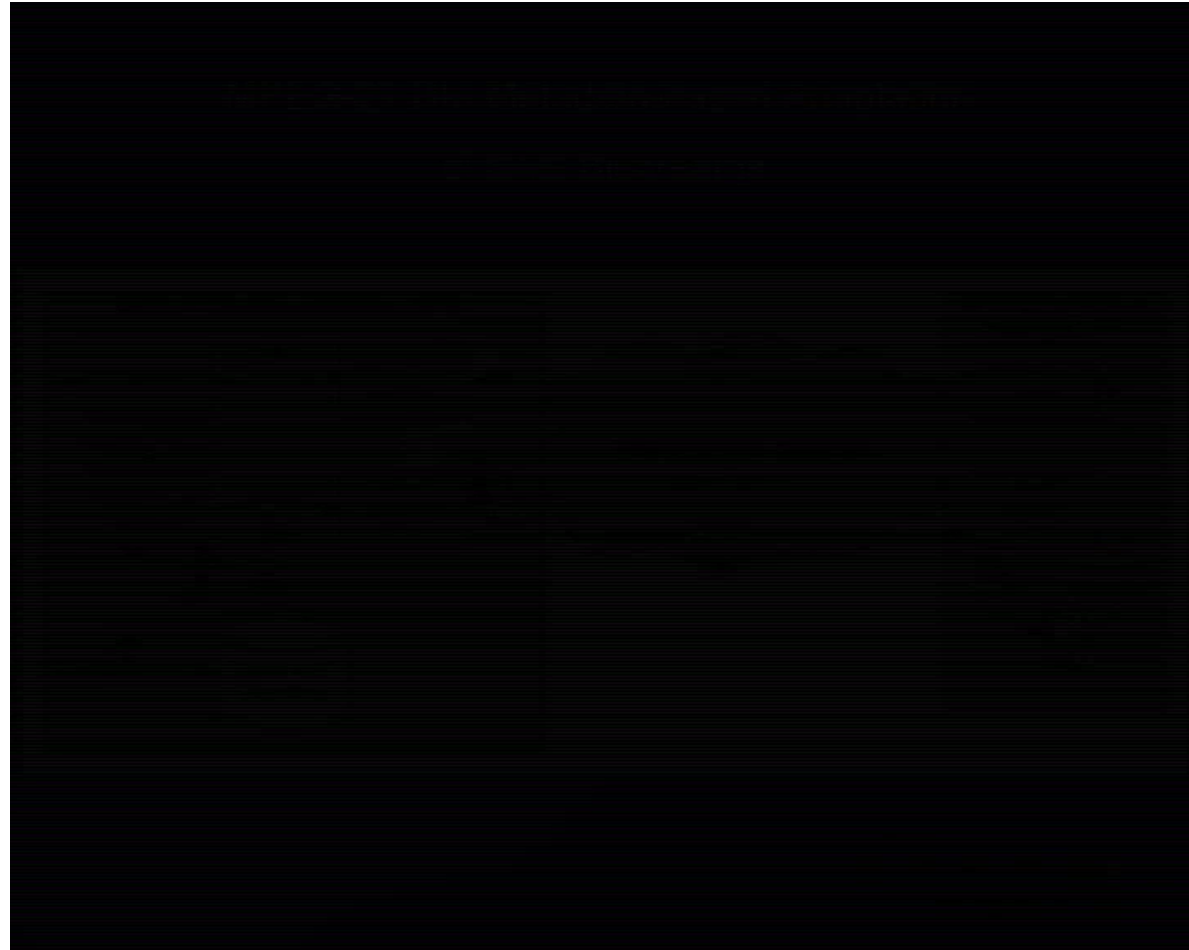
List of Technologies / MXM Engines

- MPEG Query Format (MPQF)
 - Querying a **list of available** Digital Items
 - Response: DID incl. **dii:Identifier** and **mpeg7:Title**
- MXM Request Content
 - Request Digital Item based on **dii:Identifier** incl. **UED/UCD**
 - Response: ACK + **RTSP** URL
- MPEG-21 Digital Item Declaration (DID)
 - For **declaring which DIs** are available as part of MPQF response
- MPEG-21 Digital Item Adaptation (DIA)
 - Usage Environment Description (UED): **terminal & network properties**
 - Universal Constraints Description (UCD): **limit & optimization constraints**
- MXM Media Framework Engine – VLC-based / ffmpeg
 - Media resource **adaptation**
 - Media **streaming, decoding, and control**

Architecture and Dataflow



Demo Video



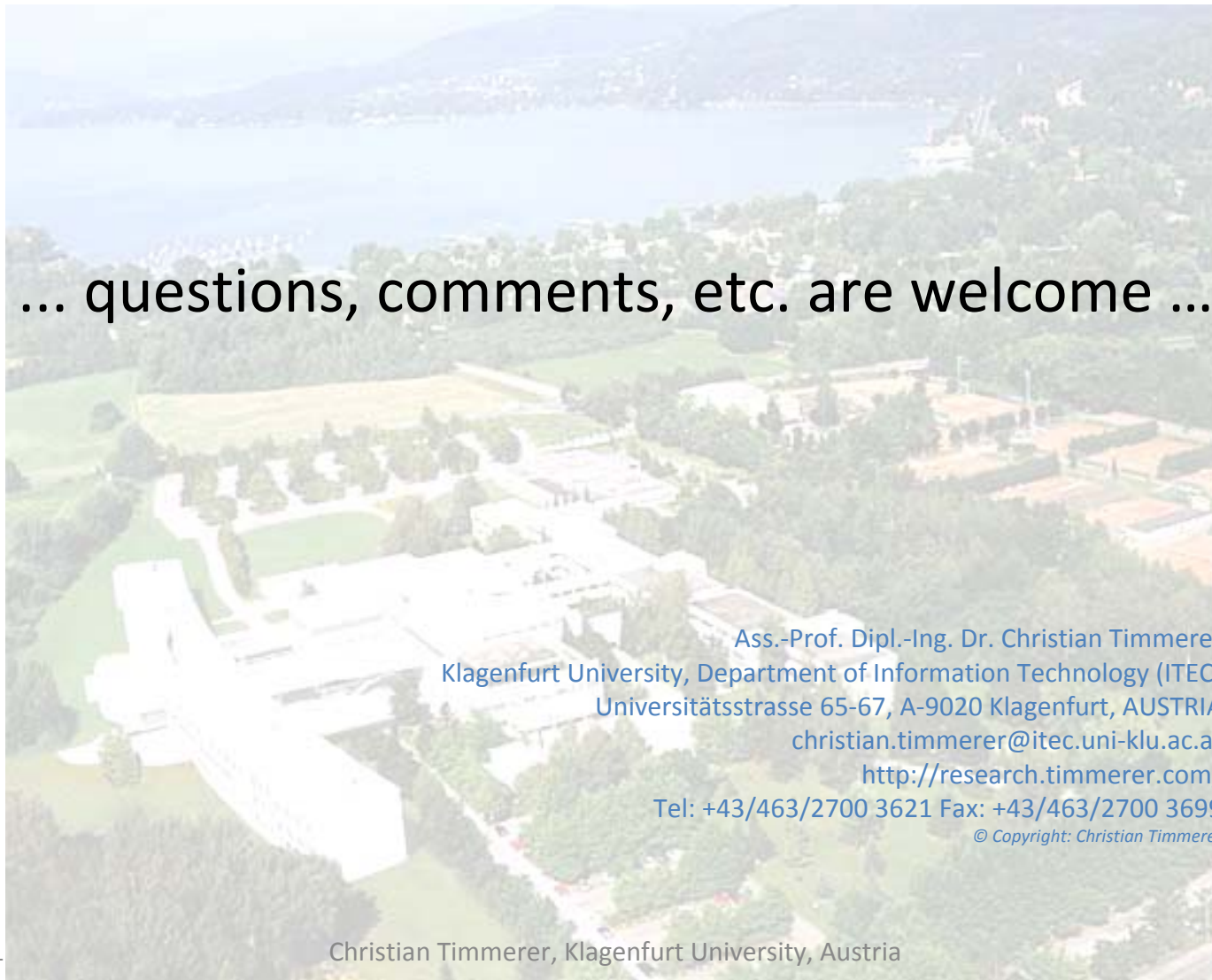
Conclusions

- Framework for **adaptive streaming** of (scalable) media resources according to **dynamically varying** usage environment conditions
- **Fully interoperable** thanks to MPEG, IETF, and W3C standards
- **Open source** and accessible through the MPEG Extensible Middleware (MXM): <http://mxm.wg11.sc29.org/>
- Some **issues** identified / lessons learned
 - **RTSP/RTP**: mainly deployed in closed systems and conditionally suitable for the open Internet → **TCP/80**
 - **Peer-to-peer** for multimedia streaming is an open field → **opportunities** for standardization bodies
 - **Integration** across multiple standardization bodies → **MAFs**

References

- C. Timmerer, M. Eberhard, I. Kofler, R. Kuschnig, M. Ransburg, M. Sablatschan, and H. Hellwagner, “On MPEG Modern Transport over Networks”, ISO/IEC JTC 1/SC 29/WG 11/M16307, 88th MPEG Meeting, Ka’anapali, USA, April 20-24, 2009.
- M. Eberhard, L. Celetto, C. Timmerer, E. Quacchio, H. Hellwagner, and F. Rovati, “An Interoperable Streaming Framework for Scalable Video Coding based on MPEG-21”, Proceedings of the 5th IET Visual Information Engineering Conference Conference (VIE’08), Xi’an, China, July 2008.
- M. Eberhard, L. Celetto, C. Timmerer, E. Quacchio, H. Hellwagner, and F. Rovati, “An Interoperable Multimedia Delivery Framework for Scalable Video Coding based on MPEG-21 Digital Item Adaptation”, Proceedings of the IEEE International Conference on Multimedia and Expo 2008 (ICME’08), Hannover, Germany, June 2008.
- M. Eberhard, L. Celetto, C. Timmerer, E. Quacchio, and H. Hellwagner: “Performance Analysis of Scalable Video Adaptation: Generic versus Specific Approach”, Proc. of the 9th International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2008), Klagenfurt, Austria, May 2008.

Thank you for your attention



... questions, comments, etc. are welcome ...

Ass.-Prof. Dipl.-Ing. Dr. Christian Timmerer
Klagenfurt University, Department of Information Technology (ITEC)
Universitätsstrasse 65-67, A-9020 Klagenfurt, AUSTRIA
christian.timmerer@itec.uni-klu.ac.at
<http://research.timmerer.com/>
Tel: +43/463/2700 3621 Fax: +43/463/2700 3699
© Copyright: Christian Timmerer