[StHe95] *Ralf Steinmetz, Ralf Guido Herrtwich;* **A View at the Multimedia Work Items in Heidelberg;** IEEE Newsletter of the Technical Committee on Multimedia Computing; Band 3, Nr.1, S. 7-9, Februar 1995.

on Network Reality in Telecommunication, Tokyo, Japan, May, 1994.

[4] Bruce Hillyer, Alexandros Biliris, and Euthimios Panagos, "The Calico Project for Continuous Media Services", to appear in Workshop Proceedings of Multimedia Database Management Systems, October 21 1994, San Francisco.

[5] Gabbe, J., Ginsberg, A. and Robinson, B., "Towards Intelligent Recognition of Multimedia Episodes in Real-Time Applications," to appear in Proceedings of ACM Multimedia 1994, San Francisco, California.

[6] Shahraray, B., "Scene Change Detection and Content-Based Sampling of Video Sequences," to appear in Digital Video Compression: Algorithms and Technologies 1995, R. J. Safranek and A. A. Rodriguez Editors, SPIE, 1995.

[7] Ginsberg, A., "A Unified Approach to Automatic Indexing and Information Retrieval," IEEE Expert, October 1993, 46-56.

A View of the Multimedia Work Items in Heidelberg

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1 Introduction

The IBM European Networking Center (ENC) in Heidelberg works in research and development as well as solutions in the field of multimedia, networking, network management, and collaborative applications. The multimedia department, namely "Creative Multimedia Studios", consists of 34 researchers, developers, designers, consultants and guest scientists.

The first focused multimedia activity started in 1988 with the DiME project [SSSW90]. A prototype system and a multimedia lab for the research and development of analog and digital media communications were established and subsequently evolved to concentrate on a fully digital system [HeSt91b]. In parallel, high-speed networking with a first broadband ISDN system was developed. Today the ENC networking department concentrates on ISDN, LAN, and ATM setups. The focus of the Heidelberg (multimedia) Projects was heavily based around multimedia communication technology [Herr92]; however, today the research has been extended to also cover tools and applications.

The following gives a short overview of the current work items that include 'multimedia technology' in our group.

2 Work Items

Much of the world-wide multimedia business arises from the actual multimedia contents as well as the way the material is presented and how it offers 'interactability'. Good interactability, however, includes 'user modes' which are notoriously difficult to produce.

Hence, one of our work items relates to the work performed by designers and AV professionals to actually produce interactive multimedia contents. Here we focus on kiosk systems located at public areas. These include the normal plethora of applications, such as banking terminals, retail information, etc. A major challenge is the combination of disjoint disciplines, for example computing skills, advertising talents, media work as well as subjunctive topics such as presentational worthiness.

Closely related to this area, we see our work as putting new demands on the system. One example is synchronization [Stei90] which imposes constraints on parameters that must not show a lapse in the coordination of audio and video streams to achieve presentations without noticeable errors [Stei95c].

In the scope of multimedia applications, the major effort is to design and implement prototypes which can cope with future advances in communication networks. In particular, we look at workstation video conferencing, e.g., in the scope of the German Berkom project [Alt93] and remote camera control for surveillance purposes [SaSt92a]. These systems work in heterogeneous environments where obviously the major challenge is to design and implement these applications such that interoperability can be achieved. This means using the same media data representation (compression) on the various system platforms and it means to "talk" the same protocols on different platforms.

As a major multimedia application area, we see 'terminals' that not only provide information in a way that is easy to understand but also allow interaction via transactions with existing remote environments. We use the term "networked kiosk" and hypermedia to fulfill the requirements of such systems [HoHe94]. As current tools do not fulfill the required support for the users, developers, and operators, we are implementing an object-oriented system based on the notion of an "abstract kiosk". In this system, an engine, editors, and communication objects rely on the same shared memory. We use this "abstract kiosk" as the basis for building multimedia systems.

Multimedia means a huge amount of data in real-time.

In our technology group, we work on resource management issues [VHN93] and their integration into operating systems [MSSt92a] [Stei95a]. Issues like scaling [Del93] and filtering are of crucial importance. As a whole, a multimedia system's needs are for a real-time environment where data is produced and consumed by stream handlers [WoHe94]. These applications are embedded in a toolkit environment[HKSt92a]. Most of this work is performed in the AIX environment.

On our way towards open systems, we have devoted substantial efforts in the development of a running MHEG engine based on the ISO CD (committee draft) document. MHEG (Multimedia and Hypermedia Expert Group) is an ISO standization effort for an interchange format. Our findings were used as input to the standardization committee.

Based on our MHEG experience we are working towards an open representation of multimedia data in the scope of interactive Television. In such an environment, it is sensible to access other telecommunication services such as radio, mail, or www. Hence, in our participation in the German Berkom GLASS project (GLobally Accessible ServiceS), we have designed and are now implementing such distributed multimedia services. 'Openness' is a requirement and joint development of the code with our partners is underway.

In this project we are making use of an existing multimedia server which was developed using the Heidelberg Transport System (HeiTS) [Hehm91b].

HeiTS has its origin in a first version demonstrated for the first time in 1992 at the CeBIT fair in Hannover. Subsequently, we intensified substantially the development around ST II [Del94] and our transport system [DHHS92]. There we address issues like multicasting and routing. Currently a member of our group is the chair of the IETF ST-II task force where actual proposals, such as receiver initiated call set-up, have been introduced into ST-II [Del94].

3 Conclusion

With the multimedia experience today, we look at multimedia from different perspectives:

1. The technical point of view has shown us that a profound knowledge of the various components of a multimedia system is helpful and often required [Stei93] [StNa95] for putting in place an adequate design. It also means that at the user interface level, professional content providers are a must today.

2. In the mode of operation, we followed the general trend from a more research standpoint to a more product and solution orientation. However, in order to stay at the leading edge of technology, constant effort must be devoted to research. At the same time we need to understand and direct the activities according to our customers' demands, which often means the elaboration of solutions in complex environments.

3. Multimedia has been addressed in diverse fields (consumer electronics, telecommunications, computers and the media industry); it also is a hot topic in research communities, such as networking, databases, hypertext, and others. With respect to the various industry areas, there have been many joint ventures and close cooperations between many major players. Therefore the establishment of specific conferences (the "IEEE International Conference on Multimedia Computing and Systems" and "ACM Multimedia"), dedicated scientific journals (IEEE "Multimedia Magazine", Springer/ACM "Multimedia Systems", "Multimedia Tools and Applications") and high-level workshops (such as the recent IWACA 94 [Stei94]) are certainly a sign of the way to go. Ralf Guido Herrtwich and Ralf Steinmetz have actively operated from Heidelberg to achieve this goal.

To summarize, in this brief look at the Heidelberg multimedia work items we have provided just an overview of what has been done and what is in progress. This is certainly the work of all our colleagues which we would like to acknowledge here.

References

[Alt93] M. Altenhofen, J. Dittrich, R. Hammerschmidt, T. Kappner, C. Kruschel, A. Kackes, T. Steinig: The BERKOM Multimedia Collaboration Service. Proceedings of the ACM Multimedia '93 Conference, Anaheim, 1993.

[Del93] L. Delgrossi, C. Halstrick, D. Hehmann, R.G. Herrtwich, O. Krone, J. Sandvoss, C. Vogt: Media Scaling with HeiTS, ACM Multimedia 93, Anaheim, August 1993.

[Del94] L. Delgrossi: Stream Protocol Version 2. Internet Draft, April 1994.

[DHHS92] L. Delgrossi, C. Halstrick, R.G. Herrtwich, H. Stuttgen: HeiTP: a Transport Protocol for ST-II, GLOBECOM 92, Orlando, 1992.

[Herr92] R.G. Herrtwich: The HeiProjects: Support for Distributed Multimedia Applica- tions, IBM Technical Report 43.9206, IBM European Networking Center, Hei- delberg, 1992.

[HoHe94] W. Holfelder, D. Hehmann "A Networked Multimedia Retrieval Management System for Distributed Kiosk Applications", Proceedings of the 1994 IEEE International Conference on Multimedia Computing and Systems, May 1994.

[Hehm91b] Dietmar Hehmann, Ralf Guido Herrtwich, Werner Schulz, Thomas Schutt, Ralf Steinmetz; HeiTS - Architecture and Implementation Strategy of the Heidelberg High-Speed Transport System; 2nd International Workshop on

Network and Operating System Support for Digital Audio and Video, Heidelberg, 18.-19. November 1991, proceedings published as "Lecture Notes in Computer Science", Springer Verlag, 1992.

[HeSt91b] Ralf Guido Herrtwich, Ralf Steinmetz; Towards Integrated Multimedia Systems: Why and How; Informatik-Fachberichte no. 293, Springer-Verlag, 1991, pp.327-342.

[HKSt92a] Dietmar Hehmann, Thomas Kappner, Ralf Steinmetz; An Introduction to HeiMAT: The Heidelberg Multimedia Application Toolkit; 3rd International Workshop on Network and Operating System Support for Digital Audio and Video, San Diego, CA, USA, November 1992, and in Lectures Notes in Computer Science, Springer-Verlag, 1993.

[SaSt92a] Peter Sander, Ralf Steinmetz; A New Remote Camera Control User Interaction Technique; German patent P 42 33 137, 1992, and applied for patent in the US and Japan, (pending).

[SSSW90] Ralf Steinmetz, Hermann Schmutz, Bernd Schoner, Michael Wasmund; Generic Support for Distributed Multimedia Applications; IEEE ICC'90, SuperCom'90, Atlanta, April 1990

[Stei90] Ralf Steinmetz; Synchronization Properties in Multimedia Systems; IEEE Journal on Selected Areas in Communication, vol.8, no.3, April 1990, pp.401-412.

[Stei93] Ralf Steinmetz; Multimedia Technology: Fundamentals and Introduction (in German); Springer-Verlag, 1993.

[Stei94] Ralf Steinmetz (ed.); Multimedia Communications and Teleservices; 2nd IWACA; Lecture Notes in Computer Science, Nr. 868, Springer-Verlag, to appear in September 1994.

[Stei95a] Ralf Steinmetz; A Multimedia File System Survey: Approaches for Continuous Media Disk Scheduling; to appear at "Computer Communications", 1994.

[Stei95c] Ralf Steinmetz; Human Perception of Jitter and Media Synchreonization; submitted to "IEEE Journal on Selected Areas in Communications", 1994.

[StNa95] Ralf Steinmetz, Klara Nahrstedt; The Fundamentals of Multimedia Systems; Prentice-Hall, inc., to appear in March 1995.

[MSSt92a] Andreas Mauthe, Werner Schulz, Ralf Steinmetz; Inside the Heidelberg Multimedia Operating System Support: Real-Time Processing of Continuous Media in OS/2; IBM Technical Report43.9214, October 1992.

[VHN93] C. Vogt, R.G. Herrtwich, R. Nagarajan: HeiRAT: The Heidelberg Resource Administration Technique - Design Philosophy and Goals, Kommunikation in verteilten Systemen, Munich, March 1993.

[WoHe94] L. Wolf, R.G. Herrtwich: The System Architecture of the Heidelberg Transport System. ACM Operating Systems Review, Vol.28, No. 2, April 1994.

Research Project at LAAS-CNRS on Distributed Multimedia Systems

CESAME: Formal Design of High Speed Multimedia Cooperative Systems

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1 Introduction

The CESAME project, a collaborative project including CNET and CNRS, aims to develop a design methodology supported by formal techniques and tools for designing and implementing high speed multimedia cooperative systems. CNET and CNRS agreed to define in 1991 the CESAME project (Conception formElle de Systemes hAuts debits Multimedias coopEratifs), whose aim is to develop architectures, methods, techniques and tools for supporting the design of distributed cooperative multimedia systems.

The CESAME project has two main general goals: the first one is to strengthen the on-going and advanced research and results that exist in the domains of Telecommunications and Computer Networks, with the objective of integrating them and creating a synergy between both domains; the second one is to provide approaches and mechanism that are both able to manage the design of future real systems and that can be supported by advanced software tools. Our design will be based on the ATM technology.

CESAME has been organized around six conceptual levels, one for each of the main domains to be addressed; they are presented in the following.

ATM

Work on ATM problems will be emphasized in

- architectures and network management,
- basic and future services and protocols,
- definition of the AAL layer.

High Speed & Multimedia Transport

Audio and video objects, when played live, generate isosynchronous streams defined by fixed rates; they have to be integrated with the usual traditional computing transfers,

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