**A Distributed Multimedia Communication System and its Applications to E-Learning**

Hans L. Cycon, Thomas C. Schmidt, Matthias Wählisch, Mark Palkow and Henrik Regensburg

In this paper we present a distributed communication framework and conferencing software and some applications to e-learning scenarios. The applications include an easy-to-use scheme for distributed presenting, recording and streaming of multimedia content. Visual devices performing synchronous communication such as voice or videoconferencing over IP (VoIP/VCoIP) are now ubiquitous and raise new challenges for the Internet infrastructure.

There is also some remarkable progress in video/audio compression algorithms, which reduce the video data stream to less than 1% at the sender site and reconstruct it again to a high-quality video sequence on the receiver site. In addition to this we use also some costumer tailored wavelet-based codecs.

**Positive Points:**

This paper demonstrates an approach for seamless integration of real-time multicast mobility.

A simple scheme, compliant with current Internet infrastructure, for locating nomadic users at roaming sessions forms also part of our conferencing system.

It enables participants to share not only static documents like Power Point files but also any dynamic PC actions like mouse pointer movements or animations

**Negative Points:**

need to focus on a reduction of packet loss probabilities.

Even though a principle feasibility of IP mobility for real-time video communication could be demonstrated, MIPv6 handover procedures need tightening.

**A Group RPC Protocol for Distributed Systems**

Chang-Seuk Lee, Kwang-Hui Lee, Jong-Kun Lee

This paper presents a group communication to cooperate with WC. After creating a specific group by user request, they can communicate each other. A group RPC protocol can improve reliability, transparency and facility of classic RPC protocol.

RPC(Remote Procedure Call) protocol is one of popular communication mechanisms. It is very simple and transparent to write distributed programs. RPC protocol user need not to have information on distributed environments and can easily construct distributed application systems. RPC protocol reduces overload of communications since it uses messages to communicate.

**Positive Points:**

Group RPC proposed in this paper can be used in various applications such as video conference, replicated distributed database and management of distributed network.

The proposed GRPC system has the advantage of RPC system, such as simplicity and ease interface and it improves the reliability, facility of SUN RPC. GRPC has numerous applications.

**Negative Points:**

This paper has presented GRPC to cooperated with SUN RPC. But, Proposed GRPC is not perfect in this paper.

Not yet developed GRPC’s compiler such as RPCGEN of SUN RPC system.

Need to yet experiment of implemented GRPC protocol with classic RPC.

**BitWorker, a Decentralized Distributed Computing System based on BitTorrent**

Durand, Arnaud; Gasparyan, Mikael; Rouvinez, Thomas; Aad, Imad Rafic; Braun, Torsten; Trinh, Tuan Anh (25 May 2015).

BitWorker, a platform for community distributed computing based on BitTorrent. Any splittable task can be easily specified by a user in a meta-information task file, such that it can be downloaded and performed by other volunteers. Peers find each other using Distributed Hash Tables, download existing results, and compute missing ones.

**Positive Points:**

Unlike existing distributed computing schemes relying on centralized coordination point(s), our scheme is totally distributed, therefore, highly robust.

Distributed Hash Tables (DHTs) extend BitTorrent file exchange, enabling BitTorrent to work in a totally decentralized fashion. It only requires an initial bootstrap to start exchanging files from any public torrent.

Furthermore, it can be downloaded and used by the community.

**Negative Points:**

The paper did not find any implementation that fully harnesses the capabilities of BitTorrent or fully decentralizes the work distribution process.

The proposed solution does not address collisions occurring when selecting a new piece to be computed. A collision is a piece computed by more than one peer.

**OPTIMAL RESOURCE ALLOCATION FOR VIDEO COMMUNICATION OVER DISTRIBUTED SYSTEMS**

Proposed by

Yifeng He and Ling Guan Department of Electrical and Computer Engineering, Ryerson University, Toronto, Ontario, Canada

this paper describes recent advances of optimal resource allocation for video communication over some major distributed systems including P2P streaming systems, wireless ad hoc networks, and wireless visual sensor networks. In general, the resource allocation problem in distributed systems can be formulated into a constrained optimization problem, with an objective to maximize (or minimize) a performance metric, subject to the resource constraints at each node. Since there is no centralized controller in the distributed systems, a distributed algorithm is efficient in terms of the scalability and the communication overhead.

Positive Points:

1. Each node only knows about its neighbors, and does not have global knowledge. There is typically no centralized controller, who can coordinate the behaviors of all the nodes.
2. First, the access band- width of the peers is often limited, especially the upload bandwidth. Second, the peers may leave the network at any time which creates a highly unreliable and dynamic network fabric. Third, each user requests the video at a different time, and the video content is delivered from the heterogenous peers. Fourth, it has been observed that users seek frequently to a different position rather than watch the video sequentially in VoD applications, which places a great challenge on playback continuity.

Negative Points:

In wireless ad hoc networks, a wireless link usually has a high transmission error rate because of shadowing, fading, and interferences from other transmitting users.

In wireless visual sensor networks, each video sensor operates under a set of unique resource constraints, including limited energy supply, limited on-board computational capability, and low transmission bandwidth.

In conventional wireless sensor networks, the power for signal processing at each sensor is very small. In contrast, the video sensor in WVSNs compresses the video before transmission.

**Distributed Multimedia Systems**

Proposed by

VICTOR O. K. LI, FELLOW, IEEE, AND WANJIUN LIAO, STUDENT MEMBER, IEEE

A distributed multimedia system (DMS) is an integrated communication, computing, and information system that enables the processing, management, delivery, and presentation of synchronized multimedia information with quality-of-service guarantees. Multimedia information may include discrete media data, such as text, data, and images, and continuous media data, such as video and audio. Such a system enhances human communications by exploiting both visual and aural senses and provides the ultimate flexibility in work and entertainment, allowing one to collaborate with remote participants, view movies on demand, access on-line digital libraries from the desktop, and so forth. In this paper, we present a technical survey of a DMS. We give an overview of distributed multimedia systems, examine the fundamental concept of digital media, identify the applications, and survey the important enabling technologies

Positive points:

The inputs of the system consist of the important factors that drive a DMS from concept to reality, and the outputs consist of a wide range of distributed multimedia applications.

The outputs of the system can be broadly classified2 into three different types of distributed multimedia applications: ITV, telecooperation, and hypermedia. Information can be represented as analog signals or digital signals.

Such networked multimedia systems not only dramatically enhance the existing CD-ROM-based multimedia applications but also encourage newly emerging broad-band applications at the expense of more complexity due to the requirement of QoS guarantees

Negative points:

This is not only expensive but is wasteful of system resources because if multiple users are viewing the same video, the system has to deliver multiple identical copies at the same time.

A user will be served by one of the streams, and user interactions are simulated by jumping to a different stream. Not all user interactions can be simulated in this fashion, however, and even for those that can be simulated, the effect is not exactly what the user requires.

Within-component layer: specifies the structure and contents within the components of the hypertext network according to the individual applications. The Dexter model does not explicitly specify this layer in the model but leaves it to the applications. The standard document architectures such as ODA and SGML can be used for this purpose

The current ODA standard does not support multimedia because of the lack of support of the time domain in both the layout and logical structures

**Integrating distributed multimedia systems and interactive television networks**

Proposed by

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Recent advances in networks, storage and video delivery systems are about to make commercial deployment of interactive multimedia services over digital television networks a reality. The emerging components individually have the potential to satisfy the technical requirements in the near future. However, no single vendor is offering a complete end-to-end commercially deployable and scalable interactive multimedia apphcations systems over digital/analog television systems. Integrating a large set of matunng sub-assemblies and interactive multimedia applications is a major task in deploying such systems. Here we deal with integration issues, requirements and trade-offs in building delivery platforms and applications for interactive television services. Such integration efforts must overcome lack of standards, and deal with unpredictable development cycles and quality problems of leading-edge technology. This proceedings version of the paper is an extended abstract

Positive points

Video-on-Demand (VOD) and Movies-on-Demand (MOD) services are considered by many to be the flagship of any interactive television service

Near-Video-on-Demand (NVOD) is a closely related service that offers somewhat lesser flexibility to the consumers at a lower cost to the provider and the consumer.

Distance learning: Educational interactive programming and distance learning and are areas where ITV has significant potential.

It is important for the systems not only to operate within the prescribed parameters at any given instant of time, but also evolve in time by incorporating new object classes and mutating existing classes.

Negative points

The future ITV service providers include the current providers of cable, telecommunications, and telephony services.

The vendors of ITV components include network technology providers, digital video services vendors, interactive server and software vendors and set-top device vendor

These external systems might be directly integratable within the software framework. Where this is not possible, external systems are encapsulated by thin or value-adding wrapper within the framework. Such external systems may include databases, file and object storage systems, search services, and operations support system

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