

# An Application Developer's Perspective on Reliable Multicast for Distributed Interactive Media

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## ABSTRACT

In this paper we investigate which characteristics reliable multicast services should have in order to be appropriate for use by distributed interactive media applications such as shared whiteboards, networked computer games, or distributed virtual environments. We take a close look at the communication requirements of these applications and at existing approaches to realize reliable multicast. Based on this information we deduce which reliable multicast transport protocols are appropriate for the different aspects of distributed interactive media. Furthermore we discuss how the application programming interface of a reliable multicast service should be designed in order to support the development of applications for distributed interactive media.

**Keywords.** Reliable Multicast, Distributed Interactive Media.

## 1. INTRODUCTION

Applications for distributed interactive media such as shared whiteboards, networked computer games, and distributed virtual environments have gained importance rapidly over the recent years. The main characteristic of a distributed interactive medium is that it involves user interactions with the medium itself. Applications for distributed interactive media frequently rely on multicast communication since a session involving such a medium is typically attended by a group of more than two users. These applications often need to exchange information in a reliable way. This is

necessary to make sure that the shared state of the medium remains consistent for all participants of a session. Reliable multicast is therefore one key issue for the realization of many distributed interactive media.

In this paper we examine the specific needs that applications for distributed interactive media place on reliable multicast services. It is not the aim of this work to define a specific reliable multicast algorithm. Instead we focus on the issue of which existing approaches are appropriate for distributed interactive media. Moreover, we discuss how the application programming interface for a reliable multicast service should be designed in order to support the development of applications for this media class. The findings presented in this paper are based on our experiences with developing applications for diverse distributed interactive media. These include a shared whiteboard [6], a 3D telecollaboration application [12], and distributed Java simulations for teleteaching purposes [9].

The remainder of this paper is structured as follows: In Section Two we present our model of the distributed interactive media class. This model makes it possible to understand and discuss the communication needs of media belonging to this class independent of any specific medium. In Section Three we give a brief summary of existing approaches that can be employed to achieve reliable multicast. Based on this information and on the media model the fourth section contains a discussion of which reliable multicast approaches are appropriate to be used for the different aspects of distributed interactive media. In Section Five we take a brief look at congestion control for distributed interactive media. In Section Six we investigate the design of application pro-

# Distributed Interactive Media

**Amir Hussain, Mirjana Ivanovic**



## **Distributed Interactive Media:**

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proceedings of the 9th International Workshop on Groupware CRIWG 2003 held in Autrans France in September 2003 The 30 revised full papers presented together with an invited keynote paper were carefully reviewed and selected from 84 submissions The papers are organized in topical sections on workspaces and groupware infrastructure tailoring groupware evaluation flexible workflow CSCL awareness supporting collaborative processes workflow management systems context in groupware supporting communities **Electronics, Communications and Networks IV** Amir Hussain, Mirjana Ivanovic, 2015-07-01 The 4th International Conference on Electronic Communications and Networks CECNet2014 inherits the fruitfulness of the past three conferences and lays a foundation for the forthcoming next year in Shanghai CECNet2014 was hosted by Hubei University of Science and Technology China with the main objective of providing a comprehensive global forum for experts and participants from academia to exchange ideas and presenting results of ongoing research in the most state of the art areas of Consumer Electronics Technology Communication Engineering and Technology Wireless Communications Engineering and Technology and Computer Engineering and Technology In this event 13 famous scholars and Engineers have delivered the keynote speeches on their latest research including Prof Vijaykrishnan Narayanan a Fellow

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Consistency in Continuous Distributed Interactive Media Martin Mauve,1999 *Multimedia Cartography* William Cartwright,Michael P. Peterson,1999 The explosive development of interactive multimedia products on CD ROM and the Internet via the WWW has generated immense interest in this field The approach to producing interactive multimedia mapping products is quite unique and there has been an upsurge of interest in developing methodologies that best exploit both the technology and communication effectiveness of multimedia mapping This book is addressed to professional cartographers interested in moving into multimedia mapping for cartographers already involved in this field who wish to discover the approaches that other practioners in multimedia cartography have already taken and for students and academics in the mapping sciences and related geographic fields wishing to update their knowledge of cartographic design and production CSCW ,2000 *Multimedia Systems and Applications* ,2001 **The Interactive Corporation** Roger L.

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## The Enigmatic Realm of **Distributed Interactive Media**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing in short supply of extraordinary. Within the captivating pages of **Distributed Interactive Media** a literary masterpiece penned by a renowned author, readers embark on a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book's core themes, assess its distinct writing style, and delve into its lasting impact on the hearts and minds of people who partake in its reading experience.

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