

Lecture Notes in Computer Science

2213

Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Tokyo

Marten J. van Sinderen
Lambert J.M. Nieuwenhuis (Eds.)

Protocols for Multimedia Systems

6th International Conference, PROMS 2001
Enschede, The Netherlands, October 17-19, 2001
Proceedings



Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany
Juris Hartmanis, Cornell University, NY, USA
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Marten J. van Sinderen
Lambert J.M. Nieuwenhuis
University of Twente, Department of Computer Science
Centre for Telematics and Information Technology (CTIT)
P.O. Box 217, 7500 AE Enschede, The Netherlands
E-mail: sinderen@ctit.utwente.nl
bart@cs.utwente.nl

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Protocols for multimedia systems : 6th international conference ;
proceedings / PROMS 2001, Enschede, The Netherlands, October 17 - 19, 2001.
Marten J. van Sinderen ; Lambert J. M. Nieuwenhuis (ed.). - Berlin ; Heidelberg ;
New York ; Barcelona ; Hong Kong ; London ; Milan ; Paris ; Tokyo : Springer, 2001
(Lecture notes in computer science ; Vol. 2213)
ISBN 3-540-42708-2

CR Subject Classification (1998): C.2.2, C.2.5, H.5.1

ISSN 0302-9743

ISBN 3-540-42708-2 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2001
Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Stefan Sossna
Printed on acid-free paper SPIN: 10840842 06/3142 5 4 3 2 1 0

Preface

This conference in Enschede, The Netherlands, is the sixth in a series of international conferences and workshops under the title Protocols for Multimedia Systems, abbreviated as PROMS. The first PROMS workshop took place in June 1994 in Berlin, Germany, followed by workshops in Salzburg, Austria (October 1995) and Madrid, Spain (October 1996). In 1997, PROMS formed a temporary alliance with Multimedia Networking, a conference previously held in Aizu, Japan, in 1995. This led to the international conference on Protocols for Multimedia Systems – Multimedia Networking, PROMS-MmNet, that took place in Santiago, Chile (November 1997). Since then PROMS has been announced as an international conference, although informal contacts and interactive sessions – as in a workshop – were retained as a desirable feature of PROMS. After a gap of three years, PROMS was organized in Cracow, Poland (October 2000), for the fifth time. We consider it a challenge to make this sixth edition of PROMS as successful as the previous events.

The goal of the PROMS series of conferences and workshops is to contribute to scientific, strategic, and practical cooperation between research institutes and industrial companies in the area of multimedia protocols. This is also the goal of PROMS 2001. The basic theme of this conference continues to be multimedia protocols, both at the network and application level, although the increasing interest in wireless, mobility, and quality-of-service as interrelated topics with relevance to multimedia are reflected in the current program.

This year, 43 research papers were submitted from academic and industrial institutions all over the world, which confirms the international character of work in this area. Every submitted paper was reviewed by at least three reviewers. Thanks to the first class reviews from our program committee members and additional reviewers, and with the help of the online conference tool ConfMan, we were able to select 18 high-quality papers for presentation at the conference. These papers are grouped as follows in sessions for the single track technical program: (1) QoS in the Internet, (2) Multimedia streaming, (3) Multimedia multicast, (4) Wireless networks and host mobility, (5) TCP/IP optimization, and (6) Service development and deployment. The technical program is complemented with two invited presentations: “From Mars to Your TV at Home - Selected Internet Developments” by Erik Huizer and “Which Way to the Wireless Internet ?” by Andrew Campbell.

Also part of this conference, but not reflected in these proceedings, is a tutorial program, scheduled before the technical program. We are pleased that we could attract Alan Parkes, Frank Eliassen, and Thomas Plagemann who were willing to share their overviews and insights on “Approaching Multimedia Content Description” (Parkes) and “Multimedia Middleware” (Eliassen/Plagemann).

We would like to thank the tutorial and invited speakers for their contribution to PROMS 2001. We are grateful for the efforts of the program committee members. With the help of additional reviewers, they managed to produce reviews on all submitted research papers while observing the tight deadlines that were imposed by the organizers. They also contributed to the paper selection process that resulted in the strong technical program of this conference. We appreciate the useful advice of the organizer of the previous conference, Zdzislaw Papir. We gratefully acknowledge the cooperation with ACM SIGCOMM and SIGMM, and the COM Chapter of IEEE

Benelux Section. We are also grateful for the financial support of our industrial sponsors, of the Faculty of Computer Science of the University of Twente, and of the Centre of Telematics and Information Technology of the University of Twente. Finally, we wish to thank the people from our local organizing committee, Marloes Castañeda, Annelies Klos, Giancarlo Guizzardi, and Christian Tzolov. We really appreciated your help!

July 2001

Marten van Sinderen
Bart Nieuwenhuis

Organization

Conference Chairs

Marten van Sinderen U. of Twente, The Netherlands
Bart Nieuwenhuis KPN Research / U. of Twente, The Netherlands

Program Committee

Arturo Azcorra Carlos III U., Spain
Hans van den Berg KPN Research / U. of Twente, The Netherlands
Andrew Campbell Colombia University, USA
Michel Diaz LAAS-CNRS, France
Henk Eertink Telematica Instituut, The Netherlands
Frank Eliassen U. of Oslo, Norway
Luís Ferreira Pires U. of Twente, The Netherlands
Francisco Fontes Portugal Telecom Inovação, SA, Portugal
Geert Heijenk Ericsson Eurolab, The Netherlands
Ulrich Hofmann U. Salzburg, Austria
David Hutchison Lancaster U., UK
Wim Jonker KPN Research / U. of Twente, The Netherlands
Dimitri Konstantas U. of Twente, The Netherlands / U. of Geneva, Switzerland
Claudia Linnhoff-Popien Institut für Informatik, Germany
Laurent Mathy Lancaster U., UK
Bart Nieuwenhuis KPN Research / U. of Twente, The Netherlands
Sergio Palazzo U. of Catania, Italy
Zdzislaw Papir AGH U. of Technology, Poland
Thomas Plagemann U. of Oslo, UniK, Norway
Radu Popescu-Zeletin GMD-FOKUS, Germany
Dick Quartel U. of Twente, The Netherlands
Jean-Luc Raffy Institut National des Telecommunications, France
Jeroen Schot Lucent Technologies, The Netherlands
Marten van Sinderen U. of Twente, The Netherlands
Johan Zuidweg Teccidel, Spain

Local Organization

Marloes Castañeda U. of Twente, The Netherlands
Annelies Klos U. of Twente, The Netherlands
Giancarlo Guizzardi U. of Twente, The Netherlands
Christian Tzolov U. of Twente, The Netherlands

Referees

| | |
|--------------------------|---|
| Arturo Azcorra | Carlos III U., Spain |
| Hans van den Berg | KPN Research / U. of Twente, The Netherlands |
| Andrew Campbell | Colombia University, USA |
| Veronique Baudin | LAAS-CNRS, France |
| Robert Choderek | AGH U. of Technology, Poland |
| Nikolay Diakov | U. of Twente, The Netherlands |
| Michel Diaz | LAAS-CNRS, France |
| Henk Eertink | Telematica Instituut, The Netherlands |
| Jacco Brok | Lucent Technologies, The Netherlands |
| Frank Eliassen | U. of Oslo, Norway |
| Luís Ferreira Pires | U. of Twente, The Netherlands |
| Francisco Fontes | Portugal Telecom Inovação, SA, Portugal |
| Cleber Guareis de Farias | U. of Twente, The Netherlands |
| Geert Heijenk | Ericsson Eurolab, The Netherlands |
| Ulrich Hofmann | U. Salzburg, Austria |
| Thierry Gayraud | LAAS-CNRS, France |
| David Hutchison | Lancaster U., UK |
| Wim Jonker | KPN Research / U. of Twente, The Netherlands |
| Dimitri Konstantas | U. of Twente, The Netherlands / U. of Geneva, Switzerland |
| Alberto García-Martínez | Carlos III U., Spain |
| Patrick Bush | Lucent Technologies, The Netherlands |
| Tom Kristensen | U. of Oslo, Norway |
| Claudia Linnhoff-Popien | Institut für Informatik, Germany |
| Rui Lopes | Lancaster U., UK |
| Kjetil Lund | U. of Oslo, Norway |
| Laurent Mathy | Lancaster U., UK |
| Bastien Peelen | Lucent Technologies, The Netherlands |
| Marek Natkaniec | AGH U. of Technology, Poland |
| Bart Nieuwenhuis | KPN Research / U. of Twente, The Netherlands |
| Pascal Berthou | LAAS-CNRS, France |
| Sergio Palazzo | U. of Catania, Italy |
| Zdzislaw Papir | AGH U. of Technology, Poland |
| Arjen de Heer | Lucent Technologies, The Netherlands |
| Thomas Plogemann | U. of Oslo, UniK, Norway |
| Ignacio Soto | Carlos III U., Spain |
| Radu Popescu-Zeletin | GMD-FOKUS, Germany |
| Dick Quartel | U. of Twente, The Netherlands |
| Jean-Luc Raffy | Institut National des Telecommunications, France |
| Martin Molina | LAAS-CNRS, France |
| Jeroen Schot | Lucent Technologies, The Netherlands |
| Marten van Sinderen | U. of Twente, The Netherlands |
| Ing Widya | U. of Twente, The Netherlands |
| Johan Zuidweg | Tecsidel, Spain |

Supporting and Sponsoring Organizations

ACM SIGCOMM

ACM SIGMM

IEEE Benelux Section, COM Chapter

KIvI

NGI

University of Twente, Computer Science Faculty

University of Twente, CTIT

Table of Contents

QoS in the Internet

| | |
|---|----|
| Globule: A Platform for Self-Replicating Web Documents | 1 |
| <i>Guillaume Pierre, Maarten van Steen</i> | |
| Architecture of QOSMIC – A QoS Manager for Internet Connections | 12 |
| <i>Franco Tommasi, Simone Molendini, Antonio Vilei, Andrea Sponziello</i> | |
| A QoS-Driven ISP Selection Mechanism for IPv6 Multi-homed Sites | 23 |
| <i>Marcelo Bagnulo, Alberto Garcia-Martinez, David Larrabeiti, Arturo Azcorra</i> | |

Multimedia Streaming

| | |
|---|----|
| Broadcasting Multimedia Channels in Future Mobile Systems | 35 |
| <i>Cristian Hesselman, Henk Eertink</i> | |
| Providing VCR Functionality in Staggered Video Broadcasting | 44 |
| <i>Jin B. Kwon, Heon Y. Yeom</i> | |
| A Fully Scalable and Distributed Architecture for Video-on-Demand | 59 |
| <i>Fernando Cores, Ana Ripoll, Emilio Luque</i> | |

Multimedia Multicast

| | |
|--|-----|
| A Mechanism for Multicast Multimedia Data with Adaptive QoS Characteristics | 74 |
| <i>Christos Bouras, A. Gkamas</i> | |
| Bandwidth Measurements of ALM Trees for Content Distribution | 89 |
| <i>Rui J. Lopes, Laurent Mathy, David Hutchison</i> | |
| GCAP: A New Multimedia Multicast Architecture for QoS | 103 |
| <i>Michel Diaz, Roberto Canonico, Luis Costa, Serge Fdida, David Hutchison, Laurent Mathy, Andreas Meissner, Stephane Owezarski, Rolland Vida, Lars Wolf</i> | |

Wireless Networks and Host Mobility

| | |
|--|-----|
| Protection of Fairness for Multimedia Traffic Streams in a Non-cooperative Wireless LAN Setting | 116 |
| <i>Jerzy Konorski</i> | |
| Ad Hoc Routing in Bluetooth | 130 |
| <i>Jeroen P.F. Willekens</i> | |

An Open Signaling Protocol for Wireless Host Mobility 145
George Kormentzas, D. Vergados, J. Soldatos, G. Stassinopoulos

TCP/IP Optimization

TCP/IP Protocol Engine System Simulation 155
M. Benz, K. Feske, U. Hatnik, P. Schwarz

Design and Implementation of a Transparent Forward Error Correction Coding
Daemon for Unreliable Transports 165
Albert K.T. Hui, Samuel T. Chanson

An Analytical Study on TCP-friendly Congestion Control
for Multimedia Streams 180
Wei Wu, Yong Ren, Xiuming Shan

Service Development and Deployment

Model-Based Service Creation in the Friends Project 192
Wouter B. Teeuw, Dick A.C. Quartel

Validation of the Open Service Access API for UMTS Application Provisioning . . 210
Maarten Wegdam, Dirk-Jaap Plas, Musa Unmehopa

On the End-User QoS-Awareness of a Distributed Service Environment 222
I. Widya, R.E. Stap, L.J. Teunissen, B.F. Hopman

Author Index 239