

Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

309

J. Nehmer (Ed.)

Experiences with Distributed Systems

International Workshop
Kaiserslautern, FRG, September 28–30, 1987
Proceedings



Springer-Verlag
Berlin Heidelberg New York London Paris Tokyo

Editorial Board

D. Barstow W. Brauer P. Brinch Hansen D. Gries D. Luckham
C. Moler A. Pnueli G. Seegmüller J. Stoer N. Wirth

Editor

Jürgen Nehmer
Fachbereich Informatik, Universität Kaiserslautern
Postfach 3049, D-6750 Kaiserslautern, FRG

Organizers

Sonderforschungsbereich 124, Universität Kaiserslautern
IBM European Network Center, Heidelberg

Organization Committee

J. Nehmer, Kaiserslautern (Chair)
T. Härdter, Kaiserslautern
H. Scheidig, Saarbrücken
G. Müller, Heidelberg
H. Schmutz, Heidelberg
W. Effelsberg, Heidelberg

CR Subject Classification (1987): C.2.4, D.4, D.3.3, H.2.4

ISBN 3-540-19333-2 Springer-Verlag Berlin Heidelberg New York
ISBN 0-387-19333-2 Springer-Verlag New York Berlin Heidelberg

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 other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its version of June 24, 1985, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1988
Printed in Germany

Printing and binding: Druckhaus Beltz, Hembsbach/Bergstr.
2145/3140-543210

PREFACE

This issue of Lecture Notes in Computer Science contains the proceedings of an international workshop on "Experiences with Distributed Systems" held September 28 - 30, 1987, at the University of Kaiserslautern. The workshop was jointly sponsored and organized by the Sonderforschungsbereich 124 "VSLI-Entwurfsmethoden und Parallelität" and the European Network Center (ENC) of the IBM Corporation, Heidelberg.

The objective of the workshop was to bring together researchers who had gathered substantial experience with the implementation of distributed systems. The emphasis was put on the exchange of (good and bad) experiences with existing concepts in distributed system design rather than presenting new ideas.

Participation in the workshop was by invitation only. The presentations can be roughly categorized as

- reports on a specific project or
- reports on experiences with a certain topic accumulated through several projects.

Experience reports on the following projects were presented:

- Amoeba (J. Mullender)
- CONIC (N. Dulay, J. Kramer, J. Magee, M. Sloman)
- DAC (U. Hollberg, B. Mattes, A. Schill, H. Schmutz, B. Schöner, R. Staroste, W. Stoll)
- INCAS (J. Nehmer)
- POOL (L. Gerlach, K. Malowaniec, H. Scheidig, R. Spurk)
- PEACE (W. Schröder)
- HCS (J. Zahorjan)

The following general topics were treated in other lectures:

- Fault tolerance (S.K. Shrivastava, L. Mancini, B. Randell)
- Design principles for distributed languages and systems
(R. Schlichting, G. Andrews, N. Hutchinson, R. Olsson, L. Peterson, A. Barak, Y. Kornatzky)
- Distributed databases (T. Härdter, K. Meyer-Wegener, A. Sikeler, P. Christmann, S. Pappe, W. Lamersdorf, W. Effelsberg)

CONTENTS

On the Adequate Support of Communication Interfaces in Distributed Systems

J. Nehmer	1
-----------------	---

On the Duality of Fault Tolerant System Structures (Preliminary Version)

S.K.Shrivastava, L.V.Mancini, B.Randell	19
---	----

Process Management in a Distributed Operating System

S.J. Mullender	38
----------------------	----

Experiences with the Development of a Portable Network Operating System

U. Hollberg, B. Mattes, A. Schill, H. Schmutz, B. Schöner, R. Staroste,W. Stoll	52
--	----

Accommodating Heterogeneity

J. Zahorjan, E.D. Lazowska, H.M. Levy, D. Notkin, J. Sanislo	89
--	----

Design Principles of Operating Systems for Large Scale Multicomputers

A. Barak, Y. Kornatzky	104
------------------------------	-----

The Distributed System POOL

L. Gerlach, K.T. Malowaniec, H. Scheidig, R. Spurk	124
---	-----

A Distributed Process Execution and Communication Environment for High- Performance Application Systems

W. Schröder	162
-------------------	-----

**Distributed System Construction:
Experience with the Conic Toolkit****N. Dulay, J. Kramer, J. Magee, M. Sloman, K. Twidle 189****Which Kinds of OS Mechanisms Should be
Provided for Database Management?****P. Christmann, Th. Härdter, K. Meyer-Wegener, A. Sikeler 213****Specification and Implementation of a
Standard for Remote Database Access****S. Pappe, W. Lamersdorf, W. Effelsberg 253****Observations on Building Distributed
Languages and Systems****R.D. Schlichting, G.R. Andrews, N.C. Hutchinson,
R.A. Olsson, L.L.Peterson 271****List of Authors 292**