

Contents

SESSION 1: Scientific Databases

- Managing Derived Data in the Gaea Scientific DBMS 1
Nabil I. Hachem, Ke Qiu, Michael Gennert and Matthew Ward
USA
- Algebraic Optimization of Computations over Scientific Databases 13
Richard Wolniewicz and Goetz Graefe
USA
- Tioga: Providing Data Management Support for Scientific Visualization Applications 25
Michael Stonebraker, Jolly Chen, Nobuko Nathan, Caroline Parson and Jiang Wu
USA

SESSION 2: Object-Oriented Databases

- An Object Data Model with Roles 39
A. Albano, R. Bergamini, G. Ghelli and R. Orsini
ITALY
- A Model of Methods Access Authorization in Object-Oriented Databases 52
Nurith Gal-Oz, Ehud Gudes and Eduardo B. Fernandez
ISRAEL and USA
- Versions of Simple and Composite Objects 62
G. Talens, C. Oussalah and M. F. Colinas
FRANCE

SESSION 3: Application of Database Technology

Querying and Updating the File	73
<i>Serge Abiteboul, Sophie Cluet and Tova Milo</i>	
FRANCE	
Declustering Objects for Visualization	85
<i>Ling Tony Chen and Doron Rotem</i>	
USA	
The Rufus System: Information Organization for Semi-Structured Data	97
<i>K. Shoens, A. Luniewski, P. Schwarz, J. Stamos and J. Thomas</i>	
USA	

SESSION 4: Heterogeneous and Distributed Systems

Managing Semantic Heterogeneity with Production Rules and Persistent Queues	108
<i>Stefano Ceri and Jennifer Widom</i>	
ITALY and USA	
The Use of Information Capacity in Schema Integration and Translation	120
<i>R. J. Miller, Y. E. Ioannidis and R. Ramakrishnan</i>	
USA	
Specifying and Enforcing Intertask Dependencies	134
<i>Paul C. Attie, Munindar P. Singh, Amit Sheth and Marek Rusinkiewicz</i>	
USA	

SESSION 5: Knowledge Bases and Deductive Databases

Integrity Constraint and Rule Maintenance in Temporal Deductive Knowledge Bases	146
<i>Dimitris Plexousakis</i>	
CANADA	
Coral++: Adding Object-Oriented to a Logic Database Language	158
<i>Divesh Srivastava, Raghu Ramakrishnan, Praveen Seshadri and S. Sudarshan</i>	
USA	
Queries Independent of Updates	171
<i>Alon Y. Levy and Yehoshua Sagiv</i>	
USA and ISRAEL	

SESSION 6: Parallelism and Distribution

Analysis of Dynamic Load Balancing Strategies for Parallel Shared Nothing Database.... 182
Systems

Erhard Rahm and Robert Marek
GERMANY

Performance of Catalog Management Schemes for Running Access Modules in a Locally.... 194
Distributed Database System

Eui Kyeong Hong
KOREA

Implementation and Performance Evaluation of a Parallel Transitive Closure Algorithm.... 206
on PRISMA/DB

Maurice A. W. Houtsma, Annita N. Wilschut and Jan Flokstra
The NETHERLANDS

SESSION 7: Industrial Session

STDL - A Portable Language for Transaction Processing 218

Philip A. Bernstein, Per O. Gyllstrom and Tom Wimberg
USA

NCR 3700 - The Next-Generation Industrial Database Computer 230

Andrew Witkowski, Felipe Cariño and Pekka Kostamaa
USA

Collections of Objects in SQL3 244

David Beech
USA

SESSION 8: Database Techniques

Universality of Serial Histograms 256

Yannis E. Ioannidis
USA

Viewers: A Data-World Analogue of Procedure Calls 268

Kazimierz Subieta, Florian Matthes, Joachim W. Schmidt, Andreas Rudloff and Ingrid Wetzel
GERMANY

Towards a Formal Approach for Object Database Design	278
<i>P. Poncelet, M. Teisseire, R. Cicchetti and L. Lakhal</i>	
FRANCE	

SESSION 9: Database Applications

Searching Large Lexicons for Partially Specified Terms using Compressed Inverted Files	290
<i>Justin Zobel, Alistair Moffat and Ron Sacks-Davis</i>	
AUSTRALIA	
Managing Temporal Financial Data in an Extensible Database	302
<i>Rakesh Chandra and Arie Segev</i>	
USA	
Hamming Filter: A Dynamic Signature File Organization for Parallel Stores	314
<i>Pavel Zezula, Paolo Ciaccia and Paolo Tiberio</i>	
CZECH REPUBLIC and ITALY	

SESSION 10: Memory Management

Managing Memory to Meet Multiclass Workload Response Time Goals	328
<i>Kurt P. Brown, Michael J. Carey and Miron Livny</i>	
USA	
Adaptive Database Buffer Allocation Using Query Feedback	342
<i>ChungMin Melvin Chen and Nicholas Roussopoulos</i>	
USA	
Dynamic Memory Allocation for Multiple-Query Workloads	354
<i>Manish Mehta and David J. DeWitt</i>	
USA	

SESSION 11: Recovery and Backup

A Cost-Effective Method for Providing Improved Data Availability During DBMS....	368
Restart Recovery after a Failure	
<i>C. Mohan</i>	
USA	

Exploiting A History Database for Backup	380
<i>David Lomet and Betty Salzberg</i>	
USA	
Recovering from Main-Memory Lapses	391
<i>H. V. Jagadish, Avi Silberschatz and S. Sudarshan</i>	
USA	

SESSION 12: Database Programming Languages

Data Sharing Analysis for a Database Programming Language via Abstract Interpretation....	405
<i>Giuseppe Amato, Fosca Giannotti and Gianni Mainetto</i>	
ITALY	
A Domain-theoretic Approach to Integrating Functional and Logic Database Languages	416
<i>Alexandra Poulouvassilis and Carol Small</i>	
UK	
Update Logging for Persistent Programming Languages: A Comparative Performance....	429
Evaluation	
<i>Anthony L. Hosking, Eric W. Brown and J. Eliot B. Moss</i>	
USA	

SESSION 13: Active Databases

On Implementing a Language for Specifying Active Database Execution Models	441
<i>Shahram Ghandeharizadch, Richard Hull, Dean Jacobs, Jaime Castillo, Martha Escobar-Molano, Shih-Hui Lu, Junhui Luo, Chiu Tsang and Gang Zhou</i>	
USA	
An Adaptive Algorithm for Incremental Evaluation of Production Rules in Databases	455
<i>Françoise Fabret, Mireille Regnier and Eric Simon</i>	
FRANCE	
An Active Object-Oriented Database: A Multi-Paradigm Approach to Constraint Man-....	467
agement	
<i>Hiroshi Ishikawa and Kazumi Kubota</i>	
JAPAN	

SESSION 14: Parallel Query Optimization

- Multi-Join Optimization for Symmetric Multiprocessors 479
Eugene J. Shekita, Honesty C. Young and Kian-Lee Tan
USA and SINGAPORE
- On the Effectiveness of Optimization Search Strategies for Parallel Execution Spaces 493
Rosana S. G. Lanzelotte, Patrick Valduriez and Mohamed Zaït
FRANCE and BRAZIL
- Applying Hash Filters to Improving the Execution of Bushy Trees 505
Ming-Syan Chen, Hui-I Hsiao and Philip S. Yu
USA

SESSION 15: Query Optimization

- Control of an Extensible Query Optimizer: A Planning-Based Approach 517
Gail Mitchell, Umeshwar Dayal and Stanley B. Zdonik
USA
- Query Optimization in the Presence of Foreign Functions 529
Surajit Chaudhuri and Kyuseok Shim
USA
- A Blackboard Architecture for Query Optimization in Object Bases 543
Alfons Kemper, Guido Moerkotte and Klaus Peithner
GERMANY

SESSION 16: Pot-Pourri

- A Plan-Operator Concept for Client-Based Knowledge Processing 555
J. Thomas and S. Deßloch
GERMANY
- Toward Practical Constraint Databases 567
Alexander Brodsky, Jozan Jaffar and Michael J. Maher
USA
- Combining Theory and Practice in Integrity Control: A Declarative Approach to the.... 581
Specification of a Transaction Modification Subsystem
Paul W. P. J. Grefen
The NETHERLANDS

SESSION 17: Disk Systems

Reading a Set of Disk Pages	592
<i>Bernhard Seeger, Per-Åke Larson and Ron McFadyen</i>	
<i>GERMANY and CANADA</i>	
Disk Mirroring with Alternating Deferred Updates (prize paper)	604
<i>Christos A. Polyzois, Anupam Bhide and Daniel M. Dias</i>	
<i>USA</i>	
Memory-Adaptive External Sorting	618
<i>HweeHwa Pang, Michael J. Carey and Miron Livny</i>	
<i>USA</i>	

SESSION 18: Transaction Management

A New Presumed Commit Optimization for Two Phase Commit	630
<i>Butler Lampson and David Lomet</i>	
<i>USA</i>	
Local Disk Caching for Client-Server Database Systems	641
<i>Michael J. Franklin, Michael J. Carey and Miron Livny</i>	
<i>USA</i>	
Key Range Locking Strategies for Improved Concurrency	655
<i>David B. Lomet</i>	
<i>USA</i>	

Invited Talks 665

Predictions and Challenges for Database Systems in the Year 2000	667
<i>Patricia G. Selinger</i>	
<i>IBM Almaden Research Center, USA</i>	
Object-Oriented Database Systems: Promises, Reality, and Future	676
<i>Won Kim</i>	
<i>UniSQL Inc, USA</i>	

DBMS Research at a Crossroads: The Vienna Update	688
<i>Michael Stonebraker, Rakesh Agrawal, Umeshwar Dayal, Erich J. Neuhold and Andreas Reuter</i>	
Object Database Morphology	693
<i>François Bancilhon</i>	
<i>O₂ Technology, FRANCE</i>	
Panels	695
Database Research Strategies of Funding Agencies	697
<i>Chair: Keith G. Jeffery</i>	
<i>Rutherford Appleton Laboratory, UK</i>	
Mobile Computing: Fertile Research Area or Black Hole?	699
<i>Chair: Henry F. Korth, Panasonic Technologies Inc. and Tomasz Imielinski, Rutgers University, USA</i>	
The Voice of the Customer: Innovative and Useful Research Directions	701
<i>Chair: Stuart E. Madnick</i>	
<i>Massachusetts Institute of Technology, USA</i>	
A Practical Issue Concerning Very Large Data Bases: The Need for Query Governors	705
<i>Gerald Cohen</i>	
<i>USA</i>	
Problems/Challenges Facing Industry Data Base Users	707
<i>Kevin Fitzgerald</i>	
<i>UK</i>	
The Need for Data Quality	709
<i>Blake Patterson</i>	
<i>USA</i>	
Database Requirements of Knowledge-based Production Scheduling and Control: a CIM Perspective	710
<i>Ulf Schreier</i>	
<i>Germany</i>	