

Cristiana Amza

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Education

- Ph.D. Computer Science. Rice University, Houston, Texas May '03
Conflict-Aware Replication for Dynamic Content Web Sites
Advisors: Dr. Willy Zwaenepoel, Dr. Alan Cox
- M.S. Computer Science. Rice University, Houston, Texas May '97
Software DSM Protocols that Adapt between Single Writer and Multiple Writer
Advisors: Dr. Willy Zwaenepoel, Dr. Alan Cox
- B.S. Computer Science & Engineering. Bucharest Politechnic, Romania June '91

Research Contributions

Scaling and Availability for Dynamic Content Sites

Designed and implemented a database replication technique using a novel scheduler design that provides scaling, strong data consistency and availability for dynamic content servers.

Database Concurrency Control

Developed a new concurrency control algorithm based on explicit versions for the database back-ends in a replicated dynamic content server. This algorithm reduces the overhead of consistency maintenance by optimizing the duration of conflicts.

Performance Studies of Dynamic Content Servers

Studied the common bottlenecks, and the effect of admission control, load balancing and transparent query caching in a replicated dynamic content server. The analysis uses implementations of e-commerce, auction site, and bulletin board applications.

Data Replication for Persistent Memory

Designed and implemented novel database replication algorithms on write through system area networks, for applications that use in-memory persistent storage. The algorithms provide both reliability and data availability while still maintaining very high transaction throughput.

Software Distributed Shared Memory (SDSM)

Developed a novel adaptive algorithm that switches between a single-writer and a multiple-writer protocol. This algorithm provides the benefits of lazy release consistency while reducing its computational and memory overheads. I also extended this algorithm to provide a combination of protocol adaptation and dynamic adaptation of the consistency unit to fit the application pattern. Other work includes a multi-threaded SDSM implementation on SMPs, and parallelizing scientific codes (e.g. FASTLINK) for SDSM.

Refereed Publications

Distributed Versioning: Consistent Replication for Scaling Back-end Databases of Dynamic Content Web Sites. C. Amza, A. Cox, W. Zwaenepoel. *ACM/IFIP International Middleware Conference (Middleware)*, June 2003

Conflict-Aware Scheduling for Dynamic Content Applications. C. Amza, A. Cox, W. Zwaenepoel. *Proceedings of the 4th USENIX Symposium on Internet Technologies and Systems (USITS)*, March 2003

Specification and Implementation of Dynamic Content Benchmarks. C. Amza, E. Cecchet, A. Chanda, A. Cox, S. Elnikety, R. Gil, J. Marguerite, K. Rajamani, W. Zwaenepoel. *Proceedings of the 5th IEEE Workshop on Workload Characterization (WWC-5)*, November 2002

Data Replication Strategies for Fault Tolerance and Availability on Commodity Clusters. C. Amza, A. Cox, W. Zwaenepoel. *Proceedings of the International Conference on Dependable Systems and Networks (DSN)*, June 2000

Adaptive Protocols for Software Distributed Shared Memory. C. Amza, A. Cox, K. Rajamany, S. Dwarkadas, L.J. Lin, W. Zwaenepoel. *Journal of the IEEE, Special Issue on Distributed Shared Memory*, pp 467-475, March 1999

Tradeoffs between False Sharing and Aggregation in Software Distributed Shared Memory. C. Amza, A. Cox, K. Rajamany, W. Zwaenepoel. *Proceedings of the 6th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, June 1997

Software DSM Protocols that Adapt between Single Writer and Multiple Writer. C. Amza, A. Cox, S. Dwarkadas, W. Zwaenepoel. *Proceedings of the 3rd International Symposium on High Performance Computer Architecture (HPCA)*, February 1997

TreadMarks: Shared Memory Computing on Networks of Workstations. C. Amza, A. Cox, S. Dwarkadas, P. Keleher, H. Lu, R. Rajamony, W. Yu, and W. Zwaenepoel. *IEEE Computer*, vol. 29, No. 2, pp. 18-28, February 1996

Technical Reports

Scaling and Availability for Dynamic Content Web Sites. C. Amza, A. Cox, W. Zwaenepoel. *Rice University TR-02-395*, June 2002

Bottleneck Characterization of Dynamic Web Site Benchmarks C. Amza, E. Cecchet, A. Chanda, A. Cox, S. Elnikety, R. Gil, J. Marguerite, K. Rajamani, W. Zwaenepoel *Rice University TR-02-391*, February 2002 (also in *IBM 3rd CAS Conference*)

Scaling e-Commerce Sites. C. Amza, A. Cox, W. Zwaenepoel. *Rice University TR-02-390*, February 2002

In Preparation

Transparent Caching and Consistency in Dynamic Content Web Sites. submitted to *the 5th Symposium on Operating System Design and Implementation (OSDI)*

Employment

Rice University, graduate research assistant May '94 - May '03

Research in various instances of cluster distributed systems: replicated databases, distributed shared memory, scaling of dynamic content cluster servers.

DEC, Galway, Ireland, internship Apr '97 - Aug '97

Implementation of a message passing layer based on the Memory Channel designed for Oracle Databases.

- Rice University**, teaching assistant Aug '93 - May '96
 Student help and grading for Operating Systems, Databases, Distributed Systems, and Compiler classes.
- Bucharest Politechnic University**, lecturer Jan '92 - Jul '93
 Taught undergraduate classes on compilers, programming techniques and data structures.
- Bucharest IATC Research Institute**, research scientist Aug '91 - Jan '92

Professional Activities

- Member of the Usenix advanced computing systems association.
- Referee for various journals and conferences (e.g., IEEE SPDP '96, HPCA '97, HPCA '98, ISCA '02, TPDS '03, Distributed Computing '04).
- Program Committee Member, International Middleware Conference '04

Awards

- NAFSA Association of International Educators fellowship Aug '93 - Aug '95
- Rice University graduate fellowship Aug '93 - May '94
- Romanian national merit award for distinguished academic record Aug '90 - May '91

Personal

Romanian citizen. Born August 1st, 1968. Married, two children.

References

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