REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

AD-A271 571

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

REPORT DATE	3. REPORT TYPE AND DATES COVERED
	FINAL/17 JAN 90 TO 16 JAN 93

4. TITLE AND SUBTITLE

REPLICA CONTROL ALGORITHMS IN DISTRIBUTED
DATABASES (U)

5. FUNDING NUMBERS

2304/FS
AFOSR-90-0135

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING MONITORING AGENCY NAME(S) AND ADDRESS(ES)

AFOSR/NM
110 DUNCAN AVE, SUITE B115
BOLLING AFB DC 20332-0001

DTIC

10. SPONSORING MONITORING AGENCY REPORT NUMBER

AFOSR-90-0135

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

UL

93-25325

13. ABSTRACT (Maximum 200 words)

The effects of commutative transactions on distributed database performance was analyzed. The benefits were found to be insignificant unless the number of transactions was large. Two distributed algorithms for adaptive replication of data were developed, one which optimizes the communication cost objective function, and a second which optimizes communication time. A dynamic replication control algorithm was studied and showed improved performance over dynamic noting schemes. Concepts for using replicated data in multilevel secure databasses have shown the ability to quarentee one-copy serialability using a small amount of trusted code. There were 14 articles published under this grant.

14. SUBJECT TERMS

15. NUMBER OF PAGES

2

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	SAR(SAME AS REPORT)

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI std Z39-18
298-102

AFOSR Final Report, July 1993

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This constitutes the final report of the three year award AFOSR grant # 90-135. The following is a list of publications that contain results of our research. All acknowledge support from AFOSR.

1. P. Ammann and S. Jajodia, "Distributed timestamp generation in planar lattice networks," To appear in *ACM Trans. on Computer Systems.*

2. S. Jajodia, R. Mukkamala, and K. V. S. Ramarao, "A view-based dynamic replication control algorithm," To appear in *BIT.*

3. O. Wolfson and S. Jajodia, "An algorithm for dynamic data distribution," *Proc. 2nd IEEE Workshop on Management of Replicated data,* Monterey, Calif, November 1992, pages 62–65.

4. O. Wolfson and S. Jajodia, "Distributed algorithms for dynamic replication of data," *Proc. 11th ACM SIGACT-SIGMOD-SIGART Symp. on Principles of Database Systems,* San Diego, Calif., June 1992, pages 149–163.

5. S. Jajodia and R. Mukkamala, "Measuring the effect of commutative transactions on distributed database performance," *Information Sciences,* Vol. 60, Nos. 1/2, February 1993, pages 91-111.

6. O. Wolfson, S. Jajodia, and Y. Huang, "The cost and time of adapµive data replication," Submitted to *ACM Trans. on Database Systems.*

7. O. Wolfson and S. Jajodia, "An algorithm for dynamic data allocation in distributed systems," Submitted to *Information Processing Letters.*

8. P. Ammann, V. Atluri, and S. Jajodia, "The partitioned synchronization rule for planar partial orders," Submitted to *IEEE Trans. on Knowledge and Data Engineering.*

9. P. Ammann, F. Jaeckle, and S. Jajodia, Concurrency control in a secure multilevel database via a two-snapshot algorithm," Submitted to *Jour. of Computer Security.*

10. D. Mutchler, "Some (naive?) questions about replica control," *Proceedings of the IEEE Workshop on the Management of Replicated Data,* Houston, November 1990, pages 113-116.

11. Y. Zhu and D. Mutchler, "An entropy heuristic for the traveling salesman problem," *Proceedings of the Fifth International Symposium on Methodologies for Intelligent Systems,* Knoxville, October 1990, pages 27-36.

12. D. Mutchler, M. Vose, and Y. Zhu, "An $O(n \log^2 n)$ algorithm for coloring perfect planar graphs," Submitted to *Information Processing Letters*.

13. D. Mutchler, "The multi-player version of minimax displays game-tree pathology," *Proceedings of the Sixth International Symposium on Methodologies for Intelligent Systems*, Charlotte, October 1991.

14. D. Mutchler, M. Van Lent and G. Kingsley., "Time-space tradeoffs in the game of one-suit bridge," To be submitted for journal publication.
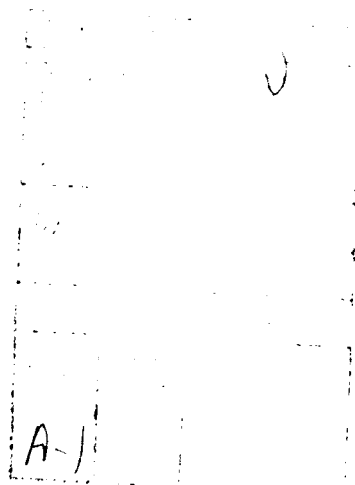
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