

**OPTIMAL SPOT-CHECKING FOR COLLUSION
TOLERANCE IN COMPUTER GRIDS**

MICANS INFOTECH

ABSTRACT

- Many grid-computing systems adopt voting-based techniques to resist sabotage. However, these techniques become ineffective in grid systems subject to collusion behavior, where some malicious resources can collectively sabotage a job execution by returning identical wrong results. Spot-checking has been used to detect and tackle the collusive issue by sending randomly chosen resources a certain number of spotter jobs with known correct results to estimate resource credibility based on the returned result.
- This paper makes original contributions by formulating and solving a new spot-checking optimization problem for grid systems subject to collusion attacks, with the objective to minimize probability of the genuine task failure (PGTF, i.e., the wrong output probability) while meeting an expected overhead constraint.

CONT...

- The problem solution contains an optimal combination of task distribution policy parameters, including the number of deployed spotter tasks, the number of resources tested by each spotter task, and the number of resources assigned to perform the genuine task.
- The optimization procedure encompasses a new iterative method for evaluating system performance metrics of PGTF and expected overhead in terms of the total number of task assignments. Both fixed and uncertain attack parameters are considered. Illustrative examples are provided to demonstrate the proposed optimization problem and solution methodology.



EXISTING SYSTEM

- The computed grid consists of a static set of N_0 resources, K_0 of which are malicious. The malicious resources collude in producing identical wrong outputs to reduce the efficiency of the voting-based replication technique against sabotage.
- To detect the colluding malicious resources (CMR), the RMS sends M spot-checking (spotter) tasks with known output to randomly chosen resources. The CMR cannot distinguish genuine and spotter tasks and, therefore, generate to any task identical wrong outputs with probability .

MICANS INFO TECH



PROPOSED SYSTEM

- This work advances the state-of-the-art on collusion tolerance in grids by formulating and solving a new spot-checking optimization problem, which finds an optimal combination of task distribution parameters including the number of deployed spotter tasks, the number of re-sources tested by each spotter task, and the number of grid resources assigned to perform the genuine task.
- The objective of the considered optimization problem is to minimize the probability of the genuine task failure (PGTF) while meeting a constraint on expected overhead.

MICANS INFOTECH



HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

MICANS INFOTECH



SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

MICANS INNOTECH



REFERENCES

- [1] R. Entezari-Maleki, K. S. Trivedi and A. Movaghar, "Performability Evaluation of Grid Environments Using Stochastic Reward Nets," IEEE Transactions on Dependable and Secure Computing, vol. 12, no. 2, pp. 204-216, March-April 1 2015.
- [2] S. Jafar, A. Krings and T. Gautier, "Flexible Rollback Recovery in Dynamic Heterogeneous Grid Computing," IEEE Transactions on Dependable and Secure Computing, vol. 6, no. 1, pp. 32-44, Jan.-March 2009.
- [3] M. C. Ferris, C. T. Maravelias, A. Sundaramoorthy, "Using Grid Computing to Solve Hard Planning and Scheduling Problems," Proc. of 18th European Symposium on Computer Aided Process Engineering, 2008
- 