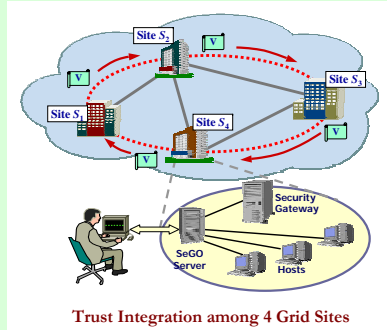


Trust Management in P2P and Grid Computing

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Trust Integration and Security Binding in Dependable Grid Computing

- *Grid job outsourcing* is hindered by security threats and doubtful trustworthiness of remote resources. Mutual trust must be established among Grid sites
- *Fuzzy inference* quantifies the imprecise data or uncertainty involved in trust evaluation of Grid resource sites
- We propose a *fuzzy logic based trust management system* to aggregate multiple *trust attributes* among Grid sites
- A new *security binding* scheme is developed with benchmark experiments for trusted Grid job scheduling



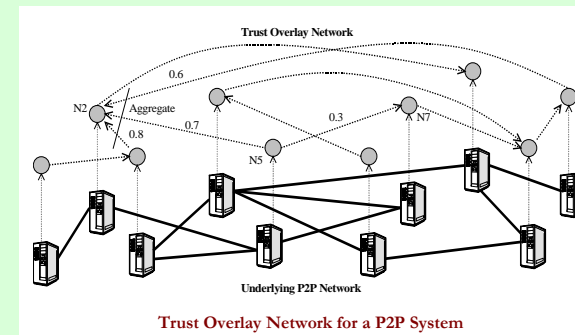
Relevant Publications:

- [1] S. Song, K. Hwang, and Y.-K. Kwok, "Trusted Grid Computing with Security Binding and Trust Integration," *Journal of Grid Computing*, accepted to appear in 2005.
- [2] S. Song, K. Hwang, and M. Macwin, "Fuzzy Trust Integration for Security Enforcement in Grid Computing," *IFIP Int'l Conf. on Network and Parallel Computing (NPC'04)*, Wuhan, China. October 18-20, 2004.
- [3] S. Song, Y.-K. Kwok, and K. Hwang, "Risk-Resilient Heuristic and Genetic Algorithms for Trusted Grid Job Scheduling," *IEEE Transactions on Computers*, submitted June 2005.

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Global Reputation Aggregation for P2P Systems using Trust Overlay Network

- Most *reputation systems* are based on collecting, aggregating and disseminating feedbacks. A TON is a *virtual overlay network* representing the trust relationship among peers.
- With empirical scrutiny of eBay trace data, we observe node degree of TON exhibits a *power-law distribution*
- Power-law distribution in TON applies to any dynamically growing P2P systems



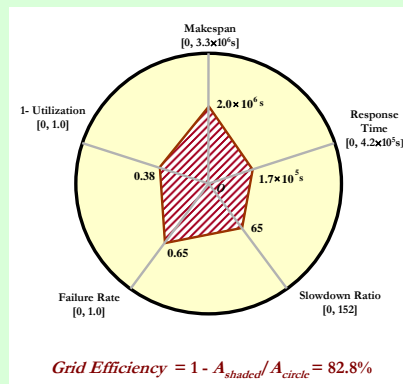
Related Publications:

- [1] R. Zhou, K. Hwang, and J. Pan, "Global Reputation Aggregation for Peer-to-Peer Systems using Trust Overlay Network," *IEEE Trans. on Parallel and Distributed Computing*, submitted Sept. 2005.
- [2] S. Song, K. Hwang, R. Zhou, and Y.-K. Kwok, "Trusted P2P Transactions with Fuzzy Reputation Aggregation," *IEEE Internet Computing Magazine*, submitted April 2005.

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Security Binding in Grid Job Scheduling

Five performance metrics are developed to measure the effects of security binding through trust integration among Grid resource sites. The performance results are based on NAS benchmark experiments on simulated Grid configurations at USC



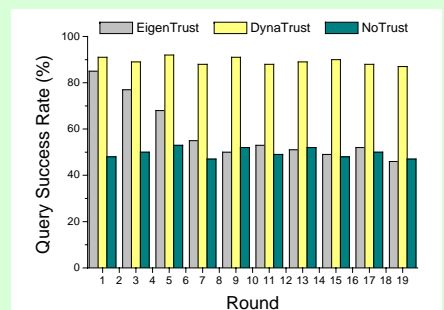
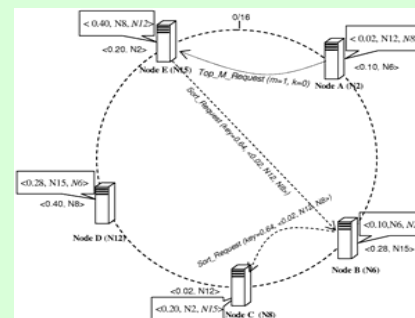
Conclusions:

- Scalable Grid performance is enabled by matching the security demand from user jobs with the trust index of distributed Grid resource sites.
- Kiviat graph depicts compound Grid performance including the makespan, site utilization, job failure rate, job response time, and slowdown ratio.
- Trusted job outsourcing makes it possible to use open Grid resources with confidence, guaranteed performance, and controllable risks.

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DynaTrust: An Adaptive Trust Management System for P2P Systems

- A DynaTrust system efficiently and effectively aggregates local scores to global reputation for P2P systems.
- DynaTrust is based on strategies of *Look ahead Random Walk (LRW)* and *Distributed Sorting Mechanism (DSM)*. LRW is especially efficient in power-law TON with small message overhead and with DSM.



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