

Trust based on evidence

Sini Ruohomaa

Department of Computer Science, University of Helsinki, Finland

`sini.ruohomaa@cs.helsinki.fi`

<http://www.cs.helsinki.fi/sini.ruohomaa/>

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ABSTRACT

In open distributed systems, the set of potential collaboration partners is large and highly dynamic. An adaptive soft security approach is needed to allow new collaborations to form, on one hand, while on the other hand quickly adapting self-defense mechanisms according to evidence of the new partners' good or bad behaviour.

Trust management protects assets coming under risk when collaborating. Evidence-based trust management has three phases: identifying the target of trust, making a context-specific trust decision, and observing the target's behaviour. Their hard security equivalents are authentication, authorization and anomaly or breach detection; the main difference is that the decision-making and observation phases are connected by a feedback loop.

The TuBE trust management system is built into collaboration middleware. The guarded service application does not need to be aware of the trust mechanism around it, as the guard is implemented around it as a wrapper [2]. Trust decisions are made by combining four factors: risk and business importance, reputation, and temporary contextual adjustments to the three. Reputation is built from continuously updated evidence: a reputation system stores and distributes local and globally shared experiences, and provides an aggregated summary of the information for use in trust decisions.

Trust is used both when setting up a collaborative virtual organization, and through its runtime. Partner selection is based on trust, with a strong focus on reputation. During the collaboration, action-specific trust decisions are made when resources must be committed.

The TuBE trust management system extends the Pilarcos middleware, which is built on the Web Services technology. Interesting research questions include the expression and propagation of trust and reputation, application-level observation, and analysis methods used for upkeeping reputation [1].

References

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- [2] Sini Ruohomaa, Lea Viljanen, and Lea Kutvonen. Guarding enterprise collaborations with trust decisions—the TuBE approach. In *Proceedings of the First International Workshop on Interoperability Solutions to Trust, Security, Policies and QoS for Enhanced Enterprise Systems (IS-TSPQ 2006)*, March 2006.