Decentralized Trust Management Based on the Reputation of Information Sources

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Introduction

The problem

- Trust an identity (authentication) vs. trust a piece of information (integrity)
- Quantify the trust
- Trust management in a distributed system
Existing solutions

- Public key systems can bind credentials to identities, e.g., PKI, PGP, etc.
- Rating credits of identities, e.g., credits histories.
Our contributions

- Assign different integrity levels to agencies and their information
- Use mathematical model to integrate information from different sources
- Protocols to exchange information and evaluate credit of agencies
- Performance evaluation
- Integrity level analysis along the information path
Protocols

- Information without feedback
- Information with feedback
- Query for the quality of information
- Ask for the reference periodically to give ratings to agents
- Collect information
Coalitions

- Set up a threshold $m$
- Get at least $m$ good feedback from references to trust an agency
Communication costs to establish trust in a distributed system with $m = 4$
Communication costs to establish trust in a distributed system with $m = 10$
An example function of the degradation of integrity levels
An example of the degradation of integrity levels

- **Agencies along the path**: The horizontal axis represents the number of agencies along the path.
- **Integrity level**: The vertical axis shows the integrity level of the agencies.
- **Degradation of the integrity level**: The dashed line represents the degradation of the integrity level.
- **Integrity levels of agencies**: The red triangles indicate the initial integrity levels of the agencies.
- **Remaining integrity levels along the path**: The blue crosses show the remaining integrity levels after degradation.
Thanks!

Thanks and questions?