

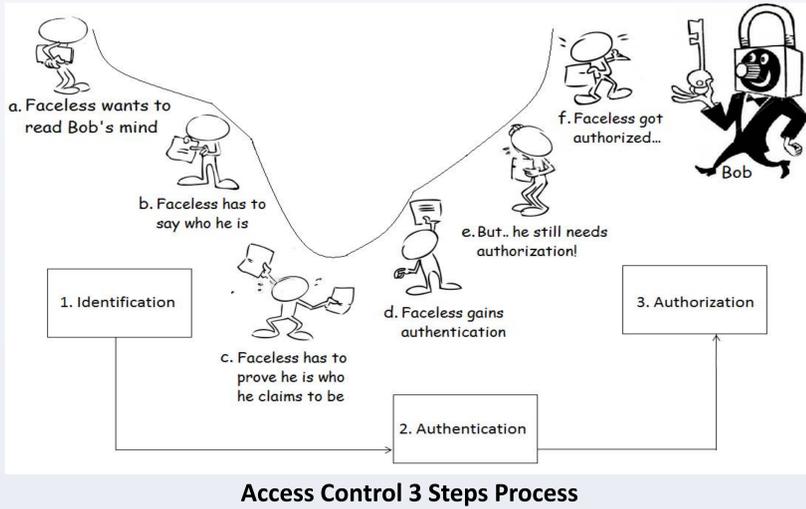
Can we Rely on the Community for Identity Management in Decentralized Social Networks?

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Privacy Preservation and Access Control – The Big Picture



Access Control and Decentralization

- 1. Identification:** Ensure consistent identification of subjects across all parts of the decentralized system and be immune against identity related attacks (identity theft, sybil attack, cloning, etc)
- 2. Authentication:** Perform authentication of users in the absence of or with limited hierarchy
- 3. Authorization:** Ensure safe authorization mechanisms which ensure flexibility and socializing features all while guaranteeing privacy preservation with no or limited hierarchy

Identification and Identity Management in OSNs - Basics

Q1: What is an Identity?

A1: an identity is,

- "sameness in all that constitutes the objective reality of a thing or the distinguishing character or personality of an individual." [1]
- "a set of socially distinguishing features that a person takes a special pride in or views as unchangeable but socially consequential." [2]
- "how to refer reliably to anything, abstract or more concrete, over time and space, and in different contexts." [3]

Q2: How to differentiate an identity from another in the context of an Online Social Network?

A2: An authority would set a convention in an identification framework by which it can recognize its members. In actual OSNs, and with Facebook as example, identification happens with the email address of the member.

Q3: How to differentiate an identity from another in the absence of an authority entity?

A3: We got no answer now! It is under research ☺

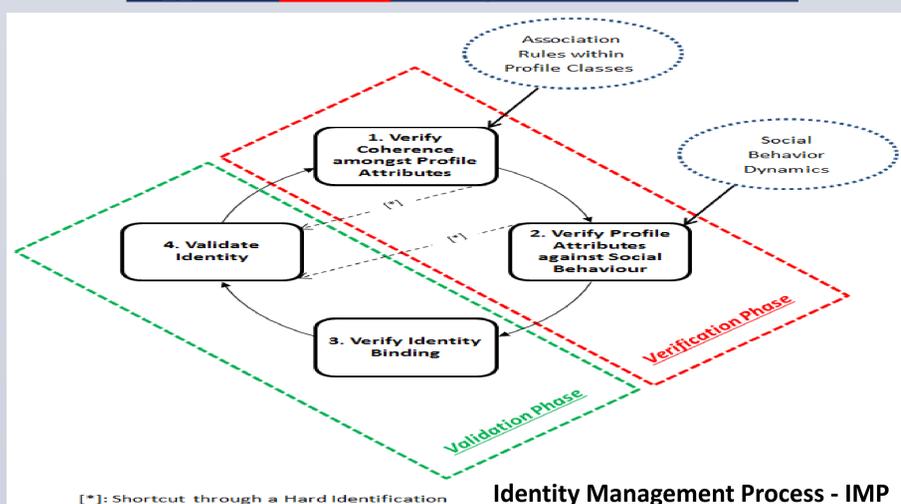
Q4: What is identity management?

A4: We mean by identity management the process that continually controls who owns/who is behind a profile on the social network.

Q5: What is the role of identity management in privacy preservation?

A5: The limited ability of verifying the authenticity or validity of profiles leads to the creation of accounts containing spoiled data on the network. Such spoiled accounts not only make access control mechanisms ineffective, but also render meaningless the users' privacy settings which most of them rely on others' identities [4]. Effective identity management would be a proactive measure against such attacks.

Suggested Identity Management Process (IMP)



Identity Management in OSNs – Current Research Questions

Research Question 1: Are some profile attributes linked to each other in the sense that the coherency amongst their values is measurable? Extendibly, can we measure the trustworthiness of a profile from the values given to its attributes?

Research Question 2: Assuming the previous question's answer is positive, can we reliably hire the community and use its feedback to measure the trustworthiness of profiles in a decentralized and privacy preserving manner (let the community validate the profile without being able to reconstruct it as a defining entity)?

Hiring the Community in the IMP – Ideas and Concerns

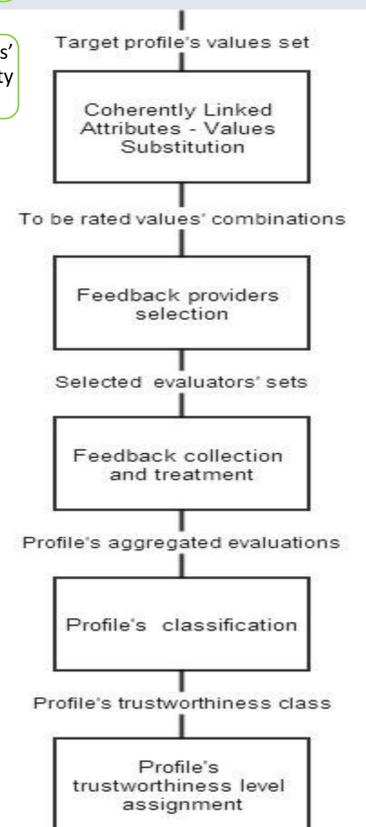
- The more coherent an online profile is (user representation), the more trustworthy it is to others on the online social space [5].
- Coherence within a profile might be measurable, and community feedback might be used to measure it (?), but
 - What are the profile models against which the coherence within a profile is to be measured and how to construct/learn them?
 - How to solicitate the community feedback without revealing private information about the target profile?
 - How to manage the quality, in terms of credibility and appropriateness, of the provided feedback?
 - How to encourage the community to participate in the process (what are the participation incentives)?

Hiring the Community in the IMP – Possible Process

- Learning Phase**
 - Learn profile attributes' linkages: experiment community group rates coherence between profile attributes values combinations
 - Construct linkability rules: detect meaningful clusters from the ratings provided

- Validation Phase**
 - Validate the rules against trusted profiles

- Operation Phase**
 - Use constructed rules to run the Social Profiles' Trustworthiness Classification from Community Feedback Process



Social Profiles' Trustworthiness Classification from Community Feedback

References

- [1] - Merriam Webster Online Dictionary. [Online], available at: <http://www.merriam-webster.com/dictionary/privacy>
- [2] - Fearon, D, J, What is Identity (As we Now Use the Word)?. Department of Political Science, Stanford University, 1999.
- [3] - Glaser, H and Halpin, H, The Linked Data Strategy for Global Identity (PhD Thesis). University of Southampton. In *IEEE Computer Society*, 2012.
- [4] - Cinzia Squicciarni, A, et al., Towards a Game Theoretical Model for Identity Validation in Social Network Sites. In *IEEE Int Conference on Privacy, Security, Risk and Trust*, IEEE, 2011.
- [5] - Ljung, A and Wahlforss, E, People Profiles & Trust On Interpersonal Trust in Web-mediated Social Spaces, 2008, [Online], available at: <http://trustmojo.com>