Towards A Framework for Cyber Social Status Based Trusted Open Collaboration

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Open Collaboration?

“You spelled ‘confidential’ wrong.”
Collaboration

• **Closed Collaboration**
  – Information and resource sharing amongst selected participants

• **Open Collaboration**
  – Anyone can participate
  – Proven to be productive
  – Inherently a social activity, hence trust establishment needs a social computing
Trusted Collaboration

• Trusted Closed Collaboration
  – Trustworthiness of selected users and shared resource is verified

• Trusted Open Collaboration (TOC)
  – NOT MEAN an open collaboration system with a guaranteed trustworthiness
  – MEANS a discriminative measure (for example, cyber social status in our case) can be facilitated in open collaboration to provide certain degree of trust to participants.
Open (source) Collaboration Principles

• **Egalitarian**
  – *Everyone can contribute, because open source projects are accessible on the Internet and the project community is typically inclusive to anyone who wants to help.*

• **Meritocratic**
  – *Contributions are judged transparently and based on their merits. All decisions are discussed publicly on mailing lists and can be looked up for reference.*

• **Self-organizing**
  – *There is typically no defined process imposed from the outside so the project community itself determines how to go about its work.*

TOC: Three Principles

- **Egalitarian**
  - user with equal footing
  - anyone can participate (contribute and get benefit)
  - No user account or anyone can create an account
  - Not necessarily means all contributions are valued equally

- **Meritocratic**
  - contribution-based weighted value of user and resource
  - True only to a certain degree since
    - Contribution-based discriminative social standing can allow a user to influence other users’ social standing
    - Social standing can be given by authority or other social activities, not by contribution (or merit)

- **Discriminative**
  - Trust is based on selective discrimination of participants and resources
  - Discrimination is based on various cyber social statuses
TOC: Two Criteria

• Contribution evaluation process
  – Self-organized
    • Collaboration community decides the process (No pre-imposed process from outside)
  – System-organized
    • Evaluation process can be pre-imposed by system
    • E.g., In wiki, the system may allow an expert to delete other’s shared resource

• Cyber Social Status (CSS) management
  – Self-governed
    • Collaboration community itself (participants’ activities) generates and manages CSS
    • User participation in governing social status and social activity
  – Authority-governed
    • CSS is given by an authority who is not a participant
Collaboration Taxonomy

Collaboration

Closed*  Open

Untrusted*  Trusted

Self-organized*  System-organized
(contribution eval. process)  (contribution eval. process)

Authority-governed  Self-governed
(cyber social status management)  (cyber social status management)

*Out of Scope
User Cyber Social Status (u-CSS)

<table>
<thead>
<tr>
<th>Authority-given</th>
<th><img src="authority-given_diagram.png" alt="Diagram" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>User-claimed</td>
<td><img src="user-claimed_diagram.png" alt="Diagram" /></td>
</tr>
<tr>
<td>User CSS-based</td>
<td><img src="user-css-based_diagram.png" alt="Diagram" /></td>
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</table>
User Cyber Social Status (u-CSS) – cont.

<table>
<thead>
<tr>
<th>Category</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource CSS-based</td>
<td><img src="image1" alt="Resource CSS diagram" /></td>
</tr>
<tr>
<td>User-participation-based</td>
<td><img src="image2" alt="User-participation diagram" /></td>
</tr>
<tr>
<td>Collaborated Social Activity (CSA)-based</td>
<td><img src="image3" alt="Collaborated Social Activity diagram" /></td>
</tr>
</tbody>
</table>
### Resource Cyber Social Status (r-CSS)

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<td>Authority-given</td>
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<td>![User CSS-based Diagram]</td>
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**Diagram Notes**
- **Authority-given**
  - Authority claims Resource
  - Resource influences CSS

- **User-claimed**
  - User claims Resource
  - Resource influences CSS

- **User CSS-based**
  - User influences CSS
  - CSS influences CSS
## Resource Cyber Social Status (r-CSS) – cont.

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<tr>
<th>Resource CSS-based</th>
<th>Collaborated Social Activity (CSA)-based</th>
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<tr>
<td><img src="image1" alt="Resource CSS diagram" /></td>
<td><img src="image2" alt="Collaborated Social Activity Log diagram" /></td>
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## Characteristics of u-CSS Types

<table>
<thead>
<tr>
<th>CSS Type</th>
<th>CSS Governing</th>
<th>Meritocracy</th>
<th>CSS Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority-given</td>
<td>authority</td>
<td>Not meritocratic</td>
<td>No Sybil Attack</td>
</tr>
<tr>
<td>User-claimed</td>
<td>Self or other user</td>
<td>Not meritocratic</td>
<td>If self, no Sybil Attc. If other, depends on difficulty of user claiming</td>
</tr>
<tr>
<td>User CSS-based*</td>
<td>Depends on added CSS type</td>
<td>No, alone. Meritocratic w/ CSA-based u-CSS</td>
<td>No Sybil Attack alone</td>
</tr>
<tr>
<td>Resource CSS-based</td>
<td>users</td>
<td>Meritocratic w/ CSA-based r-CSS</td>
<td>Vulnerable if r-CSS can be generated by CSA</td>
</tr>
<tr>
<td>User participation-based</td>
<td>self</td>
<td>limited meritocratic (no others’ eval.)</td>
<td>No Sybil Attack</td>
</tr>
<tr>
<td>CSA-based</td>
<td>users</td>
<td>Meritocratic</td>
<td>Vulnerable to Sybil Attack</td>
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*Needs other u-CSS type(s)
Characteristics of r-CSS Types

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<td>Not meritocratic</td>
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<tr>
<td>Resource CSS-based*</td>
<td>Depends on additional r-CSS type</td>
<td>Meritocratic w/ CSA-based r-CSS</td>
</tr>
<tr>
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<td>Users</td>
<td>Meritocratic</td>
</tr>
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*Needs other r-CSS type(s)
Amazon-like TOC

CSS Types used:
- CSA-based uCSS/rCSS
- uCSS-based rCSS
- rCSS-based uCSS
- Authority given uCSS
eBay-like TOC

CSS Types used:
- CSA-based uCSS
- uCSS-based rCSS
YouTube-like TOC

CSS Types used:
- CSA-based uCSS/rCSS
- uCSS-based rCSS
- User-claimed rCSS
- Authority given rCSS
Questions? Comments?