Requirements as the basis for software transparency

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Support from
Main Goal

Achieve Software Transparency
Definition (Wordnet)

“(n) transparency, transparence, transparentness
(the quality of being clear and transparent)”

“(adj) transparent [Related to: transparency]
(easily understood or seen through (because of a lack of subtlety)) "a transparent explanation"; "a transparent lie"",

antonym: “(adj) unobvious [Indirect via obvious]
(not immediately apparent)”.
Transparency (Social Sciences)

Holzner and Holzner [1] states that transparency is:
“the social value of open, public, and/or individual access to information held and disclosed by centers of authority.”.

Henriques [2] states:
“...transparency cannot be purchased wholesale. One thing it requires is painstaking attention to detail. Yet transparency is not just a technical issue of communications. The fundamental argument of this book is that transparency is required wherever power is exercised.”.

Lord [3] says: “Transparency is a condition in which information about the priorities, capabilities, and behavior of powerful organizations is widely available to the global public.”

Fung et al [4] uses the concept of target transparency: “Instead of aiming to generally improve public deliberation and officials’ accountability, target transparency aims to reduce specific risks or performance problems through selective disclosure by corporations and other organizations. The ingeniousness of target transparency lies in its mobilization of individual choice, market forces, and participatory democracy through relatively light-handed government action”.

Transparency

Transparency has been, for long, a general requirement for democratic societies. The right to be informed and to have access to the information has been an important issue on modern societies.

However, as software permeates several aspects of our society, at some point in the future, software engineers will need to deal with yet another demand: transparency. In such foreseen environment, engineers will need to have methods, techniques and tools to help make transparent software.
Information Transparency
Process Transparency
The Rationale

Software is deemed transparent if it makes the information it deals with transparent (information transparency) and if it, itself, is transparent, that is it informs about itself, how it works, what it does and why (process transparency).
Jean Camp [5] notes that “That laws and computer programs are both called ‘code’ is not a coincidence”. Camp cites Stallman “…computer code controls and enables the actions of users, and for users to have true autonomy they must be able to examine, alter, and redistribute the code” and stresses that this statement is key when government activities are embedded in computer code. “The critical feature of open code is that it can be read by humans. Open code enables informed discourse about digital process application, and the assumptions underlying both.” [5]. However, as Camp observes: open code does not guarantee transparency.

Transparency → Open Source

Weaving scenarios in the code together with a lexicon oriented ontology.

Some work done already.

http://pes.inf.puc-rio.br/cel/

But ....
The role of Requirements Engineering

“Transparency is an interesting quality because it makes it necessary to attach requirements models to software”

Professor John Mylopoulos
Our Work

Software must be developed using a requirements baseline. As such, the requirements need to be transparent for both general stakeholders and developers’ stakeholders.

We assume i* is a strong candidate to be the main representation for this transparent baseline.
Transparency Ladder

- Accessibility
- Usability
- Informativeness
- Understandability
- Auditability
- Transparency
Strategic Actors Transparency

SA Model

Organizational Structure

Agent Taxonomy

∀ agent occupies position X → agent plays
∀ role covered by position X.
Softgoals that can be satisficed (SA)

1 - Organizational Structure: a) conciseness [understandability] – the organizational structure is easily depicted (diagram), b) verifiability [auditability] – it can be verified against the SD diagram, c) validity [auditability] – there is a link to the "real world", that is it refers to structures usually present in an organization, d) accountability [auditability] - it indicates responsibility, e) traceability [auditability] – there is a link to the "real world", f) clarity [informativeness] – identifies the link from a position to a role.

2 - Agent Taxonomy: a) verifiability [auditability] – it can be verified against the SD diagram, b) validity [auditability] - links to the "real world", by the identification of the real agent (human or device), c) accountability [auditability] - indicates responsibility, d) clarity [informativeness] – identifies the real agent.

S3 - Responsibilities: a) conciseness [understandability] - presents the organizational structure in a easy way (diagram), b) Verifiability [auditability] – it can be verified against the SD, c) validity [auditability] – it links to the "real world", as it identifies roles which are usually associated with tasks in organizations, d) accountability [auditability] – it makes sure that a position has a given responsibility by stressing its role in the organization, e) traceability [auditability] – a role is identified in the “real world” by means of the tasks that are being performed.
Strategic Rationale Transparency

SR Model

Actor Intentionality

Softgoals

Detailed Intentionality

Contributions

Alternative

Strategic Rationale Transparency
Alternatives Analysis Transparency

Explicit Softgoals
- Cost
  - Hurt
  - Help
- User-Friendliness
  - Use CardKey Authentication
  - Use Biometrics Authentication
  - Use Multiple Password
- Be Authenticated
  - Be Authenticated By Password
  - Authenticate with Password
  - Use Single Password
- Authorize Access
  - Use Access Validation Rules
  - Use Identification Key
- Alternatives
  - Security
    - Internal Confidentiality
    - External Confidentiality
  - Consistency
    - [Reviewed Article]
- Detailed Intentionality
  - Make Review
  - Articles BeReviewed

Contribution

Actors Intentionality

Reviewers

[Image of diagram with various nodes and arrows connecting them, depicting the flow of information and decision-making in an alternatives analysis.]
Please help us..... (From Claudia Cappelli)

### QUESTIONNAIRE

**Question 1** - Do you agree with the ladder (Figure 2) or do you believe the requirements are all at the same level?

- **Objective**: Identify the necessity of a ladder
- **Rationale**: Ladder existence assurance

- [ ] Yes, I agree with the ladder.
- [ ] No, I think all the requirements are at the same level.

**Question 2** - Given that there are steps in this ladder, do you agree with the ordering?

- **Objective**: Identify if the step order is correct and complete
- **Rationale**: Steps correctness and completeness assurance

- [ ] Yes.
- [ ] No, I would propose the following order (use 1 to 5 in the list below to indicate your classification):
  - [ ] Accessibility - The quality of being accessed
  - [ ] Usability - The quality of being able to provide good service
  - [ ] Informativeness - The quality of increase knowledge or dissipate ignorance