Exploring i* characteristics that support software transparency

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This work presents the idea of software transparency. It posits that software transparency must be based on requirements, which will be the baseline for downstream traceability as well as upstream traceability. In that context, i* models are viewed as providing the support for several of the non-functional requirements that impact the software transparency NFR. In particular, we will explore the SA (strategic actor) model.

Keywords: Transparency, Softgoal, non-functional requirements, i-star, SA model.

1 Introduction.

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. The demand for trust based on transparency has been increased in the context of global transformations. The importance of openness in the flow of information is creating an open society in which the very idea is to establish a democratic society with engaged citizens able to understand and use the information that is accessible to them [1]. However, is not sufficient to wish to be transparent. The organizations have to know what transparency is exactly and how they can demonstrate it.

Quoting Wordnet[1], transparency is: "(n) transparency, transparence, transparentness (the quality of being clear and transparent)" and "(adj) transparent [Related to: transparency] (easily understood or seen through (because of a lack of subtlety)) "a transparent explanation".".

We have been studying transparency as a non-functional requirement, and in [2] we have produced an initial mapping of several NFRs as listed in Chung et al. [6]. Figure 1 shows the transparency network we have mapped.

1. [1] WorldNet – A lexical database for the English language http://wordnet.princeton.edu/

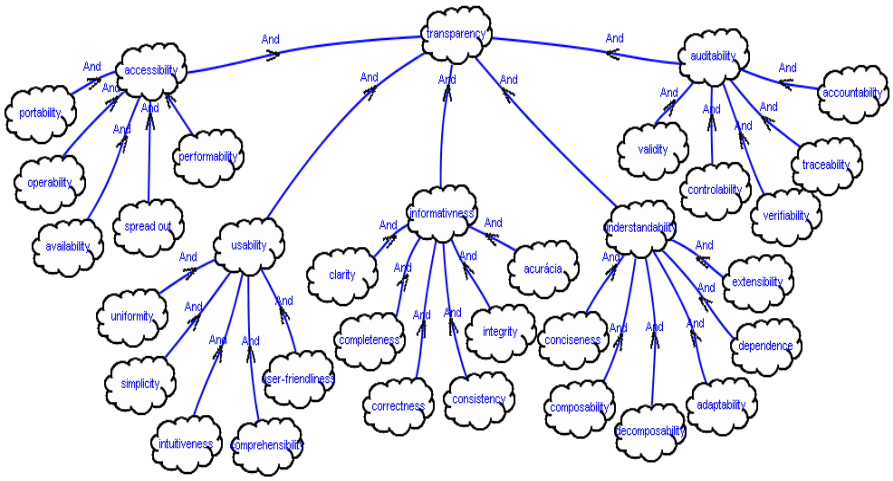

Fig. 1. Transparency Network [2]

From the transparency network we have posit an initial "transparency ladder", which must be climbed as to achieve transparency. Figure 2 shows such ladder.

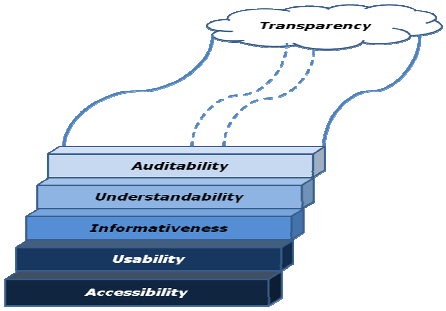

Fig. 1. Transparency Ladder

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*). We tackle the problem of software transparency using the idea of requirements that are readable for both general stakeholders as developers' stakeholders.

Our vision that software transparency should be based on requirements is best described by an observation by Professor John Mylopoulos. He states[2]:

[2] Personal Communication

"Transparency is an interesting quality because it makes it necessary to attach requirements models to software."

With this in mind, a requirements framework that allows both pre-traceability and post-traceability becomes central to the step Auditability as in the Transparency ladder, which has traceability as one of its components. Accordingly, we can refer to an upstream transparency to general stakeholders and downstream transparency to developers (code).

2 i* models as support for transparency

In [2] relations between transparency qualities (Figure 1) and "Quality Questions" (5W1H) were identified. Three business process modeling meta-models were compared and i* model ranked better since it covered most of the Quality Questions for each of the softgoals that compose the transparency network (Figure 1).

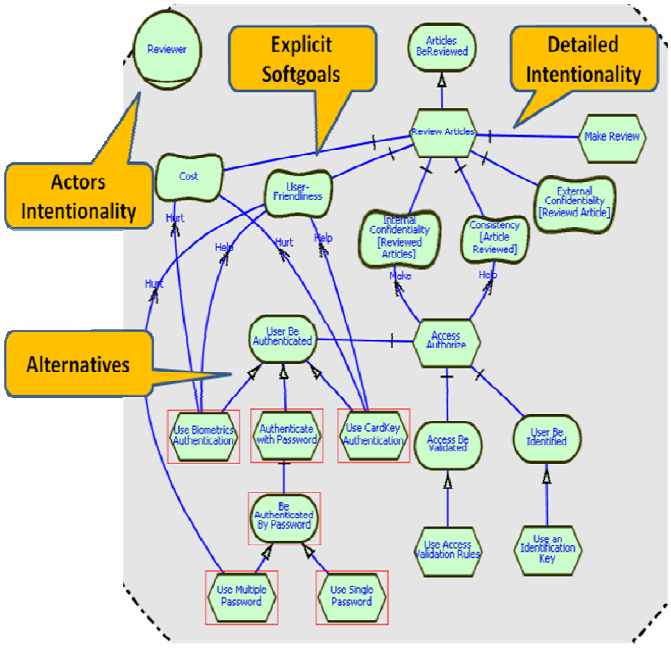

Fig. 3. An Instance of SD Transparency [3]

For instance, the SR diagram of Figure 3 presents 4 major points that address the "transparency ladder": actors' intentionality, explicit softgoals, alternatives, and detailed intentionality. By describing actors' intentionality we are addressing the NFRs (Figure 1) of traceability and verifiability, which contribute to the auditability

step. By addressing explicit softgoals we are addressing the NFRs of completeness, clarity and accuracy, which contribute to the informativess step. By addressing detailed intentionality we are addressing the NFRs of decomposability and composability which contribute to the understandability step. The description of alternatives is important to the NFRs of integrity, extensibility and validity each contributing to a different step in the ladder.

3 The Strategic Actor Model and its role on Upstream Transparency

We understand that the Strategic Actors Diagram must be considered first class citizens as the other i* diagrams [4]. We understand that the SA model has to be first produced once information sources are being identified. In [5] we have proposed an influence graph upon which requirements engineering discussed and plot the relevant information sources. These information sources should be analyzed and those information sources that are actors should be modeled by an SA model.

Note that the SA model is used in different parts of the requirements process. First it is used as a map of information sources of the type actor and later on it is used to map the actors that will be related to the elicited goals.

Our research is focusing in SA model as an instance of upstream transparency. We will explore the relationship of the SA model with other representations such ontologies and business processes models as to improve the fitness of SA models to the steps of the transparency ladder

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