What is Trust

Orfeas Stefanos Thyfronitis Litos

University of Edinburgh
`o.thyfronitis@ed.ac.uk`

Abstract. We will try to define all the abstract properties that we would like "Trust" to have.

1 Definitions

Definition 1 (Agent). *An agent can be thought of as either a programme/Turing machine/protocol (inanimate) or as a pseudonymous identity corresponding to a human. Let $\mathcal{P}$ be the set of all agents.*

Definition 2 (State). *Let agent $P \in \mathcal{P}$. If P is inanimate, then P's state at an instance $t \in \mathbb{N}$, is a function $S : \mathcal{P} \times \mathbb{N} \to \mathcal{S}$ that returns the state of the machine. If P is a human, then $S(P, t)$ is a record of the internal condition of the human, as observed by the human.*

Definition 3 (Global State). *The global state $GS : \mathbb{N} \to \mathcal{S}^{|\mathcal{P}|}$ is the set of the states of all agents $P \in \mathcal{P}$ at a specific instance:*

$$GS(t) = (S(P_1, t), ..., (P_n, t)) \quad,$$
$$where \ \bigcup_{i=1}^{n} \{P_i\} = \mathcal{P} \ .$$

Definition 4 (Trust). *Trust is a function $T : \mathcal{P}^2 \times \left(\mathcal{S}^{|\mathcal{P}|}\right)^2 \times \mathbb{N}^2 \to \mathcal{R}^+$.*

Let $in = (P_1, P_2, GS_1, GS_2, t_1, t_2) \in \mathcal{P}^2 \times \left(\mathcal{S}^{|\mathcal{P}|}\right)^2 \times \mathbb{N}^2$. Then $T(in)$ is interpreted as the level of commitment P_1 can provide that the actions of P_2 upon a world where $GS(t_1) = GS_1$ will lead to a world where $GS(t_2) = GS_2$.

References