Delegation of Responsibility
(Transcript of Discussion)

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Today I will present for the first time a work that is still under development. I will talk about some issues related to delegation.

Yesterday Carl Ellison said that people usually talk about trust but they never define it. So I decided to start the day with a definition.

During the last few months I have studied many papers investigating delegation in the security area and all of them use delegation generically as synonymous with a particular form of delegation, that is delegation of rights. Delegation is then defined as the process whereby a principal authorises an agent to act on her behalf by transferring a set of rights to the agent for a specific period of time. We defined the grantor as the person who hands over the rights, the grantee, who accepts them, and usually what is handed over is a subset of rights owned by the grantor to the grantee while the responsibilities for these rights are always shared between the grantor and the grantee. There is always a share of responsibility on the rights and usually both of them, grantee and grantor, have the capability to exercise the delegated rights.

We want to point out that there are a lot of situations where we do not desire this uncertainty due to the share of responsibilities. What we want is a mechanism able to detect who is the principal accountable for a certain action.

Another possible definition of delegation, that does not substitute the above one but I think it may be equally useful, is delegation of responsibilities. Delegation of responsibility is defined as the process whereby a principal authorises a principal to act on her behalf, for a specific period of time, during which the principal can no longer exercise these rights. The fact that the grantor cannot exercise these rights is the crucial point because this is a necessary condition for the grantor to hand over not only the rights but the responsibility attached to the rights.

The principles underlying these two different type of delegations are very different, because delegation of responsibility seems to fall in those cases where a principal has to rely on a third party to complete her transaction, but he does not have to trust the other party, while with delegation of rights, trust is involved. The grantor must carefully choose the grantee because once she has handed over the rights to him, it is very difficult if it happen, to distinguish who, between her or her grantee, has abused these rights. It is a trust relationship, that may be revoked but hardly monitored or audited.

There exist many examples of this kind of delegation, in real life.

As I say I have studied some works and papers on delegation and a lot of them focus their attention on the implementation issues but very few papers investigate the definition of delegation. As a result there are a lot of papers that
just implement in different ways delegation only of rights. There is no paper that has a different point of view on delegation. One of the few frameworks investigating the formalisation of delegation is the work done by Abadi, Lampson et al., at DEC, at the beginning of the nineties. They specify a logic and a calculus to represent several issues related to distributed systems, among these issues also delegation. However the calculus proposed is able to represent just delegation of rights.

I will give now a brief overview of what are the issues of this logic that need to be re-discussed in order to be able to represent also delegation of responsibility.

One of the basic blocks of their calculus is the relation *speaks for*. This is a relation between principals. Let us suppose to have two principals, saying that \( A \) *speaks for* \( B \) means that if \( A \) says something, the other component of the system can believe and infer, that \( B \) says the same. The relation *speaks for* implicitly assumes that whatever is said by somebody speaking for you, it is as if you said the same thing. This implication is clearly too strong if we want to represent delegation of responsibilities. In their framework, for delegation to take place, requires two steps. First \( A \) has to delegate \( B \) something. Subsequently \( B \) must explicitly accept this delegation, in such a way that \( B \) does not speak on behalf of \( A \) by mistake but he must accept and know that when he speaks for \( A \), he is entitled to do it. In the logic if \( B \) acting on behalf of \( A \) says something, this means that both \( A \) and \( B \) must contribute to the statement, so both \( A \) and \( B \) must consent on that, and this is exactly what we do not want with delegation of responsibility. The logic must be extended in order to express this other type of delegation.

I introduce here another, even wider, definition of delegation. Where delegation is defined as the process whereby a principal, authorise an agent to exercise some rights on her behalf for a specific period of time. The novelty of this definition is that there is no mention that the grantor has to hand over any right to be able to delegate, but it is sufficient for her to have just responsibilities. With this form of delegation, the grantor possess only the right to enable delegation, The grantee possess her own rights, but just the combination of the two, can generate delegation. An example of this type of delegation in the real world can be represented by the purchase of a house. In this case the buyer has to go to a solicitor to write down the contract. The buyer cannot write it by herself because she does not have enough competence. However the solicitor has her own rights that the buyer does not pass to her, but still the buyer needs to enable the solicitor to act on her behalf in writing the contract. The solicitor cannot perform the same action on the buyer’s behalf without her permission.

**Virgil Gligor:** You give the power of attorney to somebody, it does not have to be a solicitor.

**Reply:** Yes.

**Roger Needham:** There is a difference here though because there are cases where you give somebody a power of attorney to do something that you could perfectly well have done yourself, if you were not ill in hospital or something like that, or where you delegate something by commissioning somebody who is