A Note on Mobile-Agents Technologies

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***Abstract*— In this paper, I present both technical and philosophical implications that appear whenever there are mobile-agents technologies implemented over the Internet. One of the key issues is whether or not to run open source such as Linux is possible taking into account the most general platform of computation, and what we can do to compensate the problems given the situation briefly analyzed here.**

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I. The Context

Recently, it has been set from relevant discussions [6], [4] that mobile-agents technologies (MAT) consist of programming languages (which have particular features presented in [2]) and their implementations, which in turn have two main layers of software: mobile-agents and operating systems. One of the main problems (if that is not the main problem) while implementing a mobile agents technology is to protect mobile agents from malicious hosts[5].

In [2], it has been shown that, in order to solve the problem to protect mobile agents from malicious hosts, there are at least two main suggestions:

- The first suggestion is to implement some virtual machine (or some interpreter) atop normal operating systems. In this case, there can be an implementation of the virtual machine for each type of operating system. The security service can be reasonable but perhaps not for critical applications, hence, not in the general sense of mobile computation.
- The second suggestion consists in writing a single piece of software that plays the rôle of operating system but providing the service of virtual machines. Here, there is the concept of *visitor process*, and this is the most safe and secure approach.

Whenever an agent arrives at a host, a well-defined contract is established for that agent, that runs as part of a visitor process. The notion of visitor process is defined in terms of analogy between mobile agents and human beings regardless of the conceptual and philosophical[1] differences between the two. Therefore, a visitor process does not belong to any local user, and yet it has not only some constraints previously set by hosts but also some rights and, normally, cannot be killed or punished by support staff prejudice. In order to provide a general and symmetric solution, visitor processes must be protected against attacks from hosts. The mobile-agents technology developers are those who establish the general laws of the system, and those laws are technically respected by everyone, while constraints are set in the general fashion by the hosts before agents come. That is, that can be technically done on the fly, but the rules apply only to the agents who arrive afterwards, not those who are already running in the system.

II. A Few Consequences

Given a flexible context similar to that one I described, there are some conclusions to which I arrived.

Taking a typical situation of a client entering a book shop, both the client and the owner are agents, in the most general sense of the word. The personality of the client cannot be seen by the owner of the book shop, although the latter are expected to draw some conclusions about the former and vice-versa. Similarly, the personality of the owner cannot be seen by clients.

In addition, the personality of the client is not seen by any other client, although some aspects of their personalities can be transmitted between them.

From this context, it follows that the idea of open source becomes unfeasible on the most general environment that supports mobile computation. The observation is that if neither mobile agents can be open source, nor their mobile-agents system as a whole is open source.

It is known that mobile agents are expected to carry many personal data of their owners, including the representation of their personalities, in order to represent them in an efficient way, given a situation.

Notice that the above observation of mine is technical, that is, I describe the world as it is and, from that, I draw technical constraints to the system.

Apart from those technical reasons, another consequence of the same analogy is that, at least in this context of mobile agents computation, open source is not a good idea. The reason is that all the people love their own privacy[3] and want respect with respect to the privacy. In contrast with the technical observation, this kind of observation is philosophical. As it is known, ethics is a branch of philosophy.

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