Mobile Agents and Their Applications

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What' Mobile Agent?

A mobile agent is a software abstraction that can migrate across the network (hence mobile) representing users in various tasks (hence agents). It can communicate in an agent communication language, it is also a computer system in a complex environment that realize a set of tasks and goals it was designed for. It can be deployed in many complex applications such as Internet, Mobile Data Computing, Electronic commerce, Networking, Manufacturing and Scientific computing.

Basically, there are three application domains do need mobile agent: One is data-intensive applications where the data is remotely located, is owned by the remote service provider, and the user has specialized needs. Here, the user sends an agent to the server storing data. The second domain is where agents are launched by an appliance - for example, shipping an agent from a cellular phone to a remote server, The third is for extensible server, where a user can ship and install an agent representing him more permanently on a remote server.
Give two Examples of Agent in the above applications:
One Example: In the current Internet or Intranet, the growing volume data is damping the signal to noise ration, it is almost impossible to sort the info-haystack by yourself without running out of your budget and time, by using agent, you can surf and sort the data even you are in sleep, and can also get notified when anything particular data or event comes out.
Another Example: You can ship an agent from a cellular phone and install it at a remote, extensible weather server which is continuously updated with current weather data; that agent can warn you by phoning whenever a prespecified weather condition has occurred.

Mobile Agents Questions:

Mobile agents have attracted extentensive attention both from the Researcher community and the Industry starting from the beginning. There are lots of work have done in this topic, but there are still many opponents in this field. Basically, there are some questions discussed in this field as following:
1. What are the application domains in which MAs have potential deployment? Is the "killer application" an obsolete requirement for MAs or, for that matter, for adoption of other mechanism?
2. How do MAs relate to other environments.infrastructures that MA could either contribute to or benefit from: OS process migration; middleware enviorments (Jini, DCOM, CORBA) networking (active networks, for example); mobile computing (PDAs and laptops, for example)?
3. Currently, there seems to be a separation between multiagent systems and the intelligent agents community on one side and mobile agent community on the other side. Is there a potential synergy that could be exploited among these group?
4. There are theoretical and practical studies on the justification of mobile entities that respect to performance, scalability, composability, manageability, fault isolation, and so forth. In your opinion, what should be the main motivation for deploying MAs The same for not using them?
5. There seems to be an interesting inversion of the order of development of MA. Typically, universities start an investigation of a promising area, after which it gets transferred to industry. With MAs, there are a number of leading companies that started development either before or in parallel to universities. Is this just a coincidence? Where can research institutions help industry?
6. Are there some hard problems that prevents wider MA deployment (security or availability of agent platform for example); are there problems that are not worth pursuing further (thread state transfer, so-called weak versus strong mobility); are there some problems that have not been addressed sufficiently (such as versioning or composing)?

7. What is your best guess for the future? Will MAs ever widely deployed or is it just another hard mechanism that community will abandon interest in? Is mobility intrinsically a hard problem to solve, or is it just too early to attack these problems?

The Task of My Project:

The purpose of this project will address the issues list above by investigating the most current work done in the MAs field from both the research community and industry. The advantage and disadvantage of MAs will be categorized from my own point of view. Additionally, a complete application of MAs in the wireless subject will be analyzed in this project. The basic architecture of the Mobile Agents will be adopted in the project. In the meantime, the contribution to the basic architecture of MA is the goal for this project too.

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