



Summary

Over the last years, multiagent systems have been proven to be a powerful and versatile paradigm, with a big potential when it comes to solving complex problems in dynamic and distributed environments, due to their flexible and adaptive behavior. This potential does not only come from the individual features of agents (such as autonomy, reactivity or reasoning power), but also to their capability to communicate, cooperate and coordinate in order to fulfill their goals. In fact, it is this social behavior what makes multiagent systems so powerful, much more than the individual capabilities of agents.

The social behavior of multiagent systems is usually developed by means of high level abstractions, protocols and languages, which normally rely on (or at least, benefit from) agents being able to communicate and interact indirectly. However, in the development process, such high level concepts habitually become weakly supported, with mechanisms such as traditional messaging, massive broadcasting, blackboard systems or ad hoc solutions. This lack of an appropriate way to support indirect communication in actual multiagent systems compromises their potential.

This PhD thesis proposes the use of event tracing as a flexible, effective and efficient support for indirect interaction and communication in multiagent systems. The main contribution of this thesis is TRAMMAS, a generic, abstract model for event tracing support in multiagent systems. The model allows all entities in the system to share their information as trace events, so that any other entity which require this information is able to receive it. Along with the model, the thesis also presents an abstract architecture, which redefines the model in terms of a set of tracing facilities that can be then easily incorporated to an actual multiagent platform. This architecture follows a service-oriented approach, so that the tracing facilities are provided

in the same way than other traditional services offered by the platform. In this way, event tracing can be considered as an additional information provider for entities in the multiagent system, and as such, it can be integrated from the earliest stages of the development process.