Agora UCS: Ubiquitous Collaborative Space

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LIRMM: Université Montpellier 2 & CNRS; 161 rue Ada, Montpellier, France

Abstract. Agora UCS is a new architecture designed for distributed learning as a side effect of communication and collaboration. This architecture aims to achieve (i) ubiquity (time and space independent access by community members); (ii) immanence (full internal control of the destiny of the community) and (iii) multi-modal communication (reinforcing the interactions between the members of the community). The theoretical model underlying Agora UCS is inspired by an integration of agents and Grid concepts (AGIL). Agora UCS has been experimented by a dozen of communities, which represent alltogether about seventy members. We achieved quite promising results in terms of motivation and collective performances[1].

1 Requirements

Conversation and collaboration is the foundation of human learning. We base our requirements on a learning theory consisting of conversational cycles [9]. This theoretical background led us to draft the essential characteristics of a collaborative environment supporting mutual understanding and joint work: (i) immediate awareness of the life of the community; (ii) ability to maintain a clear and unambiguous internal model of the working environment and ongoing processes during the successive collaboration sessions. These general ideas have grounded the concept of Agora UCS in order to: (i) allow secure access to services in a terminal independent way; (ii) support ubiquity yet keeping the state of the collaboration independently from the user access location; (iii) dynamically allocate resources for any use of any service within a pool of mutualized and virtualized physical resources.

2 Architecture

The integration of Agents [1,2,3,7] and Grid concepts [5,6] has been extensively modeled in [8]. Figure 1 represents the Agora UCS architecture which is based on a ternary relation between three concepts. The *VO (Virtual Organisation)*, a concept borrowed from Grid, is a *community* of *agents* associated with dedicated

[1] As partners from the European ELeGI project (European Learning Grid Infrastructure, IST-002205): Joost Breuker and Marc Eisenstadt are gratefully acknowledged.

resources (the *service container*) and *rights* which specify the level of authorisations of a *VO* member over a given *service*. This conceptual model allows to develop a flexible structure satisfying the self organisation requirement of the communities. In the figure, the inspiring Agent and Grid models are highlighted (AGR: Agent-Group Role [5], OGSA: Open Grid Service Architecture [6]).

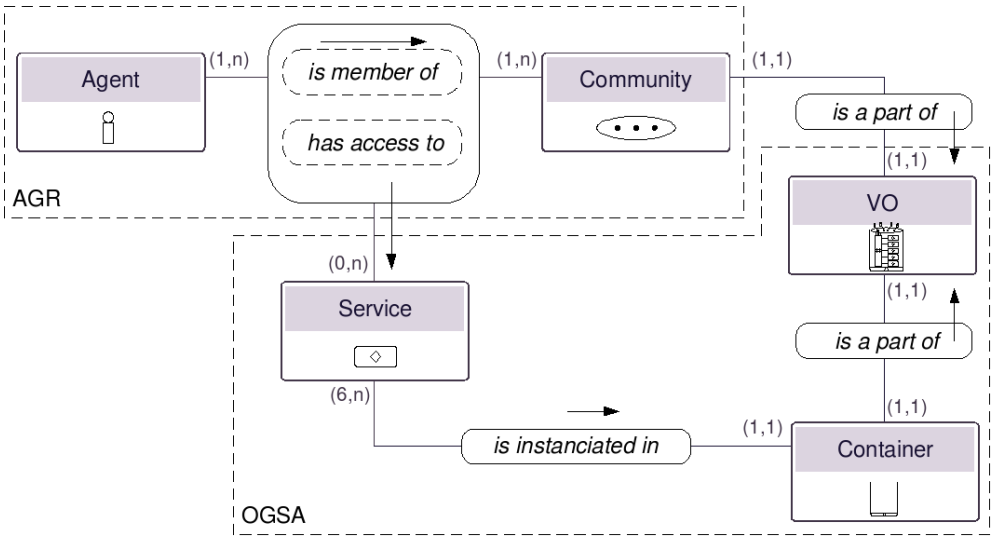

Fig. 1. The AGORA conceptual model

3 Experimentations and results

The experimentations focus both on user behavior as well as system performance to compare subjective and objective results. Most users do not have any skill in computer management. The seamless access to AGORA UCS via a simple web browser as a *thin terminal*, was implied by the requirements. Once created, a *VO* is completely autonomous. Among others, the EnCOrE[2] scenario has provided the most interesting results. AGORA UCS allowed a quick mastering of complex computational tools: unskilled users were at ease in their operations including the delegation of rights [4]. AGORA UCS enabled, for instance, the visual representation of chemistry models at a distance so that attention was put by the users on the semantics of the domain. Since, the behavior could not be forseen in advance, the flexibility of the AGORA UCS model allowed the community to

[2] EnCOrE: Encyclopédie de Chimie Organique Electronique.
Demo available at http://agora.lirmm.fr

freely organise itself. Various situations of collaboration with reinforced modalities of interaction by using a synchronous communication interface has favored the emergence of collective intelligence. Discussions in real time, combined with visual representations on shared desktops, allowed the actors to increase the effectiveness of the collaboration process. As a conclusion, the acceptance of the technology was extremely high and promising, even if we cannot yet certify that *learning* has indeed occured as a side effect of enthousiastic collaboration at a distance.

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