Agora UCS: Ubiquitous Collaborative Space

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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

resources (the *service container*) and *rights* which specify the level of authori-
sations 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
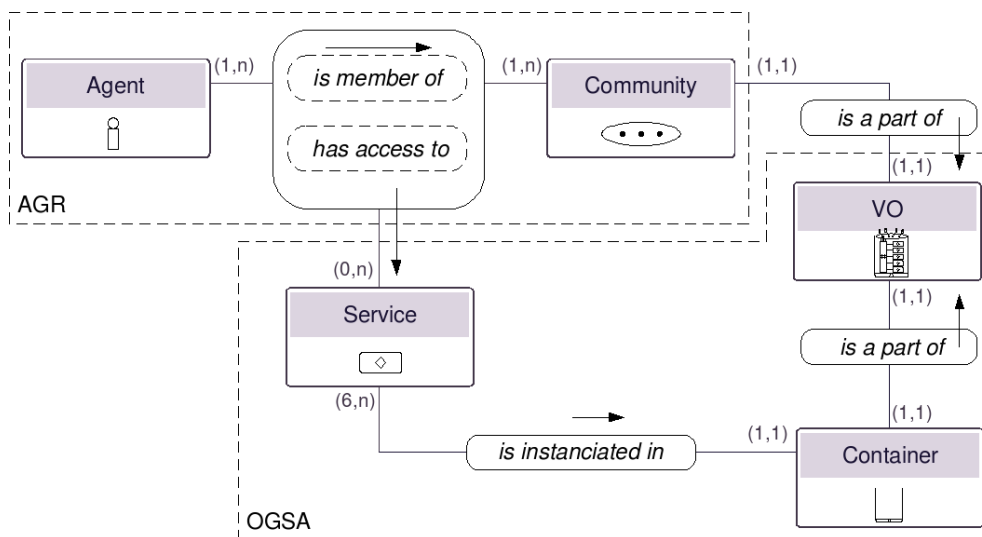(AGR: Agent-Group Role [5], OGSA: Open Grid Service Architecture [6]).

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 rep-
resentation 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

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[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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