

Modelling-Notation Source: Aalaadin/MADKit

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Document author- Renato Levy

1 Introduction

In 1998 Ferber and Gutknecht [Ferber 1998] proposed an organizational based modelling scheme to describe multi-agent systems (Aalaadin). MADKit was developed afterwards as framework support for their modelling and methodology. Aalaadin looks at MAS through the organization perspective. The authors claim that this allows the designer to approach problems such as heterogeneity of language (KQML, ACL, FIPA), multiple applications and architectures, and security in a clear and efficient way.

2 Notation Overview

The Aalaadin notation consists of three elements: groups, agents and roles.

2.1 Components

The basic components of the Aalaadin modelling can be seen in figure 1. The organization is decomposed in a set of groups (Group Structure) and the system is defined by the roles that the agents play within each group.

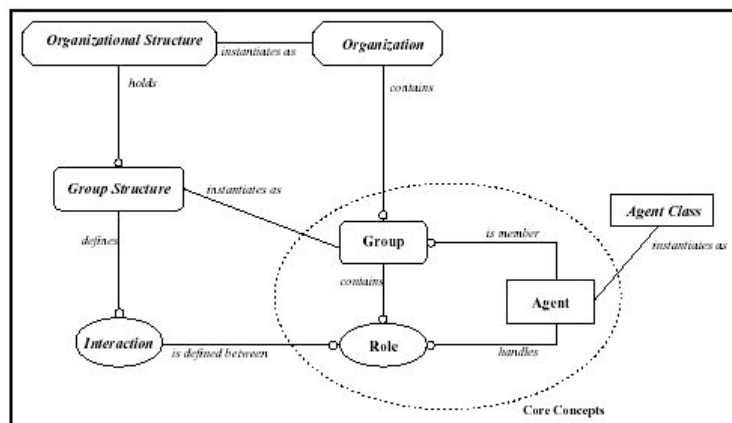


Figure 1: The methodological model

Agents are defined loosely as an active communicating entity that plays roles within group. In purpose the authors do not impose any constraints or internal structures to agents.

Groups are the core of the methodology and are defined as atomic sets of agent aggregation.

The last components are roles that are an abstract representation of the agent's functionality within a group.

2.2 Group Membership and Description

Agents can dynamically create and join groups. Security concerns are addressed within groups by a special manager role, which is by default played by the group's creator.

I could not locate a diagram that represents group membership per agent. Figure 2 demonstrates a notion of group distribution across platforms. Figure 3 demonstrates how agents perform the link between multiple groups. Figure 4 illustrates the composition of a group based on the roles in contains and the definition of the interactions between these roles. The authors have demonstrated the definition of these interactions using both sequence and activity diagrams from UML.

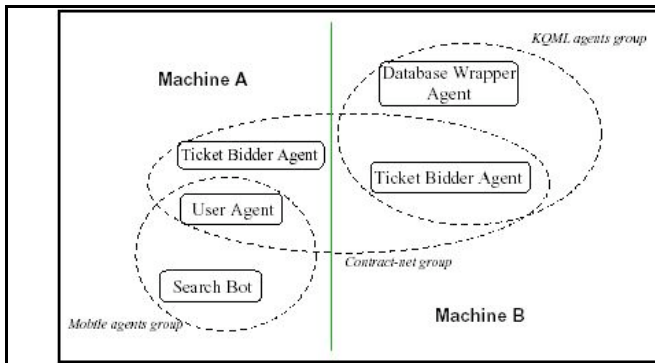


Figure 2: Group placement in platforms

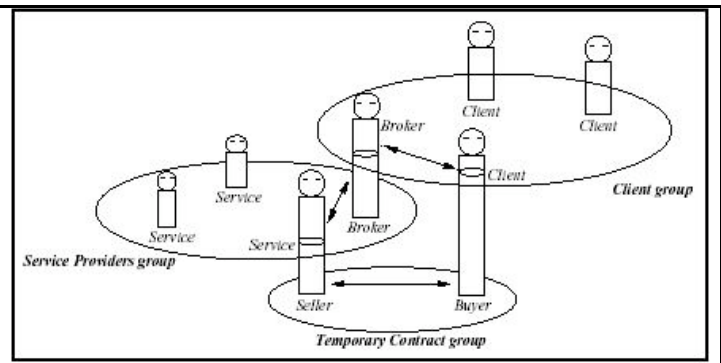


Figure 3: Agent presence in multiple groups

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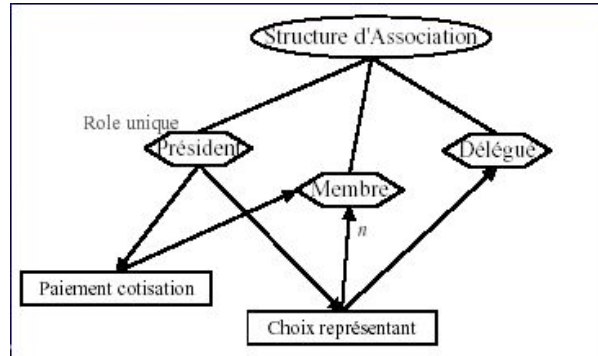


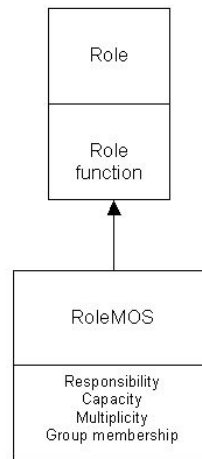
Figure 4: Group composition

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41 **2.3 Role description**

The definition of the roles is accomplished by a UML like class diagram as shown in figure 5. Extensions to UML are added to indicate role's attributes such as its functionality and group membership.

Figure 5: Role description



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44 **3 References**

45 [Ferber 1998] Ferber, j., and Gutknecht, O., *A meta-model for the analysis and design of organizations in multi-*
46 *agent systems*. In Proceedings of the Third International Conference on Multi-Agent Systems (ICMAS98) , pages
47 128--135, 1998, Paris, France.

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49 [Gutnecht] http://iun.unine.ch/ai/colline/Presentations/olg_jf.pdf