

COLYPAN : A P2P Architecture for a Project Management Collaborative Learning System

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OUTLINE

- **Introduction**
- **Contribution of multi-agents system**
- **COLYPAN : a Peer-to-Peer Architecture**
- **Conclusion & Future Work**

Introduction (1)

➤ Collaborative Learning

- Teacher : learning facilitator
- Group : information source

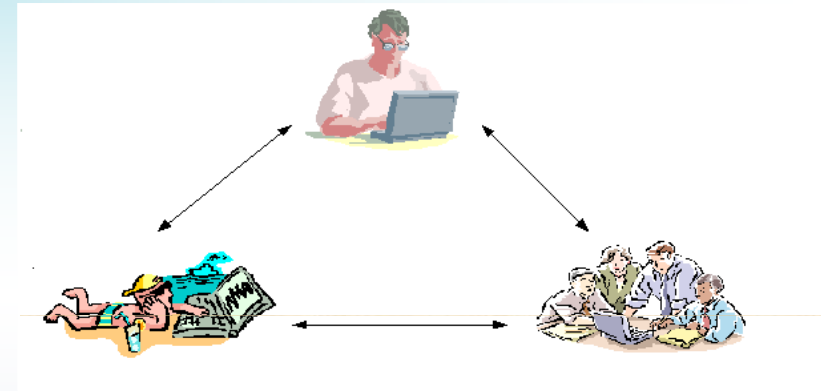
➤ In such environments,

➤ Learners are:

- Information consumer
- Information provider
- More active and responsible of their own learning

➤ Collaboration is made from:

- Communication between learners,
- Coordination of their actions



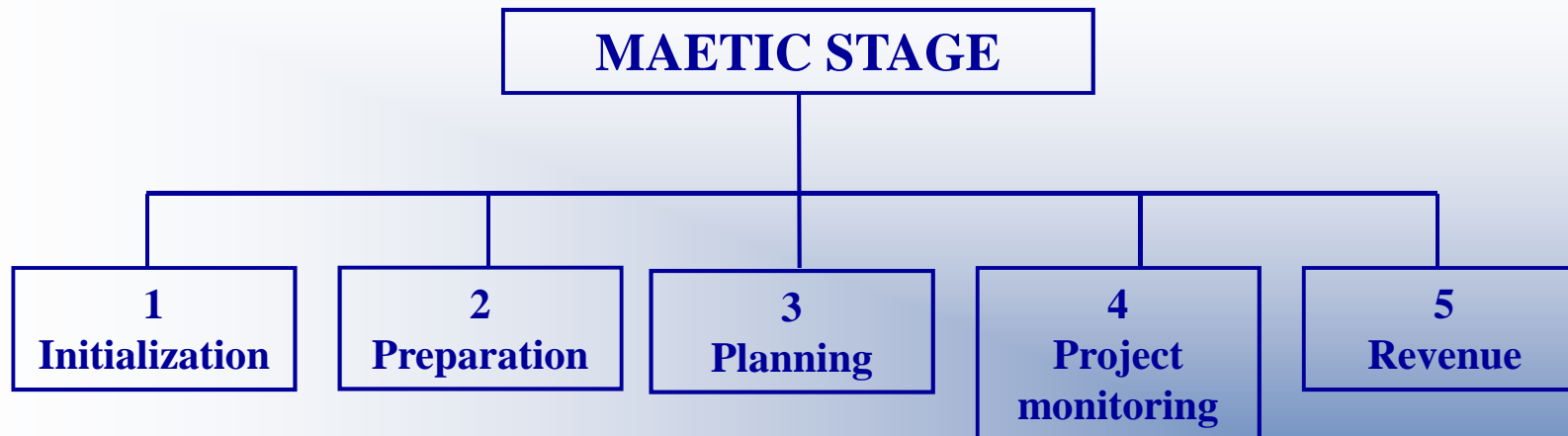
Introduction (2)

➤ MAETIC Method:

➤ A pedagogic method instrumented by the ICT

➤ Objectives :

- To allow a learner to develop requested knowledge and skills
- To promote the establishment of a process that will facilitate their educational activities



Contribution of Multi-agents Systems

- **There is a critical need for tools:**
 - ☞ **Supporting collaboration among distributed users with similar interests, or who are part of the same workgroup**
 - ☞ **Organizing information for facilitating access in various contexts,**
 - ☞ **Managing traces of all interactions related to learners belonging to a given group**

- **The use of MAS is appropriate:**
 - ☞ **They are involved in the modeling of interactions in complex societies of artificial or human individuals**
 - ☞ **They bring an interesting resolution for knowledge organization and exploitation problems**
 - ☞ **And also, for problems of the coordination and communication mechanisms**

COLYPAN: Collaboratif Learning sYstem for Project mANagment

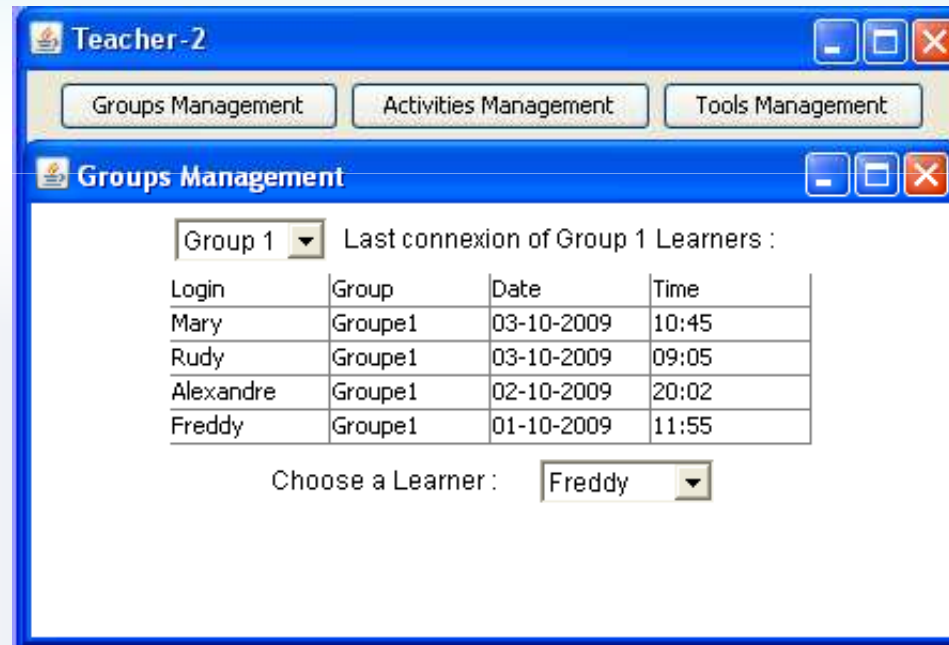
- **A system dedicated to project management**
- **A collaborative learning system where users exchange their information and skills and thus learn from each others**
- **The knowledge resources exchanged in the COLYPAN environment isn't differentiated from those exchanged for other purposes:**
 - ☞ **There is a share of physical resources: books, papers, etc.**
 - ☞ **With the growing use of information technology, there are plenty of electronic documents, references, and web links;**
 - ☞ **There is also knowledge found in people's mind**
- **The users of this system are learners and tutors**

COLYPAN: for Learners

- **It provides learners tools to accomplish their project.**
- **Learners must join groups to accomplish their activities**
- **In each group, learners have the same responsibility:**
 - ☞ **The commitment to finish the work,**
 - ☞ **Time management**
 - ☞ **The respect of deadline**
- **There are no predefined roles or division of tasks**

COLYPAN: for Teachers

- It provides teachers with tools to enable them to determine the activity level in groups
- The learning activity is defined by the teacher



Tutors support tools interface

COLYPAN: A P2P architecture (1)

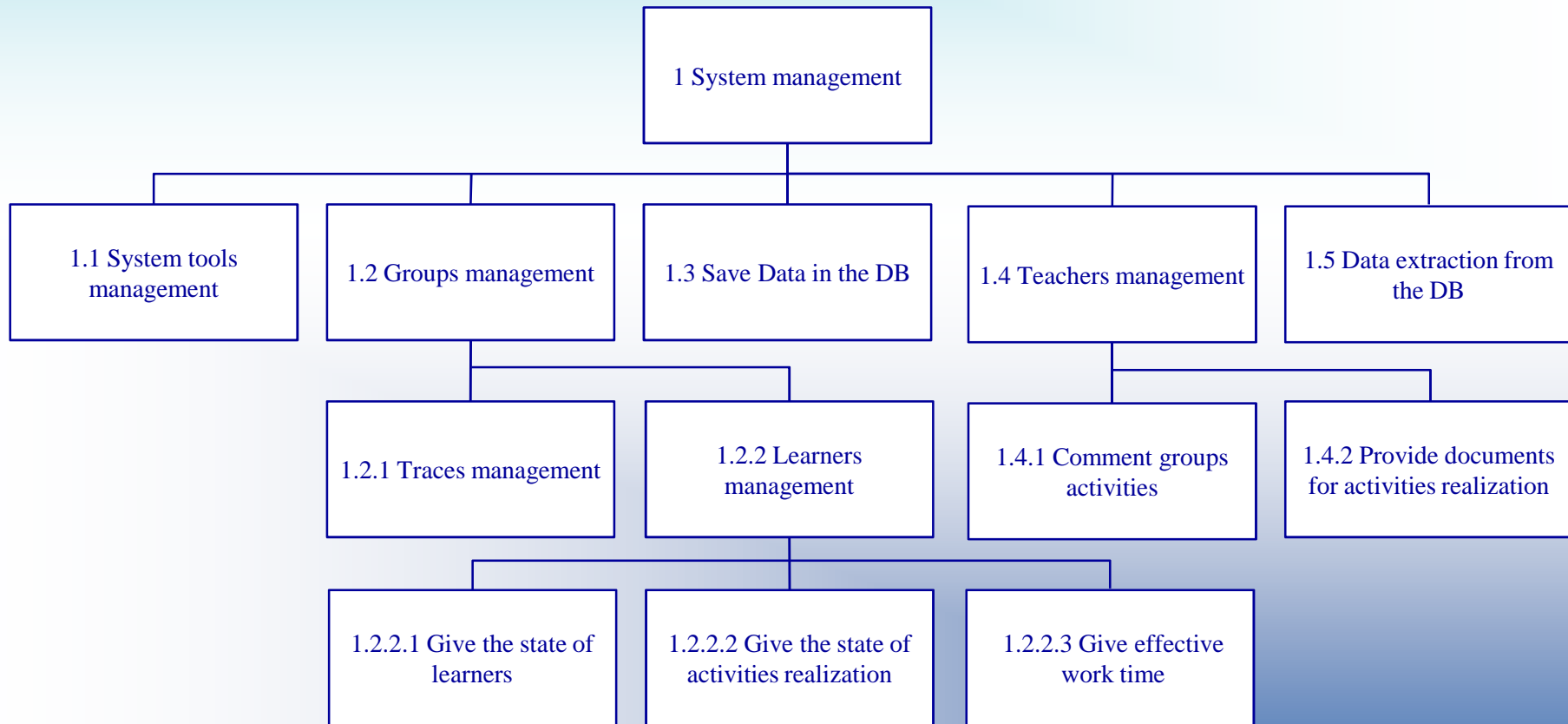
- **In collaborative learning system, each member must manage and exchange his knowledge and cooperate with others in order to achieve his goals**
- **P2P systems:**
 - ☞ **Supports autonomy : each member of the system is seen as a peer that manages and has control over a set of local technologies, applications and services;**
 - ☞ **Is decentralized: the community of peers is able to achieve its goal independently from any specific member or component;**
 - ☞ **Is cooperative : in order to join and use the system, each member must provide resources or services to the others;**
 - ☞ **Is dynamic: peers and resources can be added or removed at any time.**

COLYPAN: A P2P architecture (2)

- **The multi-agent system is an appropriate framework for realizing a P2P application**
- **The characteristic that they have are needed in P2P application:**
 - ☞ **Their capability to allow the sharing or distribution of knowledge;**
 - ☞ **They assemble a set of agents and coordinate their actions in an environment to accomplish a common goal**

The system objectives

➤ Before the system modeling, it is interesting to identify the objectives of the system



System agentification

➤ System Modeling with Aalaadin

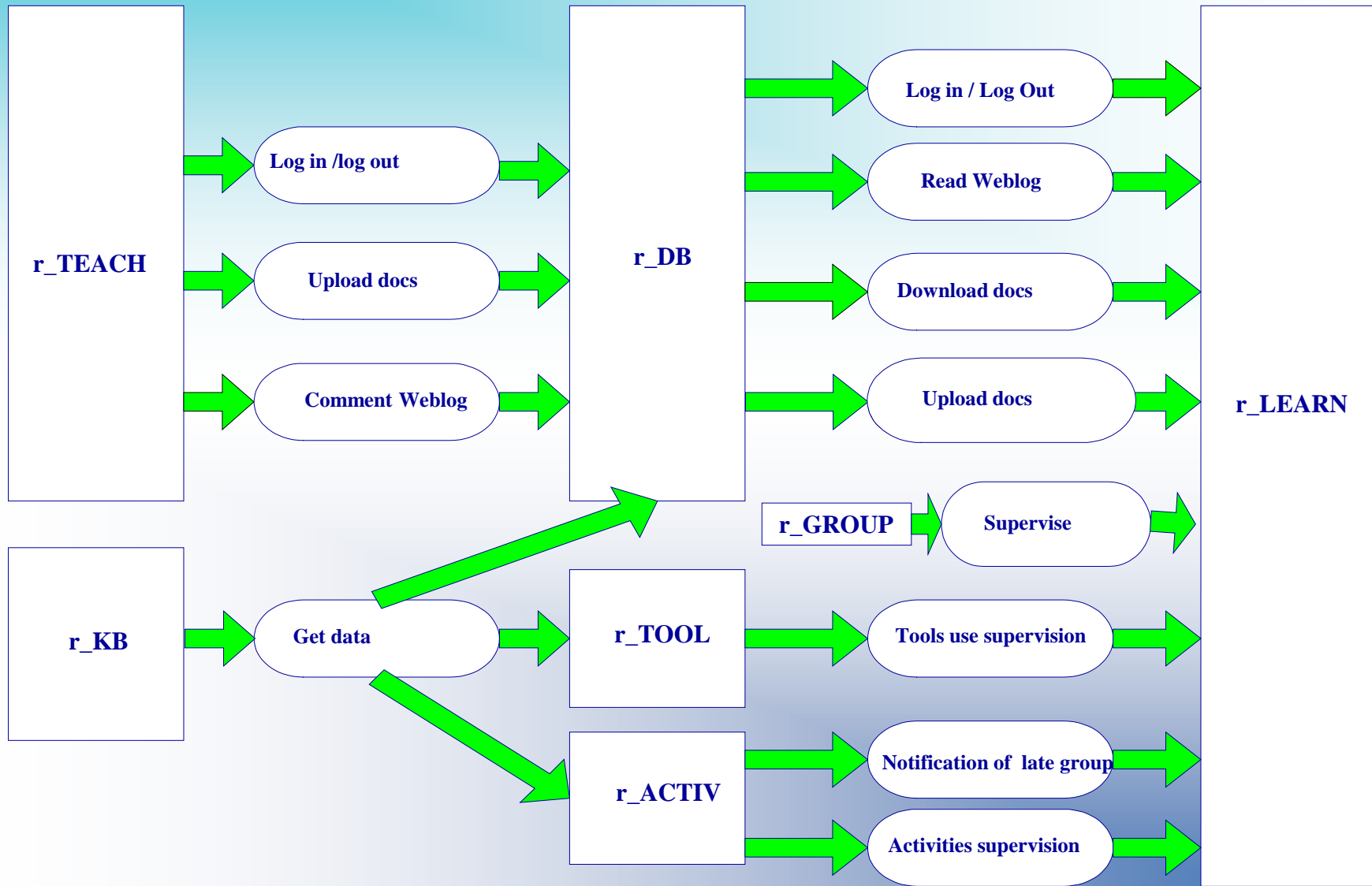
- ☞ Aalaadin is an organizational method developed by Gutknecht and Ferber ⁽¹⁾
- ☞ It is, first, a background for developing multi-agent systems, providing methodological guidance
- ☞ and secondly, a prototyping and running environment for agents based on notions of group and role through the AGR (Agent/Group/Role) model

➤ It is necessary to identify :

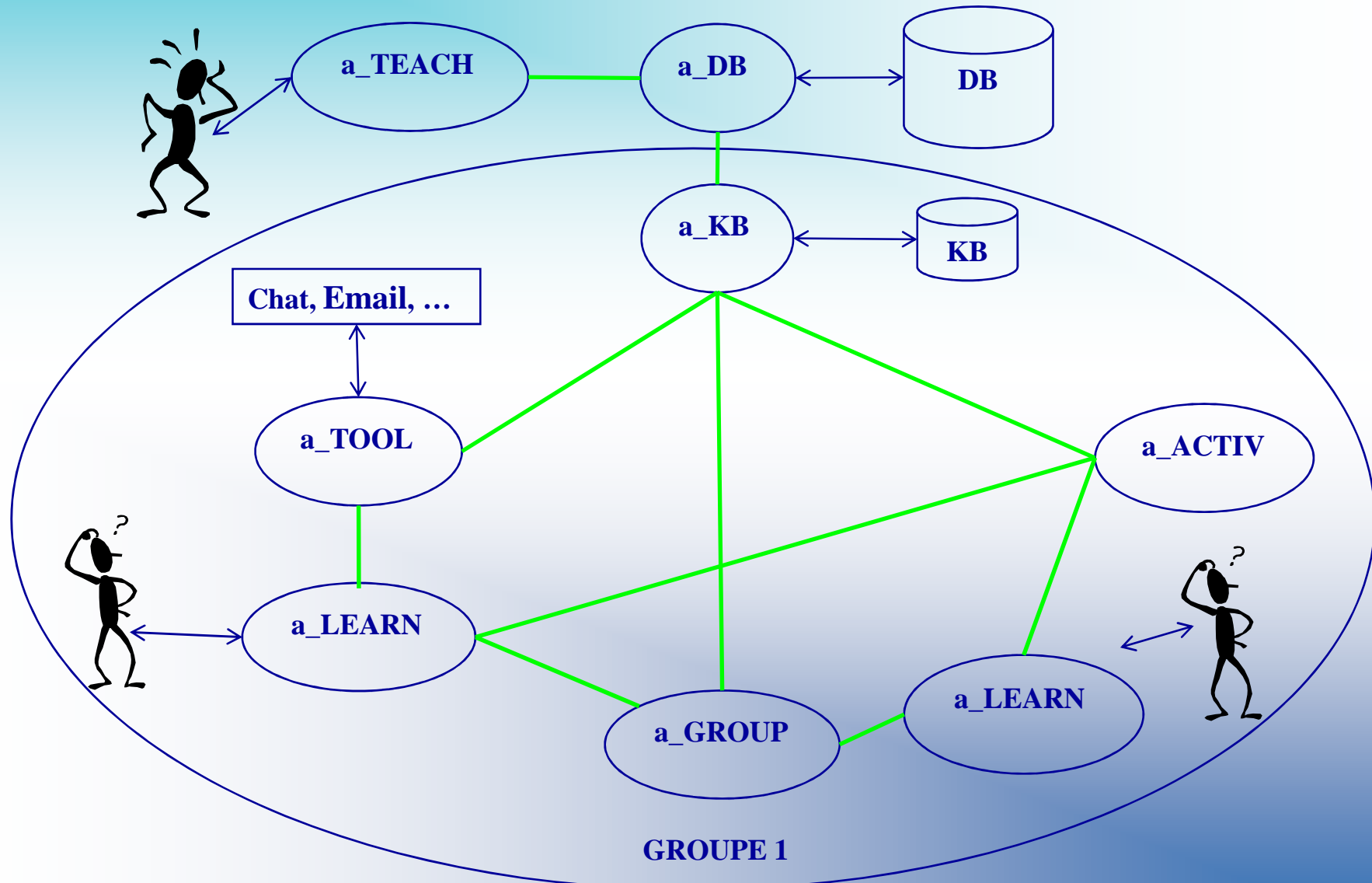
- ☞ The roles
- ☞ The agents
- ☞ The groups

⁽¹⁾ FERBER, J., GUTKNECHT, O.: Aalaadin a meta-model for the analysis and design of organizations in multi-agent systems. Dans DEMAZEAU, Y., éditeur : 3rd International Conference on Multi-agents Systems, pages 128–135, Paris, 1998. IEEE.

Roles



Overview of the System



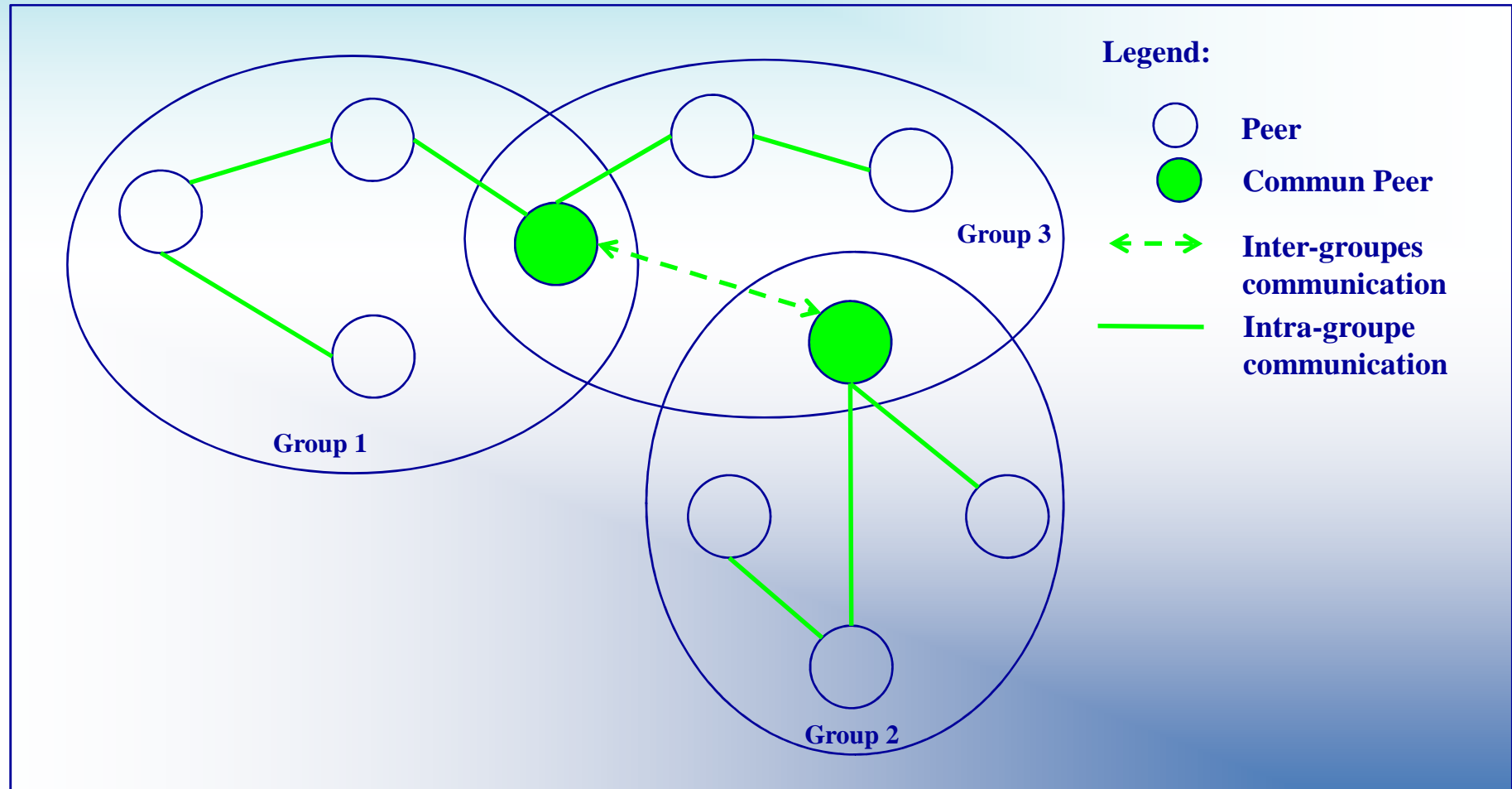
System implementation

➤ Madkit

- Is a modular and scalable multiagent platform written in Java and built upon the AGR (Agent/Group/Role) organizational model:
 - agents are situated in groups and play roles.
- Allows high heterogeneity in agent architectures and communication languages.
- MadKit communication is based on a Peer-to-Peer mechanism, and allows developers to quickly develop distributed applications using multiagent principles.
- Site : www.madkit.org

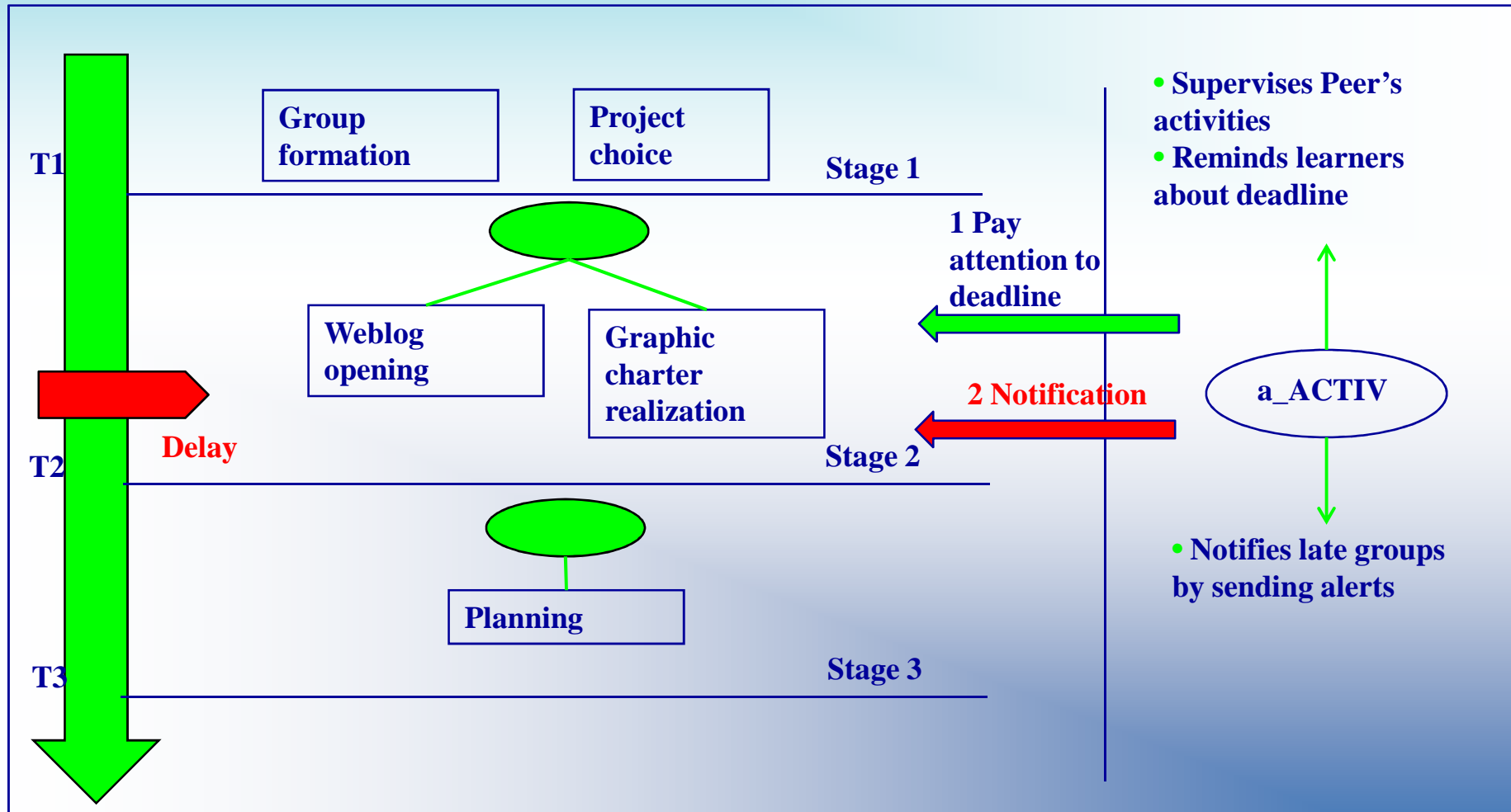
Groups working way

- To communicate, each group must have a member in common



A case study

➤ The a_Activ notification for late group



Conclusion

- **An agent-based architecture that allowed the implementation of MAETIC method**
- **The system consists of a population of autonomous agents in interaction**
- **P2P is chosen to link up the agents between them**

Future works

- **We have to develop a scalable negotiation-oriented coalition formation method**
 - ☞ **Specifically tailored for large-scale distributed systems**
 - ☞ **Nodes may crash and every agent has a partial view of the system and can only communicate with the agents in its own view**

Thank you