Empirical norm adaptation in a P2P sharing network scenario

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Overview

- Abstract and introduction
- P2P sharing network scenario
- Encountered issues and open questions

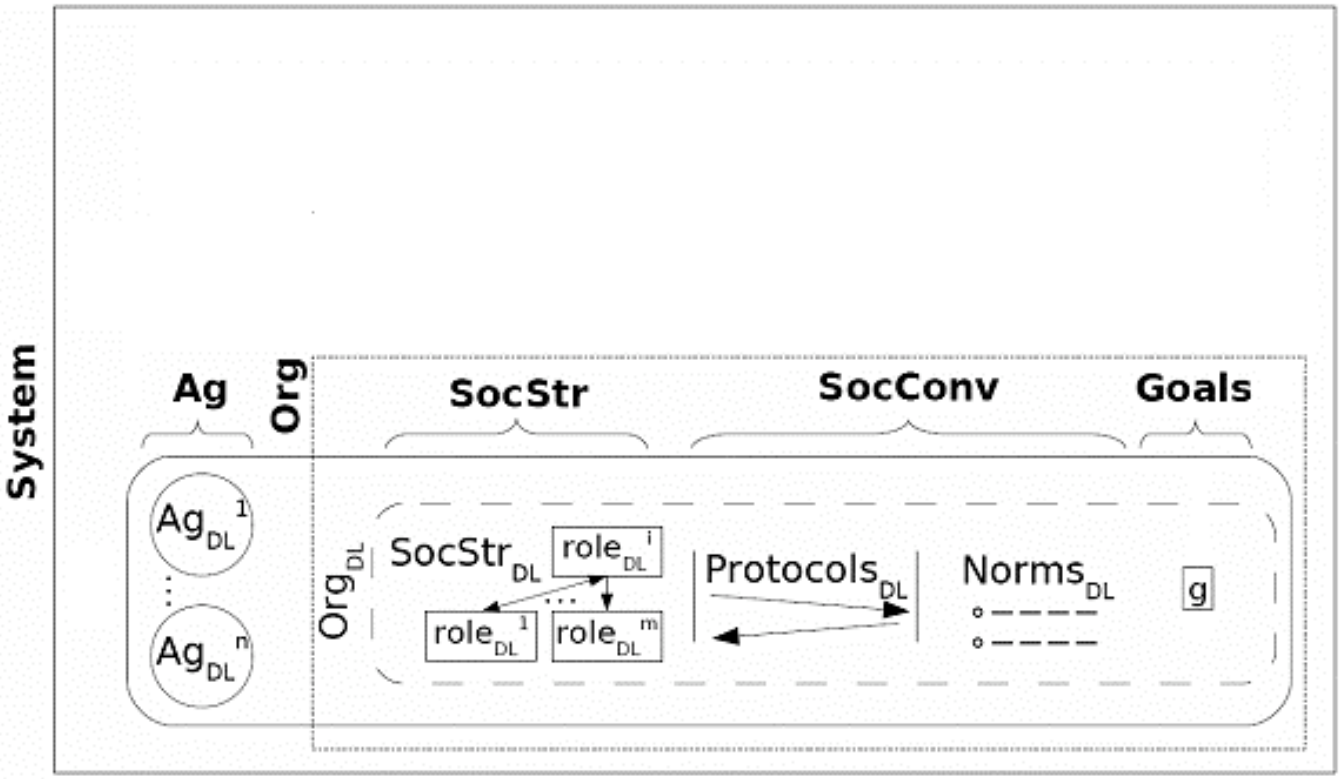
Abstract

- Within MAS, **organizational approaches** are designed to constrain the scope of possible interactions among agents. In addition to roles and protocols, **norms** have proven to be effective means of regulating participants' activities.
- Nevertheless, **changes** in the environment and/or agents' behaviours can cause a decrease in their effectiveness. Thus, a **run time norm adaptation** may help the system to better fulfill its **social objectives**.
- Empirical studies on specific scenarios may represent a first step towards a formalization of the norm adaptation process. With this perspective, our research focuses on a **empirical study** over a **P2P** multi-agent based simulation scenario.

Introduction

2-LAMA: Two Level Assisted MAS Architecture

- How to improve existing MAS?
  - **Assistance layer** (MetaLevel) on top of Domain Level



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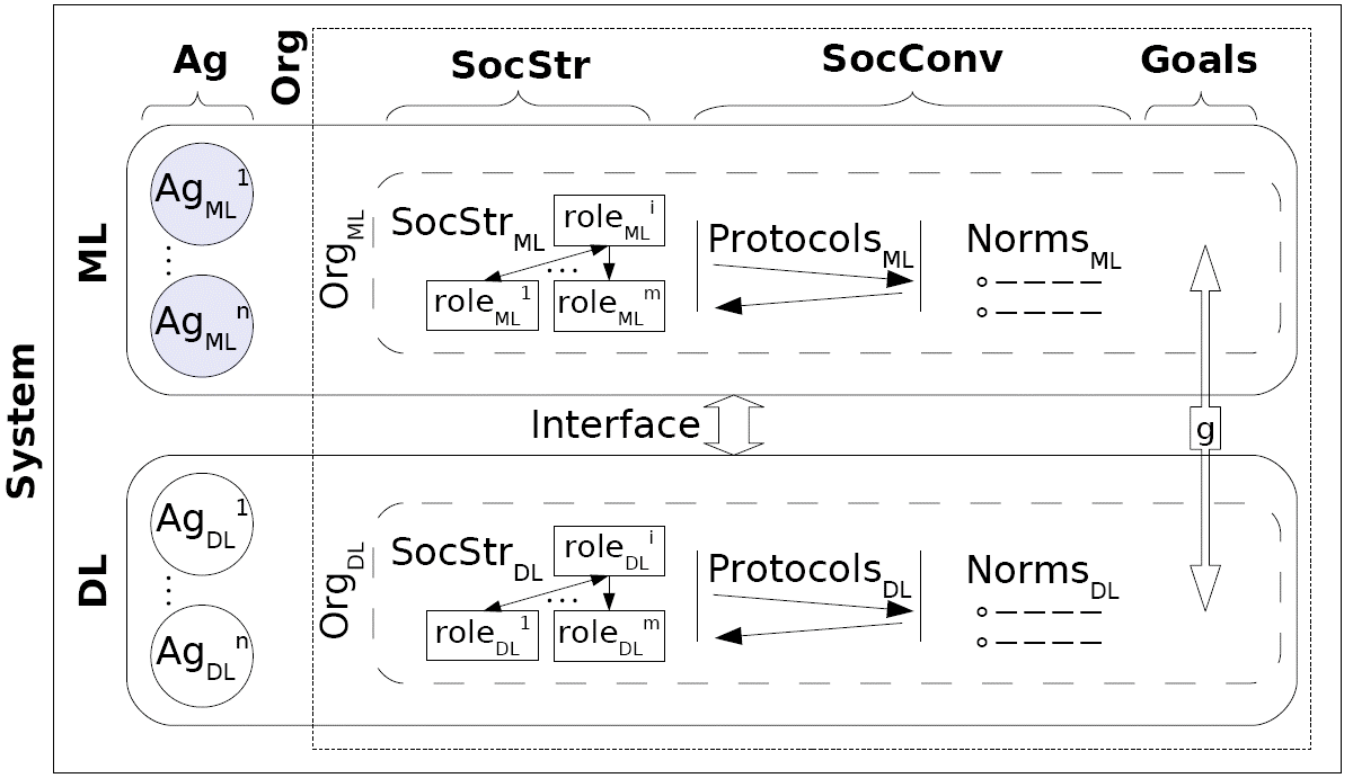

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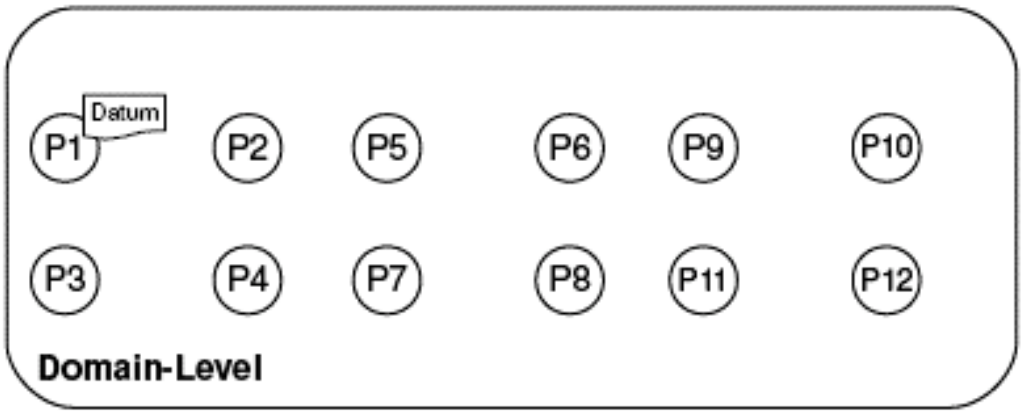
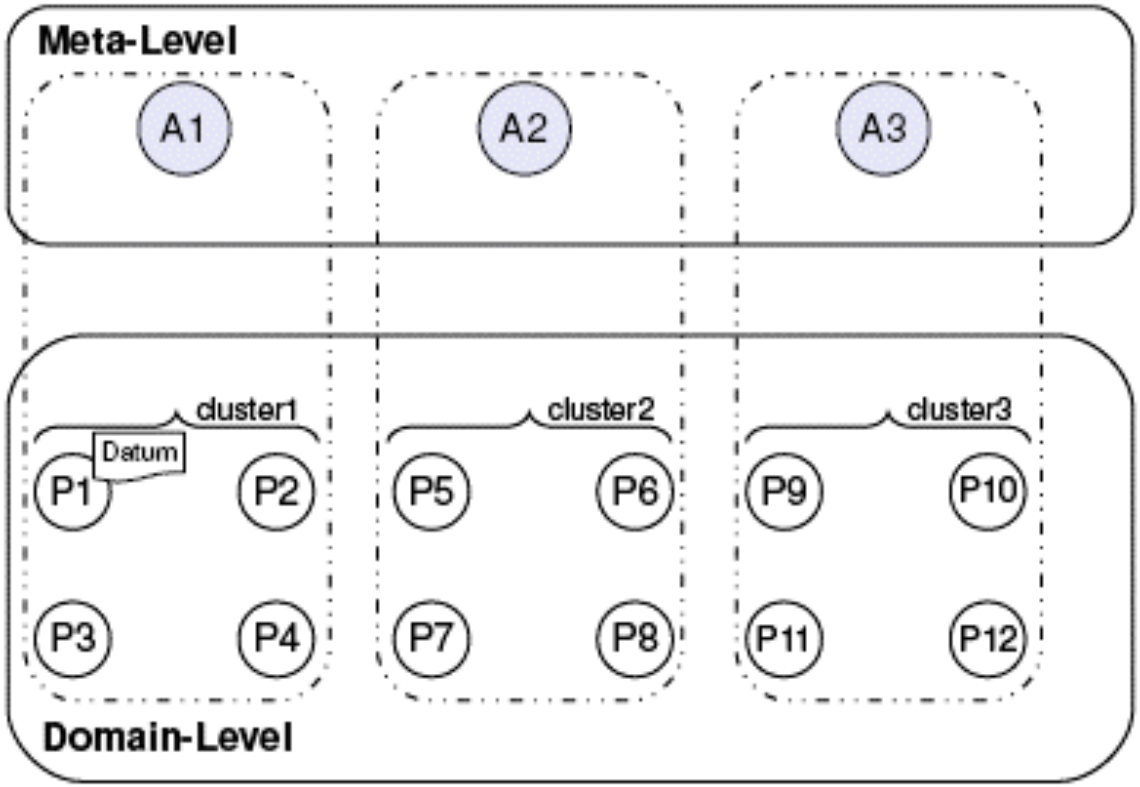
P2P sharing network scenario

- DL = peer agents sharing data



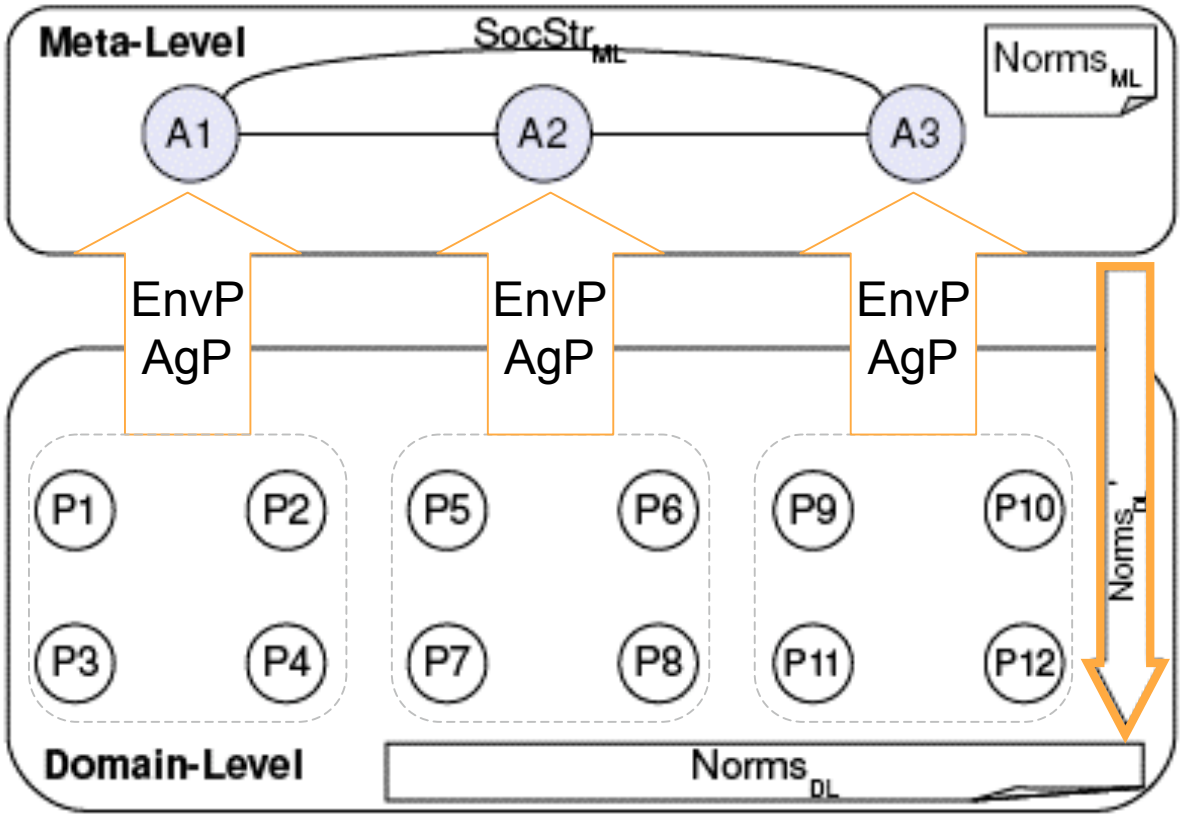
P2P sharing network scenario

- ML = assistant agents for peer clusters



P2P sharing network scenario

- Agents at ML perceive environmental and DL agent properties and adapt Norms at DL

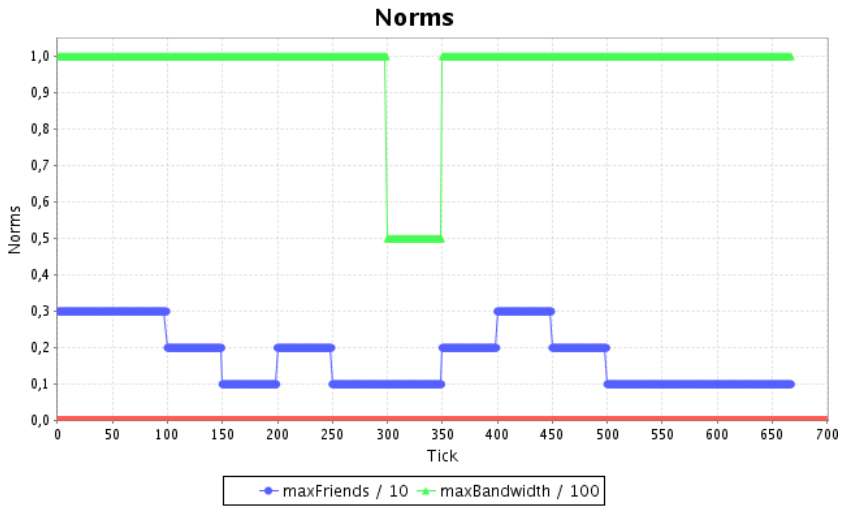


P2P sharing network scenario

- DL Norms:
  - $normFriends_{DL}$: “a peer cannot send data to more than maxFriends peers simultaneously”
    - To control the number of served peers
  - $normBW_{DL}$: “a peer cannot use more than maxBW bandwidth percentage”
    - To further control the network usage

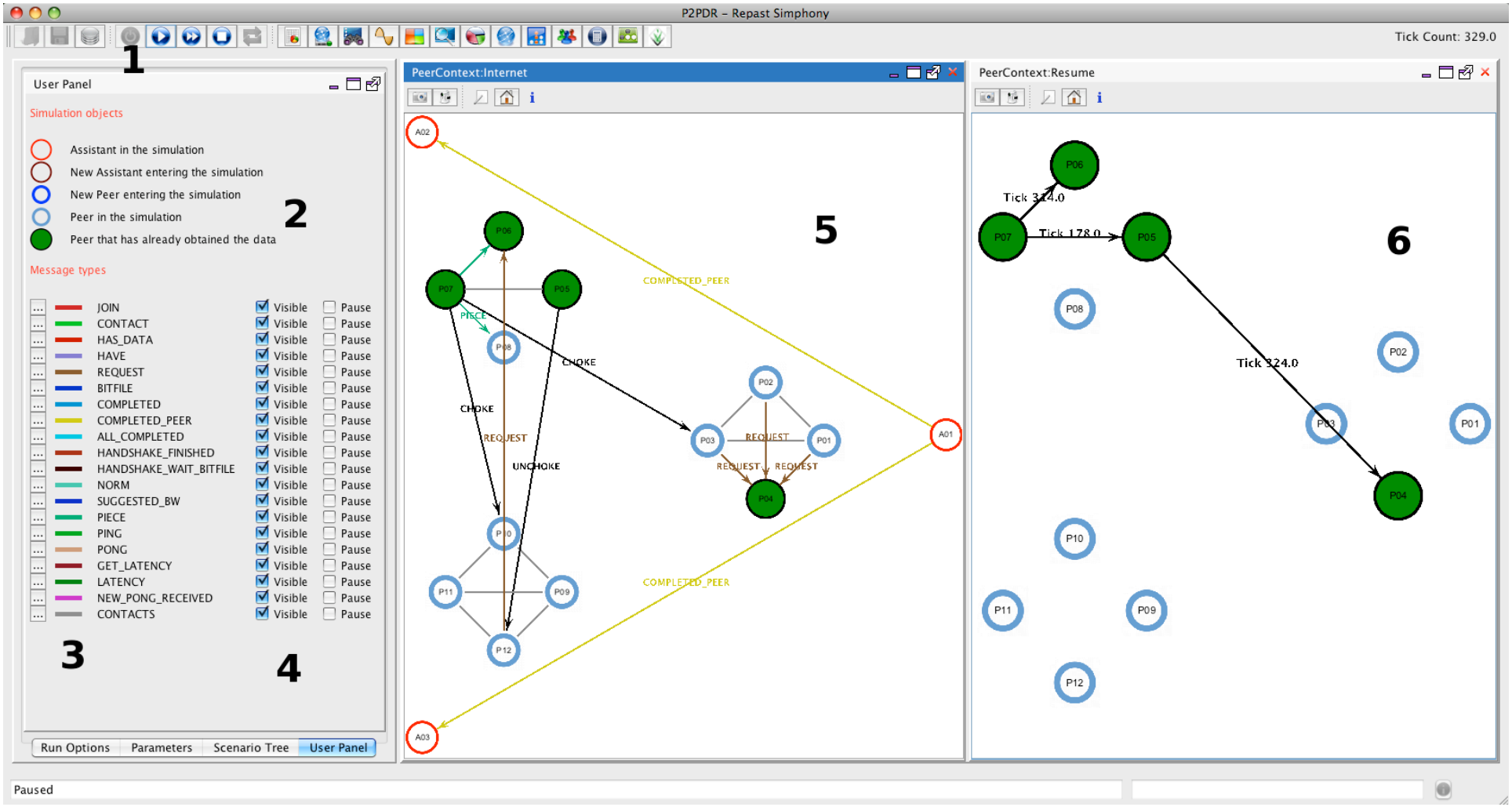
P2P sharing network scenario

- Norm adaptation: Assistants
  - compute desired new norm values
    - To align serving bandwidth with receiving one
    - To decrease net saturation
  - agree on new values
  - inform their peer agents about new norms



P2P sharing network scenario

Implementation: P2P simulator



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Empirical approach

Norm adaptation in an implemented case study

- How to specify norms so that external agents can be informed and understand them?
  - Language specifications, parameterizations,…
- Enforcement policies. Agents do comply with norms?
  - Norms / rules / constraints…
  - Always, probabilities, individual preferences, utility funct
- **How to adapt norms**?
  - design/run time?
  - Ad hoc, heuristics, learning…
- **Based on what**?
  - System evolution, environment, agent status,…

Empirical approach

Norm adaptation in an implemented case study

- When to adapt norms?
  - Interval, **goal fulfillment**,…
  - How can norms influence agents' behaviour
- **Who decides**?
  - Participant agents, agents with privileges, trusted agents, **internal agents**,…
- What **cost** do adaptation has?
  - Message costs? Adaption intervals?...
- How norm changes are **adopted**?
  - **Retrospective application**? Transition period? …