

# **Eighth International Workshop on Agents and Peer-to-Peer Computing**

## **AP2PC09**

The following was explicitly sent by the workshop chairs in lieu of proceedings.

P2P networking is the term being used to describe a new crop of decentralized approaches to self-organize large overlay networks where participants can share and exploit enormous autonomous resources. At their heart P2P systems embody the earliest principles of the internet, decentralised systems of similarly enabled 'peers'. What makes P2P networking different is that the times have changed; the numbers of peers involved has multiplied, their rate of turn-over has increased, and they now operate as an overlay within the network application layer. New techniques such as distributed hash-tables (DHTs), semantic routing, and Plaxton Meshes are being combined with traditional concepts such as Hypercubes, Trust Metrics and caching techniques to pool together the untapped computing power at the "edges" of the internet.

The possibilities of this paradigm have generated a lot of interest in research, industrial and social networks. P2P network collaboration is redefining the way of communicating, publishing, doing business and building collective knowledge thanks mainly to the advent of free or affordable technologies. For instance, the major film studios and the music corporations after realizing the economic potential of p2p networks, have started selling their product online. Citizen journalism is an example based on P2P interactions, in which the idea is that people without professional journalism training can use the tools of modern technology and the global distribution of the Internet to create, augment or fact-check media on their own or in collaboration with others; P2P reputation-based mechanisms are used to validate facts/news. P2P lending allows person to skip the bank and borrow from individuals; people can borrow from complete strangers or just use P2P lending services to structure loans between friends and family (e.g. Booper, Zopa, Kiva). Recently projects based on P2P architectures, for exchanging and sharing knowledge among companies (e.g. NeP4B), have been funded; the companies of any nature, size and geographic location will be able to search for partners, exchange data, negotiate and collaborate without limitations and constraints. For these and other similar phenomena has been coined at Harvard Law School the term Commons-based peer production to describe a new model of economic production in which the creative energy of large numbers of people is coordinated into large, meaningful projects, mostly without traditional hierarchical organization or financial compensation. The Internet is going to be revolutionized by applications able to harness the power of P2P networking to bring together communities of people and organizations with similar interests or goals, and the agent technology offers the potential for developing such systems.

In P2P computing peers and services organise themselves dynamically without central coordination in order to foster knowledge sharing and collaboration, both in cooperative and non-cooperative environments. The success of P2P systems strongly depends on a number of factors. First, the ability to ensure equitable distribution of content and services. Economic and business models which rely on incentive mechanisms to supply contributions to the system are being developed, along with methods for controlling the "free riding" issue. Second, the ability to enforce provision of trusted services. Reputation based P2P trust management models are becoming a focus of the research community as a viable solution. The trust models must balance both constraints imposed by the environment (e.g. scalability) and the unique properties of trust as a social and psychological phenomenon. Recently, we are also witnessing a move of the P2P paradigm to embrace mobile computing and sensor networks in an attempt to achieve even higher ubiquitousness. The possibility of services related to physical location and the relation with agents in physical proximity introduces new opportunities and also new technical challenges. The MultiAgent community can make substantial contributions with respect to all of these issues.

The agent paradigm serves to embody the description of the task environments, the decision-support capabilities, the collective behavior, and the interaction protocols of peers. Agent research puts its emphasis on addressing issues of user autonomy, coordination, trust, and decision making in the context of activities of other agents. P2P systems are now providing infrastructures which are sufficiently robust and scalable in order to enable the realization and application of agent-based coordination strategies to large-scale systems. Thus the goal of this workshop is to explore how research in agent-based systems and P2P Computing can be mutually beneficial. We seek high-quality and original contributions,

both on the possible applications of agent technology in P2P computing and the use of P2P infrastructures for agent-based applications (see the list of topics in appendix).

Research on P2P computing is currently performed in a wide range of areas, such as distributed computing, MultiAgent systems, databases, computational trust and mobile networks. Although this research is based on similar concepts, exchange of ideas among the communities is non-trivial, due to the different perspectives, the focus on different problems or applications and the huge differences in the methodological frameworks and technical approaches being applied. To achieve progress by exploiting the work of distinct areas these barriers have to be overcome. Thus this workshop is of interest to all of the aforementioned communities that see the potential of the agent paradigm in P2P computing for several important research issues, such as semantic interoperability, trustworthiness, negotiation, just to cite only some of them. For the MultiAgent community the workshop opens an opportunity to explore P2P systems as real large scale open environments of heterogeneous and autonomous agents in which studying, developing and tuning their methodological framework and technical solutions having also the possibility to disseminate their results to other areas working on P2P infrastructures.

We seek high-quality and original contributions on the general theme of "Agents and P2P Computing" according to the following non-exhaustive list of topics of special interest:

- Intelligent agent techniques for P2P computing
- P2P computing techniques for multi-agent systems
- The Semantic Web, Semantic Coordination Mechanisms and P2P systems
- Scalability, coordination, robustness and adaptability in P2P systems
- Self-organization and emergent behavior in P2P networks
- E-commerce and P2P computing
- Participation and Contract Incentive Mechanisms in P2P Systems
- Computational Models of Trust and Reputation
- Social Networks, Community of interest building, regulation and behavioral norms
- P2P Data Mining Agents
- P2P architectures
- Scalable Data Structures for P2P systems
- Services in P2P systems (service definition languages, service discovery, filtering and composition etc.)
- Knowledge Discovery and P2P Data Mining Agents
- P2P oriented information systems
- Information ecosystems and P2P systems
- Security issues in P2P networks
- Mobile P2P
- Pervasive computing based on P2P architectures (ad-hoc networks, wireless communication devices and mobile systems)
- Grid computing solutions based on agents and P2P paradigms
- Legal issues in P2P networks and Intellectual property rights in P2P systems

## Co-chairs

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## **Workshop program**

Sandip Sen, to be defined

Frances Brazier: The future of the energy market and the challenges of decentralised self-management

Giacomo Cabri: Agent Roles for Context-Aware P2P Systems

Sonia Bergamaschi, Maurizio Vincini, Federica Mandreoli: Working in a dynamic environment: the NeP4B approach as a MAS

Yoni Peleg, Jeffrey S. Rosenschein: Towards P2P-Based Resource Allocation in Competitive Environments

Toktam Ebadi, Maryam Purvis, Martin Purvis: A Colored Petri Net Model to Represent the Interactions Between a Set of Cooperative Agents