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Large scale distributed cooperative environments on clouds and P2P

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We are glad to present this special issue of Peer to Peer Networking and Applications on Large Scale Distributed Cooperative Environments on Clouds and P2P. The special issue collects both extended version of papers presented at the Second Workshop on Large Scale Distributed Virtual Environmets (LSDVE 2014), held in conjunction with EuroPar 2014, and papers directly submitted to this special issue.

The recent advances in networking have determined an increasing use of information technology to support interactive networked cooperative applications. Several novel applications have emerged in this area: social networks, distributed gamification applications, collaborative learning systems, large scale crowd based applications, collaborative work platforms. These kind of applications may be referred to as Large Scale Distributed Cooperative Environments. The definition of these applications affords us several challenges, for instance the design of user interfaces, coordination protocols, and proper middle-ware and

architectures supporting distributed cooperation. Collaborative applications may greatly benefit from the support of different kinds of platforms, both cloud and peer to peer. Integration of different platforms, for instance peer-to-peer and cloud environments is currently a challenge. Furthermore, the analysis and validation of the huge amount of content generated by these applications asks for big data analysis and processing techniques.

The purpose of this special issue is to investigate current trends in the definition, project and implementation of large scale networked collaborative applications and of the platforms supporting them. The aim of the special issue is to investigate open challenges for such applications, related to both the applications design and to the definition of proper architectures. Some important challenges are, for instance, collaborative protocols design, latency reduction/hiding techniques for guaranteeing real time constraints, large-scale processing of user information, privacy and security issues, state consistency/persistence.

The call for papers attracted 23 submissions. Each paper was carefully reviewed by at least three reviewers. At the end of the reviewing process, the guest editors selected 9 contributions covering various areas within these themes. The topics range from trust exploitation in P2P networks to integration of peer to peer and cloud architectures and from the definition of supports for collaborative applications (massively multiplayer games and collaborative editing) to P2P bot net detection and self-organization of P2P overlays. In the following, we report a brief description of each paper.

The first article, “C-Trust: A Trust Management System to Improve Fairness on Circular P2P Networks”, undertakes the issue of encouraging users to share with others the resources of a P2P network. The proposed method relies on circular structured networks to preserve the complete history of every transaction without maintaining a universal

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file system. This means that even though churn takes place, network does not lose the information about malicious nodes.

In “Operation Analysis of Massively Multiplayer Online Games on Unreliable Resources”, the authors present an analysis of the impact of employing real Cloud resources on the QoS offered to the clients of a Massively Multiplayer Online Game. The approach is based on a dynamic resource provisioning and load balancing algorithm.

“Scalable playback rate control in P2P live streaming systems” proposes a P2P live streaming architecture in which the system guarantees that peers receive the stream even in cases where the total upload bandwidth changes very abruptly, by dynamically adapting the playback rate.

In “DiDuSoNet: A P2P architecture for Distributed Dunbar-based Social Networks”, the authors propose a novel P2P Distributed Online Social Network where users can exercise full access control on their data. The proposed system exploits trust relationships between the users for providing a set of important social services, such as information diffusion and data availability.

In “Information Diffusion in Distributed OSN: the Impact of Trusted Relationships”, the authors discuss the capability of Distributed Online Social Networks to diffuse content based on trust between social peers and consider a large-scale Facebook network, from which the trust level between friends is estimated. This enables a realistic representation of the OSN friendship graph.

“Scalable P2P Bot Detection System Based on Network Data Stream”, presents a bot detection system that is capable

of detecting stealthy bots in a network by analysing network traffic during small time windows, and reporting the infected hosts immediately.

In “An Autonomic approach for P2P/Cloud Collaborative Environments”, the authors present a novel hybrid P2P/cloud architecture whose components and protocols are autonomically configured according to specific target goals, such as cost-effectiveness, reliability and availability.

The authors of “MiCa: Lightweight and Mobile Collaboration across a Collaborative Editing Service in the Cloud”, propose a new cloud service-based approach, to achieve efficient and scalable real-time editing works. The service is defined by a two level system, the cloning manager which provides support to create clones of mobiles, manages users’ groups and recovers failed clones in the cloud and a second level, the collaboration protocol, supporting safe mechanisms for synchronizing collaborative works in decentralized way.

Finally, in “Self-Healing Protocols for Connectivity Maintenance in Unstructured Overlays”, the author discusses the use of self-organizing protocols to improve the reliability of dynamic Peer-to-Peer (P2P) overlay networks. The work focuses on a decentralized self-healing algorithm whose aim is to provide resilience of unstructured overlay networks.

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